

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)



IN PARTNERSHIP WITH



CARITAS NYERI

**TENDER DOCUMENT FOR SMALL HOLDER IRRIGATION PROJECT IN THOME,
LAIKIPIA COUNTY.**

TENDER NO. NEMA/T/13/2019-2020)

September, 2019.

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INTRODUCTION

- 1.1 This standard tender document for procurement of works has been prepared for use by the **National Environment Management Authority (NEMA)** in tendering for the **Small Holder Irrigation Project in Thome, Laikipia County**. The project is being financed by the **Climate Change Adaptation Fund** through the **National Environment Management Authority (NEMA)** here-in after referred to as the **“Employer”** with **CARITAS Nyeri** as the **Executing Entity**.

SECTION I

INVITATION FOR TENDERS

DATE: 24th September 2019

Tender Reference No. NEMA/T/13/2019-2020

**Tender Name: SMALLHOLDER IRRIGATION PROJECT IN IN THOME,
LAIKIPIA COUNTY.**

- 1.1 The *National Environment Management Authority (NEMA)* in partnership with *CARITAS Nyeri*, invites sealed tenders for the construction of *A Small Holder Irrigation Project in Thome, Laikipia County*.
- 1.2 Interested eligible candidates may obtain (**for free**) further information and inspect tender documents on the following websites:
www.nema.go.ke
www.tenders.go.ke
www.caritas-nyeri.org
- 1.3 A complete set of tender documents may also be obtained by interested candidates upon payment of a non-refundable fee of **KShs.1,000** in **Bankers Cheque** or **CASH Deposits** payable to **NEMA Revenue Account, KCB – KICC Branch, Account Number 1102298158**. The deposit slip should be submitted at the **NEMA Headquarter's Cash Office**.
- 1.4 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for 120 days from the closing date of tender.
- 1.5 Completed tender documents are to be enclosed in plain sealed envelopes marked with Tender name and reference number and deposited in the Tender Box at **NEMA Headquarters** addressed to:

**THE DIRECTOR GENERAL,
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY,
ELAND HOUSE, POPO ROAD, OFF MOMBASA ROAD,
P.O. BOX 67839 – 00200 NAIROBI.**

so as to be received on or before **Wednesday, 9th October 2019 by 11:00 am**.

- 1.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at **NEMA Headquarters along Popo Road, South C**.

For (*Accounting Officer/Procuring Entity*)

SECTION II - INSTRUCTIONS TO TENDERERS

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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 the **National Environment Management Authority (NEMA)**.

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 appendix.

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 update the following information already submitted during prequalification:-

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

- 3.2 The price to be charged for the tender document shall not exceed Kshs.1,000/=
- 3.3 The procuring entity shall allow the tenderer to view the tender document free of charge before purchase.

4. Site Visit

- 4.1. The tenderer is advised to visit and examine the Site and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the Site shall be the tenderer's own responsibility.
- 4.2. The tenderer and any of his personnel or agents will be granted permission by the Employer to enter upon premises and lands for the purpose of such inspection, but only upon the express condition that the tenderer, his personnel or agents, will release and indemnify the Employer from and against all liability in respect of, and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission, would not have arisen.
- 4.3. The Employer shall organize a site visit at a date to be notified. A representative of the Employer will be available to meet the intending tenderers at the Site. Tenderers must provide their own transport. The representative will not be available at any other time for site inspection visits.

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

TENDER DOCUMENTS

5 Tender Documents

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

- a. Form of Invitation for Tenders
- b. Instructions to Tenderers
- c. Form of Tender
- d. Appendix to Form of Tender
- e. Form of Tender Surety
- f. Statement of Foreign Currency Requirements
- g. 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

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

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

6 Inquiries by tenderers

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

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

7 Amendment of Tender Documents

- 7.1 At any time prior to the deadline for submission of tenders the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective tenderer, modify the tender documents by issuing Addenda.
- 7.2 Any Addendum will be notified in writing or by cable, telex or facsimile to all prospective tenderers who have purchased the tender documents and will be binding upon them.
- 7.3 In order to allow prospective tenderers reasonable time in which to take the Addendum into account in preparing their tenders, the Employer may, at his discretion, extend the deadline for the submission of tenders.

PREPARATION OF TENDERS

8 Language of Tender

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

9 Documents Comprising the Tender

- 9.1 The tender to be prepared by the tenderer shall comprise:
- i. the Form of Tender and Appendix thereto,
 - ii. a Tender Security
 - iii. the Priced 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 **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 15% 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 sixty (60) 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 not exceed 2 percent of the tender price.
- 13.3 The Tender Security shall be valid at least thirty (30) days beyond the tender validity period.

- 13.4 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.
- 13.5 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible but not later than 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.
- 13.6 The Tender Surety may be forfeited:
- a) if a tenderer withdraws his tender during the period of tender validity: or
 - b) in the case of a successful tenderer, if he fails, within the specified time limit
 - i. to sign the Agreement, or
 - ii. to furnish the necessary Performance Security
 - c) if a tenderer does not accept the correction of his tender price pursuant to clause 23.

14 No Alternative Offers

- 14.1 The tenderer shall submit an offer which complies fully with the requirements of the tender documents unless otherwise provided for in the appendix. Only one tender may be submitted by each tenderer either by himself or as partner in a joint venture. 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 cable, 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) Non attendance 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 prescribed deadline for submission of tenders.

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

- 19.3 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 Correction of Errors

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

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

- (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bills of Quantities, the amount as stated in the Form of Tender shall prevail.
- (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected builder's work (i.e. corrected tender sum less Prime Cost and Provisional Sums).
- (e) The Error Correction Factor shall be applied to all builder's work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuations of variations.
- (f) The amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 13.

25 Conversion to Single Currency

- 25.1 For compensation of tenders, the tender price shall first be broken down into the respective amounts payable in various currencies by using the selling rate or rates of the Central Bank of Kenya ruling on the date twenty one (21) days before the final date for the submission of tenders.
- 25.2 The Employer will convert the amounts in various currencies in which the tender is payable (excluding provisional sums but including Dayworks where priced competitively) to Kenya Shillings at the selling rates stated in clause 25.1.

26 Evaluation and Comparison of Tenders

- 26.1 The Employer will evaluate only tenders determined to be substantially responsive to the requirements of the tender documents in accordance with clause 23.
- 26.2 In evaluating tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:
 - (a) Making any correction for errors pursuant to clause 24.
 - (b) Excluding Provisional Sums and provision, if any, for Contingencies in the Bills of Quantities, but including Day works where priced competitively.
- 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 analyses for any or all items of the Bills of Quantities, to demonstrate the relationship between those prices, proposed construction methods and schedules. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of subsequent default of the successful tenderer under the Contract.
- 26.6 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Contract Price excluding provisional sums to a non-indigenous sub-contractor.
- 26.7 Preference where allowed in the evaluation of tenders shall not exceed 15%
- 26.8 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.
- 26.9 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.
- 26.10 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.
- 26.11 Poor past performance shall not be used as an evaluation criteria 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 hereabove.

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 or any obligation to inform the affected tenderers of the grounds for the Employer's action.

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

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.

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

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

29 Performance Guarantee

29.1 Within twenty eight [28] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in the amount stated in the Appendix to Instructions to Tenderers and in the format stipulated in the Conditions of Contract.

29.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Bank Guarantee issued at the tenderer's option by a reputable Bank approved by the Employer and located in the Republic of Kenya and shall be divided into two elements namely, a performance security payable in foreign currencies (based upon the exchange rates determined in accordance with clause 60(5) of the Conditions of Contract) and a performance security payable in Kenya Shillings. The value of the two securities shall be in the same proportions of foreign and local currencies as requested in the form of foreign currency requirements.

29.3 Failure of the successful tenderer to lodge the required Performance Security shall constitute a breach of Contract and sufficient grounds for the annulment of the award and forfeiture of the Tender Security and any other

remedy under the Contract. The Employer may award the Contract to the next ranked tenderer.

30 Advance Payment

An advance payment, if approved by the Employer, shall be made under the Contract, if requested by the Contractor, in accordance with clause 60(1) of the Conditions of Contract. The Advance Payment Guarantee shall be denominated in the proportion and currencies named in the form of foreign currency requirements. For each currency, a separate guarantee shall be issued. The guarantee shall be issued by a Bank located in the Republic of Kenya, or a foreign Bank through a correspondent Bank located in the Republic of Kenya, in either case subject to the approval of the Employer.

31 Corrupt or fraudulent practices

31.1 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

- 3 A complete set of tender documents may be obtained by interested bidders by downloading from NEMA's website www.nema.go.ke or www.caritas-nyeri.org or www.tenders.go.ke (**FREE OF CHARGE**). Bidders who will download the tender documents must forward their company details to; procurement@nema.go.ke in order to facilitate subsequent clarifications and/or addendum. The particulars should include Name of the Firm, Address, Telephone Number, Email and Tender Name.

The tender documents may also be obtained from **NEMA Headquarters Procurement Section** upon payment of a **Non-Refundable Fee** of **KShs 1,000/=** in **Bankers Cheque** or **CASH Deposits** payable to **NEMA Revenue Account, KCB – KICC Branch, Account Number 1102298158**. The deposit slip should be submitted at the NEMA Headquarter's Cash Office.

- 4 The tenderer is advised to visit and examine the Site (**See Specifications Section V**) (Thome Village in Laikipia County and its surroundings on **Tuesday, October 1, 2019 from 11am to 4pm** and obtain for him/herself on his/her own responsibility, all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the Site shall be the tenderer's own responsibility. Further information about the site can be obtained from CARITAS Nyeri via: **Mr. James Kagiri (0720-422-250)**.

- 6 A tenderer making an inquiry relating to the tender document may notify the Employer in writing via email i.e. procurement@nema.go.ke.

13 **Tender Security**

Amount of Tender Security is **2% of the tender price**.

- 16 (i) The name and address of the Employer for the purposes of submission of tenders is **National Environment Management Authority (NEMA)**.
- (ii) The name of the proposed Works and where available the Contract Number is **Construction of Small Holder Irrigation Scheme in**

**Thome, Laikipia County, Tender Number:
NEMA/T/13/2019/2020.**

- (iii) The tender opening date and time shall be **Wednesday, 9th October 2019 at 11:00 am.**

28 Performance Guarantee

The amount of Performance Security is **5% of the Contract Price.**

29 Evaluation and Comparison of Tenders

The following evaluation criteria shall be applied notwithstanding any other requirement in the tender document:

Stage I: Pre-liminary Evaluation

a) Mandatory Requirements

The following requirements **MUST** be met by the tenderer

| No | Requirement | Yes | No |
|----|--|-----|----|
| 1 | Copy of Certificate of Incorporation | | |
| 2 | Copy of Form CR12 | | |
| 3 | Copy of VALID KRA Tax compliance Certificate | | |
| 4 | Copy of KRA PIN / VAT Certificate | | |
| 5 | Copy of Valid NCA 6 Certificate or Higher | | |
| 6 | Licensed qualified water resource contractor for year 2017(Class E or above) | | |

At this stage the tenderer's submission will either be responsive or non-responsive. The non-responsive submissions will be eliminated from the entire evaluation process and will not be considered further .

Stage II: Technical Evaluation (PASS MARK 70%)

Summary sheet

| Scoring criteria | | | Bidder's Score |
|-------------------------|--------------------------------------|-----------------------------|-----------------------|
| | Description | Maxim Possible Score | |
| 1 | Experience / Works of similar nature | 33 | |
| 2 | Equipment for the works | 26 | |
| 3 | Staff Competence (Technical) | 21 | |
| 4 | Evidence of financial capability for | 20 | |
| TOTAL | | 100 | |

NB:

This section will be scored out of 100 points and will determine the technical score. The Pass mark is 70/100. Bidders who score below this will not progress to Financial Evaluation.

1.0 EXPERIENCE /WORKS OF SIMILAR NATURE (Attach Evidence e.g. Completion Certificates, Contracts) (33)

Schedule 1.1 (equal or higher values) max score (12)

| Criteria | Maximum Points Possible | Bidder's score | Remarks |
|---|--------------------------------|-----------------------|----------------|
| Three projects of equal or higher value in the last five years. | 12 - (@ 4) | | |
| Any three projects of value between 50-99% of value of works in the last five years | 6 - (@ 2) | | |
| Any three projects less than 50% value of the tendered works in the last five years | 3 - (@1) | | |
| No submission of project record | 0 | | |
| MAX SUB-TOTAL SCORE | 12 | | |

Note :

1. Score awarded will be in line with the Bidder submitting documents which conform to the requirements above.
2. Only one score will be provided as per the submissions.
3. The highest score attained will be allotted as per the submissions in accordance to the above.
4. The score will be prorated based on the three largest projects of the contractor within the last five years.

Schedule 1.2 (Similar nature) max score (15)

| Criteria | Maximum Points Possible | Bidder's Score | Remarks |
|--|--------------------------------|-----------------------|----------------|
| Three projects of similar nature and complexity combining the majority of the major elements under this tender – (bidder to detail and clearly display similarity of proposed works to their experience) in the last 5 years. | 15 – (@ 5) | | |
| Three projects of similar nature including a number of elements under this tender (bidder to detail and clearly display similarity of proposed works to their experience) in the last 5 years, e.g small piped distribution systems, | 9 – (@ 3) | | |
| Any Three projects of similar nature but not same complexity | 6 – (@ 2) | | |
| Any three other unrelated construction works e.g. marine works , steel works, road works etc | 3 – (@1) | | |
| No submission in details works undertaken | 0 | | |
| MAX SUB-TOTAL SCORE | 15 | | |

Note :

1. Score awarded will be in line with the Bidder submitting requirements which conform to the requirements above.
2. Only one score will be provided as per the submissions.
3. The highest score attained will be allotted as per the submissions in accordance to the above.
4. The score will be prorated based on the three most similar projects of the contractor.

Schedule 1.3 (reference and clients) max score (6)

| Criteria | Maximum Points Possible | Bidder's Score | Remarks |
|---|--------------------------------|-----------------------|----------------|
| Three or more similar works satisfactorily completed for GoK ,Ministry of Water and Irrigation or any other Ministry in the last 3 years (evidence for the same should be clearly submitted – completion cert, reference letters, proof of payment in full, etc). (National Irrigation Board, TARDA, etc.) | 6 – (@ 2) | | |
| Three or more similar works satisfactorily completed for other Government Agencies or County Governments in the last 3 years (evidence for the same should be clearly submitted –completion cert, reference letters, proof of payment, etc) (Both National and County Governments) | 3 – (@ 1) | | |
| Works for other Clients | 2 | | |
| No details and references submitted | 0 | | |
| MAX SUB-TOTAL SCORE | 6 | | |

Note :

1. Score awarded will be in line with the Bidder submitting requirements which conform to the requirements above.
2. Only one score will be provided as per the submissions.
3. The highest score attained will be allotted as per the submissions in accordance to the above.

2.0 CONTRACTORS EQUIPMENT (26)

Schedule 2.1- Equipment, availability and ownership score (13)

| Plant type required | | Score per item | | Bidder's Score | Remarks |
|--|--|----------------|--------|----------------|---------|
| | | Owned | Leased | | |
| 1 | 2 No Dozers from D6, D8 | 2 | 1 | | |
| 2 | 1 No Excavator with rock breaker head attachment | 1 | 0.5 | | |
| 3 | 1 No Backhoe Excavator with 0.5m ³ bucket | 1 | 0.5 | | |
| 4 | 2 No Wheel Loader 5 Ton bucket | 1 | 0.5 | | |
| 5 | 2 No 21 Ton payload tippers | 2 | 1 | | |
| 6 | 1 No 14 ton truck | 1 | 0.5 | | |
| 7 | 1 No Water bowser 5000lts | 1 | 0.5 | | |
| 8 | 1 No Pickup 1 Ton | 1 | 0.5 | | |
| 9 | 1 No Concrete mixer 3m ³ /min | 0.5 | 0.25 | | |
| 10 | 1 No Concrete vibrator with Poker | 0.5 | 0.25 | | |
| 11 | 1 No Compressor machine with jacks | 0.5 | 0.25 | | |
| 12 | 2 No Water pumps | 0.5 | 0.25 | | |
| 13 | 1 Set of assorted Survey Equipment(Total Station, Automatic level, accessories) | 1 | 0.5 | | |
| MAX SUB-TOTAL SCORE NB: Log book and ownership documents must bear the name of the Company. Provide Certified copies for owned equipment. | | 13 | | | |

Schedule 2.2 age of equipment score (13)

| Plant type required | | Score per item | | | | Bidder's Score | Remarks |
|--|--|----------------|----------------|---------------|---------------|----------------|---------|
| | | 1-8 years | 8-10 years old | Over 10 years | Over 15 years | | |
| 1 | 1 No 7 ton truck | 1 | 0.5 | 0.25 | 0 | | |
| 2 | 2 No 20 Ton payload tippers | 2 | 1 | 0.5 | 0 | | |
| 3 | 1 No Water bowser 5000lts | 1 | 0.5 | 0.25 | 0 | | |
| 4 | 1 No Pickup 1 Ton | 1 | 0.5 | 0.25 | 0 | | |
| 5 | 1 No Dozer D6, D8 | 2 | 1 | 0.5 | 0 | | |
| 6 | 1 No Backhoe Excavator with 0.5m3 bucket | 1 | 0.5 | 0.25 | 0 | | |
| 7 | 2 No Wheel Loader 5 Ton bucket | 1 | 0.5 | 0.25 | 0 | | |
| 8 | 1 No Excavator with rock breaker head attachment | 1 | 0.5 | 0.25 | 0 | | |
| 9 | 1 No Concrete mixer 3m3 /min | 0.5 | 0.25 | 0.125 | 0 | | |
| 10 | 1 No Concrete vibrator with Poker | 0.5 | 0.25 | 0.125 | 0 | | |
| 11 | 1 No Compressor machine with jacks | 0.5 | 0.25 | 0.125 | 0 | | |
| 12 | 1 No Water pump complete with engine 10cm/hr | 0.5 | 0.25 | 0.125 | 0 | | |
| 13 | 1 Set of assorted Survey Equipment(Total Station, Automatic level, accessories) | 1 | 0.5 | 0.25 | 0 | | |
| MAX SUB-TOTAL SCORE NB: Log book and ownership documents must bear the name of the Company. Provide Certified copies for owned equipment. | | 13 | | | | | |

Note:

1. If number available is less than required prorate for the line accordingly.
2. Schedule of all equipment proposed to be used for these works should be Submitted.
3. Proof of certificates of ownership in form of Log Book Copies, Log Books held by Banking and Credit institutions stating the equipment is hire purchased by the contractor or agreements made for Lease with copies of the Log Books of the intended equipment for hire must be provided -failure to do so will attract a zero score.
4. All equipment listed must be, as a minimum, in good condition, and this will be confirmed by due diligence checks if deemed necessary.

3.0 STAFF max score (21)**Schedule 3.1- Availability and education score (11)**

| Key staff required | No. required | Maximum score for Educational qualification – Score per person | | Bidder's score | Remarks |
|--|--------------|--|---------------------|----------------|---------|
| | | Degree (civil eng) | Diploma (civil eng) | | |
| <i>Management (Key personnel should be registered with relevant bodies e.g. EBK) – Doc. Should also be certified</i> | | | | | |
| <i>Project Engineer/Manager (Civil, water Eng. or equivalent) – Irrigation, etc.</i> | 1 | 2 | 1 | | |
| <i>Ass. Engineer (Civil-any building trade)</i> | 1 | 1 | 0.5 | | |
| MAX SUB-TOTAL SCORE | | 3 | | | |

| Supervisory | No. required | Maximum score for Educational qualification – Score per person | | | Bidder's Score | Remarks |
|---|--------------|--|---------|-------------|----------------|---------|
| | | Degree | Diploma | Certificate | | |
| Site agent (Civil or building any trade) | 1 | 2 | 1 | 0 | | |
| Foreman 1 (Civil or building any trade) (NCA Accredited) | 1 | 1 | 1 | 1 | | |
| Ass. Foreman (related to civil & Building etc.) | 1 | 1 | 1 | 1 | | |
| Surveyor (to check) | 1 | 1 | 1 | 0 | | |
| MAX SUB-TOTAL SCORE | | 5 | | | | |

| Artisans | No. required | Maximum score for Educational qualification – Score per person | | Bidder's Score | Remarks |
|---|--------------|--|-----------------------------------|----------------|---------|
| | | Diploma | Certificate/ O level/ other | | |
| Masons (NCA Registered) | 2 | 1 | 0.25 | | |
| Plumbers / Pipe fitters | 2 | 1 | 0.25 | | |
| Plant Operators | 5 | 0.5 | 0.25 | | |
| Other support staff (Admin.- Storekeeper, Secretary, Accountant, etc.) | 5 | 0.5 | 0.25 | | |
| MAX SUB-TOTAL SCORE | | 3 | | | |
| MAX TOTAL OF ALL STAFF | 15 | | | | |

Schedule 3.2 Experience score (10)

| Key staff required | No. required | Maximum score for experience in construction industry – Score per person | | | | | | Bidder's score | Remarks |
|---|---------------------|---|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|-----------------------|----------------|
| Management | | Over 10 years | | 3-10 years | | Up to 3 years | | | |
| | | Relevant experience | General experience | Relevant experience | General experience | Relevant experience | General Experience | | |
| <i>Project Engineer/manager</i> | 1 | 3 | 2 | 2 | 1 | 1 | 0 | | |
| <i>Ass. Engineer (Civil-any building trade)</i> | 1 | 1 | | 0.5 | | 0.5 | | | |
| Supervisory | | | | | | | | | |
| <i>Site agent (Civil or building any trade)</i> | 1 | 3 | 2 | 2 | 1 | 1 | 0 | | |
| <i>Foreman 1 (Civil or building any trade)</i> | 1 | 1 | | 0.5 | | 0.25 | | | |
| <i>Ass. Foreman</i> | 1 | 0.5 | | 0.25 | | 0.125 | | | |
| <i>Surveyor</i> | 1 | 0.5 | | 0.25 | | 0.125 | | | |
| Artisans | | | | | | | | | |
| <i>Masons</i> | 2 | 0.25 | | 0.25 | | 0.125 | | | |
| <i>Plumbers / Pipe fitters</i> | 2 | 0.25 | | 0.25 | | 0.125 | | | |
| <i>Plant Operators</i> | 5 | 0.25 | | 0.25 | | 0.125 | | | |
| <i>Other support staff</i> | 5 | 0.25 | | 0.25 | | 0.125 | | | |
| MAX SUB-TOTAL SCORE | | 10 | | | | | | | |

Note:

1. If number available is less than required prorate for the line, proof of certificates and registration with professional body must be attached.
2. If no experience the line is scored zero. Proof of CV with references must be provided.
3. Total for each bidder for 3.1 and 3.2 transferred to summary sheet.
4. If number available is less than required then prorate for the line, proof of certificates and registration with professional body must be attached.

4.0 EVIDENCE OF FINANCIAL CAPACITY (20)

Schedule 4.1 Available records score (5)

| Financial Record Provided | Maximum score | Bidder's Score | Remarks |
|--|----------------------|-----------------------|----------------|
| Provide audited accounts for year - 2014 | 0.5 | | |
| Provide audited accounts for year – 2015 | 0.5 | | |
| Provide audited accounts for year – 2016 | 0.5 | | |
| Provide audited accounts for year – 2017 | 0.5 | | |
| Provide audited accounts for year – 2018 | 0.5 | | |
| Provide bank statements (6 months to date) | 0.5 | | |
| Provide letter of credit (bank/supplier) | 1 | | |
| Other financial record showing access to finances to carry out proposed works (bank statements etc.) | 1 | | |
| <i>MAX SUB-TOTAL SCORE (Certified, Credible Audit</i> | 5 | | |

Schedule 4.2 Amount in 2017 record compared to value of work score (15)

| Financial capability (from financial statements) | Maximum score for financial capacity | | | | | Bidder's Score | Remarks |
|--|---|------------------|------------------|------------------|---------------------|-------------------|---------|
| | Equal or over | 75% to 99% | 50% to 74% | 25% to 50% | Less than 25% | | |
| Value of gross turn over three times the value of tendered work in last five years | 5 | 3.5 | 2.5 | 1 | 0.5 | | |
| Value of assets to tendered works | 5 | 3.5 | 2.5 | 1 | 0.5 | | |
| Value of credit line available to tendered works value | 5 | 3.5 | 2.5 | 1 | 0.5 | | |
| MAX SUB-TOTAL SCORE | 15 | | | | | | |

Note: Only Tenderers scoring 70% and above of the total technical score (stage two) shall proceed to stage three for Financial Evaluation.

STAGE III: FINANCIAL EVALUATION

The tenderer with the lowest evaluated financial price will be recommended for award of the contract.

SECTION III: CONDITIONS OF CONTRACT, PART I – GENERAL CONDITIONS

Foreword

The terms of the Fourth Edition of the Conditions of Contract for Works of Civil Engineering Construction have been prepared by the Fédération Internationale des Ingénieurs Conseils (FIDIC) and are recommended for general use for the purpose of construction of such works where tenders are invited on an international basis. The Conditions, subject to minor modifications, are also suitable for use on domestic contracts.

The version in English of the Conditions is considered by FIDIC as the official and authentic text for the purpose of translation.

In the preparation of the Conditions it was recognised that while there are numerous Clauses which will be generally applicable there are some Clauses which must necessarily vary to take account of the circumstances and locality of the Works. The Clauses of general application have been grouped together in this document and are referred to as Part 1 - General Conditions. They have been printed in a form which will facilitate their inclusion as printed in the contract documents normally prepared.

The General Conditions are linked with the Conditions of Particular Application, referred to as Part 11, by the corresponding numbering of the Clauses, so that Parts 1 and 11 together comprise the Conditions governing the rights and obligations of the parties.

Part II must be specially drafted to suit each individual Contract.

When dredging and certain types of reclamation work are involved special consideration must be given to Part II.

To assist in the preparation of Part II explanatory material and example clauses are published with the Conditions in a separately bound document entitled "Conditions of Contract for Works of Civil Engineering Construction, Part II - Conditions of Particular Application, with Guidelines for preparation of Part II Clauses, Fourth Edition".

FIDIC has published a "Guide to the Use of FIDIC Conditions of Contract for Works of Civil Engineering Construction" which includes comments on the provisions of the Fourth Edition of the Conditions. Users of the Fourth Edition may find it helpful to refer to this Guide.

It may also be helpful for users to refer to other FIDIC publications, such as:

Tendering Procedure (First Edition 1982)
Construction, Insurance and Law (1986)

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PART 1 - GENERAL CONDITIONS

Definitions and Interpretation

Definitions 1.1 In the Contract (as hereinafter defined) the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires:

- (a) (i) "Employer" means the person named as such in Part 11 of these Conditions and the legal successors in title to such person, but not (except with the consent of the Contractor) any assignee of such person.
- (ii) "Contractor" means the person whose tender has been accepted by the Employer and the legal successors in title to such person, but not (except with the consent of the Employer) any assignee of such person.
- (iii) "Subcontractor" means any person named in the Contract as a Subcontractor for a part of the Works or any person to whom a part of the Works has been subcontracted with the consent of the Engineer and the legal successors in title to such person, but not any assignee of any such person.
- (iv) "Engineer" means the person appointed by the Employer to act as Engineer for the purposes of the Contract and named as such in Part II of these Conditions.
- (v) "Engineer's Representative" means a person appointed from time to time by the Engineer under Sub-Clause 2.2
- (b) (i) "Contract" means these Conditions (Parts 1 and 11), the Specification, the Drawings, the Bill of Quantities, the Tender, the Letter of Acceptance, the Contract Agreement (if completed) and such further documents as may be expressly incorporated in the Letter of Acceptance or Contract Agreement (if completed).
- (ii) "Specification" means the specification of the Works included in the Contract and any modification thereof or addition thereto made under Clause 51 or submitted by the Contractor and approved by the Engineer.
- (iii) "Drawings" means all drawings, calculations and technical information of a like nature provided by the Engineer to the Contractor under the Contract and all drawings, calculations, samples, patterns, models, operation and maintenance manuals and other technical information of a like nature submitted by the Contractor and approved by the Engineer.
- (iv) "Bill of Quantities" means the priced and completed bill of quantities forming part of the Tender.
- (v) "Tender" means the Contractor's priced offer to the Employer for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance.
- (vi) "Letter of Acceptance" means the formal acceptance by the Employer of the Tender.
- (vii) "Contract Agreement" C means the contract agreement (if any) referred to in Sub-Clause 9. 1.
- (viii) "Appendix to Tender" means the appendix comprised in the form of Tender annexed to these Conditions.

(c) (i) “Commencement Date” means the date upon which the Contractor receives the notice to commence issued by the Engineer pursuant to Clause 41.

(ii) “Time for Completion” means the time for completing the execution of and passing the Tests on Completion of the Works or any Section or part thereof as stated in the Contract (or as extended under Clause 44) calculated from the Commencement Date.

(d) (i) “Tests on Completion” means the tests specified in the Contract or otherwise agreed by the Engineer and the Contractor which are to be made by the Contractor before the Works or any Section or part thereof are taken over by the Employer.

(ii) “Taking-Over Certificate” means a certificate issued pursuant to Clause 48.

(e) (i) “Contract Price” means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract.

(ii) “Retention Money” means the aggregate of all monies retained by the Employer pursuant to Sub-Clause 60.2(a).

(iii) “Interim Payment Certificate” means any certificate of payment issued by the Engineer other than the Final Payment Certificate.

(iv) “Final Payment Certificate” means the certificate of payment issued by the Engineer pursuant to Sub-Clause 60.8.

(f) (i) “Works” means the Permanent Works and the Temporary Works or either of them as appropriate.

(ii) “Permanent Works” means the permanent works to be executed (including Plant) in accordance with the Contract.

(iii) “Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.

(iv) “Plant” means machinery, apparatus and the like intended to form or forming part of the Permanent Works.

(v) “Contractor’s Equipment” means all appliances and things of whatsoever nature (other than Temporary Works) required for the execution and completion of the Works and the remedying of any defects therein, but does not include Plant, materials or other things intended to form or forming part of the Permanent Works.

(vi) “Section” means a part of the Works specifically identified in the Contract as a Section.

(vii) “Site” means the places provided by the Employer where the Works are to be executed and any other places as may be specifically designated in the Contract as forming part of the Site.

(g) (i) “cost” means all expenditure properly incurred or to be incurred, whether on or off the Site, including overhead and

other charges properly allocable thereto but does not include any allowance for profit.

(ii) "day" means calendar day.

(iii) "foreign currency" means a currency of a country other than that in which the Works are to be located.

(iv) "writing" means any hand-written, type-written, or printed communication, including telex, cable and facsimile transmission.

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| Headings and Marginal Notes | 1.2 | The headings and marginal notes in these Conditions shall not be deemed part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract. |
| Interpretation | 1.3 | Words importing persons or parties shall include firms and corporations and any organisation having legal capacity. |
| Singular and Plural | 1.4 | Words importing the singular only also include the plural and vice versa where the context requires. |
| Notices, Consents, Approvals, Certificates and Determinations | 1.5 | Wherever in the Contract provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified such notice, consent, approval, certificate or determination shall be in writing and the words "notify", "certify" or "determine" shall be construed accordingly. Any such consent, approval, certificate or determination shall not unreasonably be withheld or delayed. |
| Engineer's Duties and Authority | 2.1 | Engineer and Engineer's Representative (a) The Engineer shall carry out the duties specified in the Contract. (b) The Engineer may exercise the authority specified in or necessarily to be implied from the Contract, provided, however, that if the Engineer is required, under, the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer. (c) Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract. |
| Engineer's Representative | 2.2 | The Engineer's Representative shall be appointed by and be responsible to the Engineer and shall carry out such duties and exercise such authority as may be |

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| Engineer's Authority to Delegate | 2.3 | <p>delegated to him by the Engineer under Sub-Clause 2.3.</p> <p>The Engineer may from time to time delegate to the Engineer's Representative any of the duties and authorities vested in the Engineer and he may at any time revoke such delegation. Any such delegation or revocation shall be in writing and shall not take effect until a copy thereof has been delivered to the Employer and the Contractor.</p> <p>Any communication given by the Engineer's Representative to the Contractor in accordance with such delegation shall have the same effect as though it had been given by the Engineer. Provided that:</p> <p>(a) any failure of the Engineer's Representative to disapprove any work, materials or Plant shall not prejudice the authority of the Engineer to disapprove such work, materials or Plant and to give instructions for the rectification thereof, and</p> <p>(b) if the Contractor questions any communication of the Engineer's Representative he may refer the matter to the Engineer who shall confirm, reverse or vary the contents of such communication.</p> |
| Appointment of Assistants | 2.4 | <p>The Engineer or the Engineer's Representative may appoint any number of persons to assist the Engineer's Representative in the carrying out of his duties under Sub-Clause 2.2. He shall notify to the Contractor the names, duties and scope of authority of such persons. Such assistants shall have no authority to issue any instructions to the Contractor save in so far as such instructions may be necessary to enable them to carry out their duties and to secure their acceptance of materials, Plant or workmanship as being in accordance with the Contract, and any instructions given by any of them for those purposes shall be deemed to have been given by the Engineer's Representative.</p> |
| Instructions in Writing | 2.5 | <p>Instructions given by the Engineer shall be in writing, provided that if for any reason the Engineer considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Engineer, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this Sub-Clause. Provided further that if the Contractor, within 7 days, confirms in writing to the Engineer any oral instruction of the Engineer and such confirmation is not contradicted in writing within 7 days by the Engineer, it shall be deemed to be an instruction of the Engineer.</p> |

The provisions of this Sub-Clause shall equally apply to instructions given by the Engineer's Representative and any assistants of the Engineer or the Engineer's Representative appointed pursuant to Sub-Clause 2.4.

Engineer to Act
2.6
Impartially

Wherever, under the Contract, the Engineer is required to exercise his discretion by:

- (a) giving his decision, opinion or consent,
- (b) expressing his satisfaction or approval,
- (c) determining value, or
- (d) otherwise taking action which may affect the rights and obligations of the Employer or the Contractor

he shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances. Any such decision, opinion, consent, expression of satisfaction, or approval, determination of value or action may be opened up, reviewed or revised as provided in Clause 67.

Assignment and Subcontracting

Assignment of Contract **3.1**

The Contractor shall not, without the prior consent of the Employer (which consent, notwithstanding the provisions of Sub-Clause 1.5, shall be at the sole discretion of the Employer), assign the Contract or any part thereof, or any benefit or interest therein or thereunder, otherwise than by:

- (a) a charge in favour of the Contractor's bankers of any monies due or to become due under the Contract, or
- (b) assignment to the Contractor's insurers (in cases where the insurers have discharged the Contractor's loss or liability) of the Contractor's right to obtain relief against any other party liable.

Subcontracting 4.1

The Contractor shall not subcontract the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not subcontract any part of the Works without the prior consent of the Engineer. 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. Provided that the Contractor shall not be required to obtain such consent for:

- (a) the provision of labour,
- (b) the purchase of materials which are in accordance with the standards specified in the Contract, or

(c) the subcontracting of any part of the Works for which the Subcontractor is named in the Contract.

Assignment of 4.2
Subcontractors'
Obligations

In the event of a Subcontractor having undertaken towards the Contractor in respect of the work executed, or the goods, materials, Plant or services supplied by such Subcontractor, any continuing obligation extending for a period exceeding that of the Defects Liability Period under the Contract, the Contractor shall at any time, after the expiration of such Period, assign to the Employer, at the Employer's request and cost, the benefit of such obligation for the unexpired duration thereof.

Contract Documents

Language/
s

5.1 There is stated in Part II of these Conditions:
(a) the language or languages in which the Contract documents shall be drawn up, and
(b) the country or state the law of which shall apply to the Contract and according to which the Contract shall be construed.

and Law

If the said documents are written in more than one language, the language according to which the Contract shall be construed and interpreted is also stated in Part II of these Conditions, being therein designated the "Ruling Language".

Priority of
Contract
Documents

5.2 The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:
(1) The Contract Agreement (if completed);
(2) The Letter of Acceptance;
(3) The Tender;
(4) Part II of these Conditions;
(5) Part I of these Conditions; and
(6) Any other document forming part of the Contract.

Custody and
Supply of
Drawings and
Documents

6.1 The Drawings shall remain in the sole custody of the Engineer, but two copies thereof shall be provided to the Contractor free of charge. The Contractor shall make at his own cost any further copies required by him. Unless it is strictly necessary for the purposes of the Contract, the Drawings, Specification and other documents provided by the

Employer or the Engineer shall not, without the consent of the Engineer, be used or communicated to a third party by the Contractor. Upon issue of the Defects Liability Certificate, the Contractor shall return to the Engineer all Drawings, Specification and other documents provided under the Contract.

The Contractor shall supply to the Engineer four copies of all Drawings, Specification

and other documents submitted by the Contractor and approved by the Engineer in accordance with Clause 7, together with a reproducible copy of

any material which cannot be reproduced to an equal standard by photocopying.

In addition the Contractor shall supply such further copies of such Drawings,

Specification and other documents as the Engineer may request in writing for the

use of the Employer, who shall pay the cost thereof.

One Copy of Drawings to be Kept on Site **6.2** One copy of the Drawings, provided to or supplied by the Contractor as aforesaid, shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer and by any other person authorised by the Engineer in writing.

Disruption of Progress **6.3** The Contractor shall give notice to the Engineer, with a copy to the Employer, whenever planning or execution of the Works is likely to be delayed or disrupted unless any further drawing or instruction is issued by the Engineer within a reasonable time. The notice shall include details of the drawing or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

Delays and Cost of Delay of Drawings **6.4** If, by reason of any failure or inability of the Engineer to issue, within a time reasonable in all the circumstances, any drawing or instruction for which notice has been given by the Contractor in accordance with Sub-Clause 63, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:
 (a) any extension of time to which the Contractor is entitled under Clause 44, and
 (b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

Failure by Contractor to Submit Drawings **6.5** If the failure or inability of the Engineer to issue any drawings or instructions is caused in whole or in part by the failure of the Contractor to submit Drawings, Specification or other documents which he is required to submit under the

Contract, the Engineer shall take such failure. by the Contractor into account when making his determination pursuant to Sub-Clause 6.4.

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| Supplementary Drawings and Instructions | 7.1 | The Engineer shall have authority to issue to the Contractor, from time to time, such supplementary Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and the remedying of any defects therein. The Contractor shall carry out and be bound by the same. |
| Permanent Works Designed by Contractor | 7.2 | Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall submit to the Engineer, for approval: (a) such drawings, specifications, calculations and other information as shall be necessary to satisfy the Engineer as to the suitability and adequacy of that design, and (b) operation and maintenance manuals together with drawings of the Permanent Works as completed, in sufficient detail to enable the Employer to operate, maintain, dismantle, reassemble and adjust the Permanent Works incorporating that design. The Works shall not be considered to be completed for the purposes of taking over in accordance with Clause 48 until such operation and maintenance manuals, together with drawings on completion, have been submitted to and approved by the Engineer Approval by the Engineer, in accordance with Sub-Clause 7.2, shall not relieve the Contractor of any of his responsibilities under the Contract. |
| Responsibility Unaffected by Approval | 7.3 | |
| General Obligations | | |
| Contractor's General Responsibilities | 8.1 | The Contractor shall, with due care and diligence, design (to the extent provided for by the Contract), execute and complete the Works and remedy any defects therein in accordance with the provisions of the Contract. The Contractor shall provide all superintendence, labour, materials, Plant, Contractor's Equipment and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract. The Contractor shall give prompt notice to the Engineer, with a copy to the Employer, of any error, omission, fault or other defect in the design of or Specification for the Works which he discovers when reviewing the Contract or executing the Works. |
| Site | 8.2 | The Contractor shall take full responsibility for the adequacy, |

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| Operations and Methods of Construction | | <p>stability and safety of all Site operations and methods of construction. Provided that the Contractor shall not be responsible (except as stated hereunder or as may be otherwise agreed) for the design or specification of Permanent Works, or for the design or specification of any Temporary Works not prepared by the Contractor. Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall be fully responsible for that part of such Works, notwithstanding any approval by the Engineer. The Contractor shall, if called upon so to do, enter into and execute</p> |
| Contract Agreement | 9.1 | <p>the Contract Agreement, to be prepared and completed at the cost of the Employer, in the form annexed to these Conditions with such modification as may be necessary.</p> |
| Performance Security | 10.1 | <p>If the Contract requires the Contractor to obtain security for his proper performance of the Contract, he shall obtain and provide to the Employer such security within 28 days after the receipt of the Letter of Acceptance, in the sum stated in the Appendix to Tender. When providing such security to the Employer, the Contractor shall notify the Engineer of so doing. Such security shall be in the form annexed to these Conditions or in such other form as may be agreed between the Employer and the Contractor. The institution providing such security shall be subject to the approval of the Employer. The cost of complying with the requirements of this Clause shall be borne by the Contractor, unless the Contract otherwise provides.</p> |
| Period of Validity of Performance Security | 10.2 | <p>The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract. No claim shall be made against such security after the issue of the Defects Liability Certificate in accordance with Sub-Clause 62.1 and such security shall be returned to the Contractor within 14 days of the issue of the said Defects Liability Certificate.</p> |
| Claims under Performance Security | 10.3 | <p>Prior to making a claim under the performance security the Employer shall, in every case, notify the Contractor stating the nature of the default in respect of which the claim is to be made.</p> |
| Inspection of Site | 11.1 | <p>The Employer shall have made available to the Contractor, before the submission by the Contractor of the Tender, such data on hydrological and sub-surface</p> |

conditions as have been obtained by or on behalf of the Employer from investigations undertaken relevant to the Works but the Contractor shall be responsible for his own interpretation thereof.

The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself (so far as is practicable, having regard to considerations of cost and time) before submitting his Tender, as to:

(a) the form and nature thereof, including the sub-surface conditions,

(b) the hydrological and climatic conditions,

(c) the extent and nature of work and materials necessary for the execution and

completion of the Works and the remedying of any defects therein, and

(d) the means of access to the Site and the accommodation he may require,

and, in general, shall be deemed to have obtained all necessary information,

subject as above mentioned, as to risks, contingencies and all other circumstances

which may influence or affect his Tender.

The Contractor shall be deemed to have based his Tender on the data made

available by the Employer and on his own inspection and examination, all as

above mentioned.

**Sufficiency
of Tender**

12.1

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of

Quantities, all of which shall, except insofar as it is otherwise provided in the

Contract, cover all his obligations under the Contract (including those in respect

of the supply of goods, materials, Plant or services or of contingencies for which

there is a Provisional Sum) and all matters and things necessary for the proper

execution and completion of the Works and the remedying of any defects therein.

**Not
Foreseeable**

12.2

If, however, during the execution of the Works the Contractor encounters

Physical

physical obstructions or physical conditions, other than climatic conditions on

Obstructions

the Site, which obstructions or conditions were, in his opinion, not foreseeable by

or Conditions

an experienced contractor, the Contractor shall forthwith give notice thereof to

the Engineer, with a copy to the Employer. On receipt of such notice, the Engineer shall, if in his opinion such obstructions or conditions could not have been reasonably foreseen by an experienced contractor, after due consultation with the Employer and the Contractor, determine

(a) any extension of time to which the Contractor is entitled under Clause 44, and
(b) the amount of any costs which may have been incurred by the Contractor by reason of such obstructions or conditions having been encountered, which shall be added to the Contract Price,
and shall notify the Contractor accordingly, with a copy to the Employer. Such determination shall take account of any instruction which the Engineer may issue to the Contractor in connection therewith, and any proper and reasonable measures acceptable to the Engineer which the Contractor may take in the absence of specific instructions from the Engineer.

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| Work to be in Accordance with Contract | 13.1 | Unless it is legally or physically impossible, the Contractor shall execute and complete the Works and remedy any defects therein in strict accordance with the Contract to the satisfaction of the Engineer. The Contractor shall comply with and adhere strictly to the Engineer's instructions on any matter, whether mentioned in the Contract or not, touching or concerning the Works. |
| Programme to be Submitted | 14.1 | The Contractor shall take instructions only from the Engineer (or his delegate). The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, submit to the Engineer for his consent a programme, in such form and detail as the Engineer shall reasonably prescribe, for the execution of the Works. |
| Revised Programme | 14.2 | The Contractor shall, whenever required by the Engineer, also provide in writing for his information a general description of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. |
| Cash Flow Estimate to be Submitted | 14.3 | If at any time it should appear to the Engineer that the actual progress of the Works does not conform to the programme to which consent has been given under Sub-Clause 14.1, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to such programme necessary to ensure completion of the Works within the Time for Completion. |
| Contractor not Relieved of Duties or Responsibilities | 14.4 | The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, provide to the Engineer for his information a detailed cash flow estimate. |
| Contractor's Superintendence | 15.1 | in quarterly periods, of all payments to which the Contractor will be entitled under the Contract and the Contractor shall subsequently supply revised cash flow estimates at quarterly intervals, if required to do so by the Engineer. The submission to and consent by the Engineer of such programmes or the provision of such general descriptions or cash flow estimates shall not relieve the Contractor of any of his duties or responsibilities under the Contract. The Contractor shall provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. |
| Contractor's Employees | 16.1 | The Contractor, or a competent and authorised representative approved of by the Engineer, which approval may at any time be withdrawn, shall give his whole time to the superintendence of the Works. Such authorised representative shall receive, on behalf of the Contractor, instructions from the Engineer. |
| Engineer at Liberty to Object | 16.2 | If approval of the representative is withdrawn by the Engineer, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving notice of such withdrawal, remove the representative from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another representative approved by the Engineer. |

The Contractor shall provide on the Site in connection with the execution and completion of the Works and the remedying of any defects therein:

(a) only such technical assistants as are skilled and experienced in their respective callings and such foremen and leading hands as

are competent to give proper superintendence of the Works, and (b) such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely fulfilling of the Contractor's obligations under the Contract.

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person provided by the Contractor who, in the opinion of the Engineer, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose presence on Site is otherwise considered by the Engineer to be undesirable, and such person shall not be again allowed upon the Works without the consent of the Engineer. Any person so removed from the Works shall be replaced as soon as possible.

Setting-out 17. 1

The Contractor shall be responsible for:
(a) the accurate setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing,
(b) the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of the Works, and
(c) the provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.
If, at any time during the execution of the Works, any error appears in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer, shall, at his own cost, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer, in which case the Engineer shall determine an addition to the Contract Price in accordance with Clause 51 and shall notify the Contractor accordingly, with a copy to the Employer.
The checking of any setting-out or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the accuracy thereof and the Contractor shall carefully protect and preserve all benchmarks, sight-rails, pegs and other things used in setting-out the Works.

**Boreholes and 18.1
Exploratory
Excavation**

If, at any time during the execution of the Works, the Engineer requires the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be the subject of an instruction in accordance with Clause 51, unless an item or a Provisional Sum in respect of such work is included in the Bill of Quantities.

**Safety, Security 19.1
and Protection
of
the
Environment**

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 entitled to be upon the Site and keep the Site (so far as the same is under his control) and the Works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons,
(b) provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer or by any duly constituted authority, for the protection of the Works or for the safety and

convenience of the public or others, and
(c) take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

Employer's Responsibilities

19.2

If under Clause 31 the Employer shall carry out work on the Site with his own

workmen he shall, in respect of such work:

(a) have full regard to the safety of all persons entitled to be upon the Site, and

(b) keep the Site in an orderly state appropriate to the avoidance of danger to such persons.

If under Clause 31 the Employer shall employ other contractors on the Site he shall require them to have the same regard for safety and avoidance of danger.

Care of Works 20.1 The Contractor shall take full responsibility for the care of the Works and materials and Plant for incorporation therein from the Commencement Date until the date of issue of the Taking-Over Certificate for the whole of the Works, when the responsibility for the said care shall pass to the Employer. Provided that:

(a) if the Engineer issues a Taking-Over Certificate for any Section or part of the Permanent, Works the Contractor shall cease to be liable for the care of that Section or part from the date of issue of the Taking-Over Certificate, when the responsibility for the care of that Section or part shall pass to the Employer, and

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| | | (b) the Contractor shall take full responsibility for the care of any outstanding Works and materials and Plant for incorporation therein which he undertakes to finish during the Defects Liability Period until such outstanding Works have been completed pursuant to Clause 49. |
| Responsibility to Rectify Loss or Damage | 20.2 | If any loss or damage happens to the Works, or any part thereof, or materials or Plant for incorporation therein, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, other than the risks defined in Sub-Clause 20.4, the Contractor shall, at his own cost, rectify such loss or damage so that the Permanent Works conform in every respect with the provisions of the Contract to the satisfaction of the Engineer. The Contractor shall also be liable for any loss or damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50. |
| Loss or Damage Due to Employer's Risks | 20.3 | In the event of any such loss or damage happening from any of the risks defined in Sub-Clause 20.4, or in combination with other risks, the Contractor shall, if and to the extent required by the Engineer, rectify the loss or damage and the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer. In the case of a combination of risks causing loss or damage any such determination shall take into account the proportional responsibility of the Contractor and the Employer. |
| Employer's Risks | 20.4 | The Employer's risks are: (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, (b) rebellion, revolution, insurrection, or military or usurped power, or civil war, (c) ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof, (d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds, (e) riot, commotion or disorder, unless solely restricted to employees of the |

Contractor or of his Subcontractors and arising from the conduct of the Works,

(f) loss or damage due to the use or occupation by the Employer of any Section or

part of the Permanent Works, except as may be provided for in the Contract,

(g) loss or damage to the extent that it is due to the design of the Works, other

than any part of the design provided by the Contractor or for which the

Contractor is responsible, and

(h) any operation of the forces of nature against which an experienced contractor

could not reasonably have been expected to take precautions.

The Contractor shall, without limiting his or the Employer's obligations and

responsibilities under Clause 20, insure:

(a) the Works, together with materials and Plant for incorporation therein, to the

full replacement cost (the term "cost" in this context shall include profit),

(b) an additional sum of 15 per cent of such replacement cost, or as may be

Insurance of Works and Contractor's Equipment

21.1

specified in Part II of these Conditions, to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature, and (c) the Contractor's Equipment and other things brought onto the Site by the Contractor, for a, sum sufficient to provide for their replacement at the Site.

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| Scope of Cover | 21.2 | <p>The insurance in paragraphs (a) and (b) of Sub-Clause 21.1 shall be in the joint names of the Contractor and the Employer and shall cover:</p> <p>(a) the Employer and the Contractor against all loss or damage from whatsoever cause arising, other than as provided in Sub-Clause 21.4, from the start of work at the Site until the date of issue of the relevant Taking-Over Certificate in respect of the Works or any Section or part thereof as the case may be, and</p> <p>(b) the Contractor for his liability:</p> <p>(i) during the Defects Liability Period for loss or damage arising from a cause occurring prior to the commencement of the Defects Liability Period, and</p> <p>(ii) for loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50.</p> |
| Responsibility for Amounts not Recovered | 21.3 | <p>Any amounts not insured or not recovered from the insurers shall be borne by the Employer or the Contractor in accordance with their responsibilities under Clause 20.</p> |
| Exclusions | 21.4 | <p>There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by:</p> <p>(a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,</p> <p>(b) rebellion, revolution, insurrection, or military or usurped power, or civil war,</p> <p>(c) ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof, or</p> <p>(d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.</p> |
| Damage to Persons and Property | 22.1 | <p>The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of:</p> <p>(a) death of or injury to any person, or</p> <p>(b) loss of or damage to any property (other than the Works), which may arise out of or in consequence of the execution and completion of the Works and the remedying of any defects therein, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, subject to the exceptions defined in Sub-Clause 22.2.</p> |

Exceptions

22.2 The “exceptions” referred to in Sub-Clause 22.1 are:

- (a) the permanent use or occupation of land by the Works, or any part thereof,
- (b) the right of the Employer to execute the Works, or any part thereof, on, over, under, in or through any land,
- (c) damage to property which is the unavoidable result of the execution and completion of the Works, or the remedying of any defects therein, in accordance with the Contract, and
- (d) death of or injury to persons or loss of or damage to property resulting from any act or neglect of the Employer, his agents, servants or other contractors, not being employed by the Contractor, or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or, where the injury or damage was contributed to by the Contractor, his servants or agents, such part of the said injury or damage as may be just and equitable having regard to the extent of the responsibility of the Employer, his servants or agents or other contractors for the injury or damage.

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| Indemnity by Employer | 22.3 | The Employer shall indemnify the Contractor against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the exceptions defined in Sub-Clause 22.2. |
| Third Party Insurance (including Employer's Property) | 23.1 | The Contractor shall, without limiting his or the Employer's obligations and responsibilities under Clause 22, insure, in the joint names of the Contractor and the Employer, against liabilities for death of or injury to any person (other than as provided in Clause 24) or loss of or damage to any property (other than the Works) arising out of the performance of the Contract, other than the exceptions defined in paragraphs (a), (b) and (c) of Sub-Clause 22.2. |
| Minimum Amount of insurance Cross Liabilities | 23.2 | Such insurance shall be for at least the amount stated in the Appendix to Tender. |
| Accident Injury to Workmen | or 24.1 | The insurance policy shall include a cross liability clause such that the insurance shall apply to the Contractor and to the Employer as separate insured. |
| Insurance Against Accident to Workmen | 24.2 | The Employer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or any Subcontractor, other than death or injury resulting from any act or default of the Employer, his agents or servants. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, other than those for which the Employer is liable as aforesaid, and against all claims, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto. |
| Evidence and Terms of | 25.1 | The Contractor shall insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the Works. Provided that, in respect of any persons employed by any Subcontractor, the Contractor's obligations to insure as aforesaid under this Sub-Clause shall be satisfied if the Subcontractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such Subcontractor to produce to the Employer, when required, such policy of insurance and the receipt for the payment of the current premium. The Contractor shall provide evidence to the Employer prior to the start of work at the Site that the insurances required under the Contract have been effected and |

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| Insurances | | shall, within 84 days of the Commencement Date, provide the insurance policies to the Employer. When providing such evidence and such policies to the Employer, the Contractor shall notify the Engineer of so doing. Such insurance policies shall be consistent with the general terms agreed prior to the issue of the Letter of Acceptance. The Contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the Employer. |
| Adequacy of Insurances | 25.2 | The Contractor shall notify the insurers of changes in the nature, extent or programme for the execution of the Works and ensure the adequacy of the insurances at all times in accordance with the terms of the Contract and shall, when required, produce to the Employer the insurance policies in force and the receipts for payment of the current premiums. |
| Remedy on Contractor's Failure to Insure | 25.3 | If the Contractor fails to effect and keep in force any of the insurances required under the Contract, or fails to provide the policies to the Employer within the period required by Sub-Clause 25.1, then and in any such case the Employer may effect and keep in force any such insurances and pay any premium as may be necessary for that purpose and from time to time deduct the amount so paid from any monies due or to become due to the Contractor, or recover the same as a debt due from the Contractor. |
| Compliance with Policy Conditions | 25.4 | In the event that the Contractor or the Employer fails to comply with conditions imposed by the insurance policies effected pursuant to the Contract, each shall indemnify the other against all losses and claims arising from such failure. |

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| Compliance with Statutes, Regulations | <p>26.1 The Contractor shall conform in all respects, including by the giving of all notices and the paying of all fees, with the provisions of:</p> <p>(a) any National or State Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the Works and the remedying of any defects therein, and</p> <p>(b) the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works, and the Contractor shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such provisions. Provided always that the Employer shall be responsible for obtaining any planning, zoning or other similar permission required for the Works to proceed and shall indemnify the Contractor in accordance with Sub-Clause 22.3.</p> |
| Fossils | <p>27.1 All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site shall, as between the Employer and the Contractor, be deemed to be the absolute property of the Employer. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall, immediately upon discovery thereof and before removal, acquaint the Engineer of such discovery and carry out the Engineer's instructions for dealing with the same. If, by reason of such instructions, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:</p> <p>(a) any extension of time to which the Contractor is entitled under Clause 44, and</p> <p>(b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.</p> |
| Patent Rights | <p>28.1 The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Contractor's Equipment, materials or Plant used for or in connection with or for incorporation in the Works and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto,</p> |

except where such infringement results from compliance with the design or Specification provided by the Engineer.

Royalties 28.2

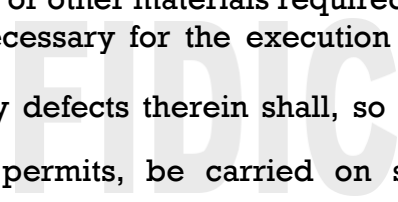
Except where otherwise stated, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the Works.

Interference with Traffic and Adjoining Properties 29.1

All operations necessary for the execution and completion of the Works and the remedying of any defects therein shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person.

The Contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters insofar as the Contractor is responsible therefor.



- Avoidance of Damage to Roads** **30.1** The Contractor shall use every reasonable means to prevent any of the roads or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his Subcontractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of materials, Plant, Contractor's Equipment or Temporary Works from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such roads and bridges. Save insofar as the Contract otherwise provides, the Contractor shall be responsible for and shall pay the cost of strengthening any bridges or altering or improving any road communicating with or on the routes to the Site to facilitate the movement of Contractor's Equipment or Temporary Works and the Contractor shall indemnify and keep indemnified the Employer against all claims for damage to any such road or bridge caused by such movement, including such claims as may be made directly against the Employer, and shall negotiate and pay all claims arising solely out of such damage.
- Transport of Contractor's Equipment or Temporary Works** **30.2** If, notwithstanding Sub-Clause 30.1, any damage occurs to any bridge or road communicating with or on the routes to the Site arising from the transport of materials or Plant, the Contractor shall notify the Engineer with a copy to the Employer, as soon as he becomes aware of such damage or as soon as he receives any claim from the authority entitled to make such claim. Where under any law or regulation the haulier of such materials or Plant is required to indemnify the road authority against damage the Employer shall not be liable for any costs, charges or expenses in respect thereof or in relation thereto. In other cases the Employer shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto. Provided that if and so far as any such claim or part thereof is, in the opinion of the Engineer, due to any failure on the part of the Contractor to observe and perform his obligations under Sub-Clause 30.1, then the amount, determined by the Engineer, after due consultation with the Employer and the Contractor, to be
- Transport of Materials or Plant** **30.3**

due to such failure shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided also that the Employer shall notify the Contractor whenever a settlement is to be negotiated and, where any amount may be due from the Contractor, the Employer shall consult with the Contractor before such settlement is agreed.

- Waterborne Traffic** **30.4** Where the nature of the Works is such as to require the use by the Contractor of waterborne transport the foregoing provisions of this Clause shall be construed as though "road" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.
- Opportunities for Other Contractors** **31.1** The Contractor shall, in accordance with the requirements of the Engineer, afford all reasonable opportunities for carrying out their work to:
- (a) any other contractors employed by the Employer and their workmen,
 - (b) the workmen of the Employer, and
 - (c) the workmen of any duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works.
- Facilities for Other Contractors** **31.2** If however, pursuant to Sub-Clause 31.1 the Contractor shall, on the written request of the Engineer:
- (a) make available to any such other contractor, or to the Employer or any such authority, any roads or ways for the maintenance of which the Contractor is responsible,

(b) permit the use, by any such, of Temporary Works or Contractor's Equipment on the Site, or

(c) provide any other service of whatsoever nature for any such, the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

Labour

Contractor to 32.1 **Keep Site Clear** During the execution of the Works the Contractor shall keep the Site reasonably free from all unnecessary obstruction and shall store or dispose of any Contractor's Equipment and surplus materials and clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required.

Clearance of Site on Completion 33.1 Upon the issue of any Taking-Over Certificate the Contractor shall clear away and remove from that part of the Site to which such Taking-Over Certificate relates all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave such part of the Site and Works clean and in a workmanlike 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 Liability Period.

Engagement of Staff and Labour 34.1 The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

Returns of Labour and Contractor's Equipment 35.1 The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Contractor's Equipment as the Engineer may require.

Materials, Plant and Workmanship

Quality of Materials, Plant and Workmanship 36.1 All materials, Plant and workmanship shall be:
(a) of the respective kinds described in the Contract and in accordance with the Engineer's instructions, and
(b) subjected from time to time to such tests as the Engineer may require at the place of manufacture, fabrication or preparation, or on the Site or at such other place or places as may be specified in the Contract, or at all or any

of such places.

The Contractor shall provide such assistance. labour, electricity, fuels, stores, apparatus and instruments as are normally required for examining, measuring and testing any materials or Plant and shall supply samples of materials, before incorporation in the Works, for testing as may be selected and required by the Engineer.

Cost of Samples 36.1 All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Contract.

Cost of Tests 36.3 The cost of making any test shall be borne by the Contractor if such test is:

(a) clearly intended by or provided for in the Contract, or

(b) particularised in the Contract (in cases only of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil) in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

Cost of Tests not 36.4 If any test required by the Engineer which is:

Provided for (a) not so intended by or provided for,
(b) (in the cases above mentioned) not so particularised, or
(c) (though so intended or provided for) required by the Engineer to be carried out at any place other than the Site or the place of manufacture, fabrication or preparation of the materials or Plant tested,

shows the materials, Plant or workmanship not to be in accordance with the provisions of the Contract to the satisfaction of the Engineer, then the cost of such test shall be borne by the Contractor, but in any other case Sub-Clause 36.5 shall apply.

Engineer's 36.5 Where, pursuant to Sub-Clause 36.4, this Sub-Clause applies the Engineer shall, after due consultation with the Employer and the Contractor, determine:

Determination where Tests not any extension of time to which the Contractor is entitled under
(a) Clause 44, and
the amount of such costs, which shall be added to the Contract
Provided for (b) Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

Inspection of 37.1 The Engineer, and any person authorised by him, shall at all reasonable times
Operations have access to the Site and to all workshops and places where materials or Plant are being manufactured, fabricated or prepared for the Works and the Contractor shall afford every facility for and every assistance in obtaining the right to such access.

Inspection and 37.2 The Engineer shall be entitled, during manufacture, fabrication or preparation to inspect and test the materials and Plant to be supplied under the Contract. If materials or Plant are being manufactured, fabricated or prepared in workshops or places other than those of the Contractor, the Contractor shall obtain permission for the Engineer to carry out such inspection and testing in those workshops or places. Such inspection or testing shall not release the Contractor from any obligation under the Contract.

Dates for 37.3 The Contractor shall agree with the Engineer on the time and place for the inspection or testing of any materials or Plant as provided in the Contract. The Engineer shall give the Contractor not less than 24 hours notice of his intention to carry out the inspection or to attend the tests. If the Engineer, or his duly authorised representative, does not attend on the date agreed, the Contractor may, unless otherwise instructed by the Engineer, proceed with the tests, which shall be deemed to have been made in the presence of the Engineer. The

Contractor shall forthwith forward to the Engineer duly certified copies of the test readings. If the Engineer has not attended the tests, he shall accept the said readings as accurate.

Rejection **37.4** If, at the time and place agreed in accordance with Sub-Clause 37.3, the materials or Plant are not ready for inspection or testing or if, as a result of the inspection or testing referred to in this Clause, the Engineer determines that the materials or Plant are defective or otherwise not in accordance with the Contract, he may reject the materials or Plant and shall notify the Contractor thereof immediately. The notice shall state the Engineer's objections with reasons. The Contractor shall then promptly make good the defect or ensure that rejected materials or Plant comply with the Contract. If the Engineer so requests, the tests of rejected materials or Plant shall be made or repeated under the same terms and conditions. All costs incurred by the Employer by the repetition of the tests shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer and may be deducted from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

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| Independent Inspection | 37.5 | The Engineer may delegate inspection and testing of materials or Plant to an independent inspector. Any such delegation shall be effected in accordance with Sub-Clause 2.4 and for this purpose such independent inspector shall be considered as an assistant of the Engineer. Notice of such appointment (not being less than 14 days) shall be given by the Engineer to the Contractor. |
| Examination of Work before Covering up | 38.1 | No part of the Works shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any such part of the Works which is about to be covered up or put out of view and to examine foundations before any part of the Works is placed thereon. The Contractor shall give notice to the Engineer whenever any such part of the Works or foundations is or are ready or about to be ready for examination and the Engineer shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such part of the Works or of examining such foundations. |
| Uncovering and Making Openings | 38.2 | The Contractor shall uncover any part of the Works or make openings in or through the same as the Engineer may from time to time instruct and shall reinstate and make good such part. If any such part has been covered up or put out of view after compliance with the requirement of Sub-Clause 38.1 and is found to be executed in accordance with the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of the Contractor's costs in respect of such of uncovering, making openings in or through, reinstating and making good the same, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer. In any other case all costs shall be borne by the Contractor. |
| Removal of Improper Work, Materials or Plant | 39.1 | The Engineer shall have authority to issue instructions from time to time, for: <ul style="list-style-type: none"> (a) the removal from the Site, within such time or times as may be specified in the instruction, of any materials or Plant which, in the opinion of the Engineer, are not in accordance with the Contract, (b) the substitution of proper and suitable materials or Plant, and (c) the removal and proper re-execution, notwithstanding any |

previous test thereof or interim payment therefor, of any work which, in respect of

- (i) materials, Plant or workmanship, or
- (ii) design by the Contractor or for which he is responsible, is not, in the opinion of the Engineer, in accordance with the Contract.

Default of Contractor in Compliance

39.2 In case of default on the part of the Contractor in carrying out such instruction within the time specified therein or, if none, within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

Suspension

Suspension 40. 1 of Work

The Contractor shall, on the instructions of the Engineer, suspend the Works or any part thereof for such time and in such manner as

the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is:

- (a) otherwise provided for in the Contract,
- (b) necessary by reason of some default of or breach of contract by the Contractor or for which he is responsible,

- (c) necessary by reason of climatic conditions on the Site, or
- (d) necessary for the proper execution of the Works or for the safety of the Works or any part thereof (save to the extent that such necessity arises from any act or default by the Engineer or the Employer or from any of the risks defined in Sub-Clause 20.4),

Sub-Clause 40.2 shall apply.

Engineer's Determination on 40.2 Where, pursuant to Sub-Clause 40.1, this Sub-Clause applies the Engineer shall after due consultation with the Employer and the Contractor, determine

following

Suspension,

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount, which shall be added to the Contract Price, in respect of the cost incurred by the Contractor by reason of such suspension, and shall notify the Contractor accordingly, with a copy to the Employer.

Suspension lasting more than 84 Days 40.3 If the progress of the Works or any part thereof is suspended on the instructions of the Engineer and if permission to resume work is not given by the Engineer within a period of 84 days from the date of suspension then, unless such

suspension is within paragraph (a), (b), (c) or (d) of Sub-Clause 40.1, the Contractor may give notice to the Engineer requiring permission, within 28 days from the receipt thereof, to proceed with the Works or that part thereof in regard to which progress is suspended. If, within the said time, such permission is not granted, the Contractor may, but is not bound to, elect to treat the suspension,

where it affects part only of the Works, as an omission of such part under Clause 51 by giving a further notice to the Engineer to that effect, or, where it affects the whole of the Works, treat the suspension as an event of default by the Employer and terminate his employment under the Contract in accordance with the provisions of Sub-Clause 69.1, whereupon the provisions of Sub-Clauses 69.2 and 69.3 shall apply.

Commencement and Delays

Commencement of Works 41.1

The Contractor shall commence the Works as soon as is reasonably possible after the receipt by him of a notice to this effect from the Engineer, which notice shall be issued within the time stated in the Appendix to tender after the date of the Letter of Acceptance. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

Possession of Site and Access Thereto 42.1

Save insofar as the Contract may prescribe:

- (a) the extent of portions of the Site of which the Contractor is to be given possession from time to time
- (b) the order in which such portions shall be made available to the Contractor, and, subject to any requirement in the Contract as to the order in which the Works

shall be executed, the Employer will, with the Engineer's notice to commence the Works, give to the Contractor possession of

(c) so much of the Site, and

(d) such access as, in accordance with the Contract, is to be provided by the Employer as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in Clause 14, if any, and otherwise in accordance with such reasonable proposals as the Contractor ' shall, by notice to the Engineer with a copy to the Employer, make.

The Employer will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with such programme or proposals, as the case may be.

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| Failure to Give Possession | 42.2 | <p>If the Contractor suffers delay and/or incurs costs from failure on the part of the Employer to give possession in accordance with the terms of Sub-Clause 42.1, the Engineer shall, after due consultation with the Employer and the Contractor, determine:</p> <p>(a) any extension of time to which the Contractor is entitled under Clause 44, and</p> <p>(b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.</p> |
| Rights of Way and Facilities | 42.3 | <p>The Contractor shall bear all costs and charges for special or temporary rights of way required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional facilities outside the Site required by him for the purposes of the Works.</p> |
| Time for Completion | 43.1 | <p>The whole of the Works and, if applicable, any Section required to be completed within a particular time as stated in the Appendix to Tender, shall be completed in accordance with the provisions of Clause 48, within the time stated in the Appendix to Tender for the whole of the Works or the Section (as the case may be), calculated from the Commencement Date, or such extended time as may be allowed under Clause 44.</p> |
| Extension of Time for Completion | 44.1 | <p>In the event of:</p> <p>(a) the amount or nature of extra or additional work,</p> <p>(b) any cause of delay referred to in these Conditions,</p> <p>(c) exceptionally adverse climatic conditions,</p> <p>(d) any delay, impediment or prevention by the Employer, or</p> <p>(e) other special circumstances which may occur, other than through a default of or breach of contract by the Contractor or for which he is responsible, being such as fairly to entitle the Contractor to an extension of the Time for Completion of the Works, or any Section or part thereof, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of such extension and shall notify the Contractor accordingly, with a copy to the Employer.</p> |
| Contractor to Provide Notification and Detailed | 44.2 | <p>Provided that the Engineer is not bound to make any determination unless the Contractor has</p> <p>(a) within 28 days after such event has first arisen notified the Engineer with a copy to the Employer, and</p> |

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| Particulars | | (b) within 28 days, or such other reasonable time as may be agreed by the Engineer, after such notification submitted to the Engineer detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time. |
| Interim Determination of Extension | 44.3 | <p>Provided also that where an event has a continuing effect such that it is not practicable for the Contractor to submit detailed particulars within the period of 28 days referred to in Sub-Clause 44.2(b), he shall nevertheless be entitled to an extension of time provided that he has submitted to the Engineer interim particulars at intervals of not more than 28 days and final particulars within 28 days of the end of the effects resulting from the event. On receipt of such interim particulars, the Engineer shall, without undue delay, make an interim determination of extension of time and, on receipt of the final particulars, the Engineer shall review all the circumstances and shall determine an overall extension of time in regard to the event. In both such cases the Engineer shall make his determination after due consultation with the Employer and the Contractor and shall notify the Contractor of the determination, with a copy to the Employer. No final review shall result in a decrease of any extension of time already determined by the Engineer.</p> |

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| Restriction on Working Hours | 45.1 | Subject to any provision to the contrary contained in the Contract, none of the Works shall, save as hereinafter provided, be carried on during the night or on locally recognised days of rest without the consent of the Engineer, except when work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. Provided that the provisions of this Clause shall not be applicable in the case of any work which it is customary to carry out by multiple shifts. |
| Rate of Progress | 46.1 | If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Engineer, too slow to comply with the Time for Completion, the Engineer shall so notify the Contractor who shall thereupon take such steps as are necessary, subject to the consent of the Engineer, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this Clause, the Contractor considers that it is necessary to do any work at night or on locally recognised days of rest, he shall be entitled to seek the consent of the Engineer so to do. Provided that if any steps, taken by the Contractor in meeting his obligations under this Clause, involve the Employer in additional supervision costs, such costs shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. |
| Liquidated Damages for Delay | 47.1 | If the Contractor fails to comply with the Time for Completion in accordance with Clause 48, for the whole of the Works or, if applicable, any Section within the relevant time prescribed by Clause 43, then the Contractor shall pay to the Employer the relevant sum stated in the Appendix to Tender as liquidated damages for such default and not as a penalty (which sum shall be the only monies due from the Contractor for such default) for every day or part of a day which shall elapse between the relevant Time for Completion and the date stated |

in a Taking-Over Certificate of the whole of the Works or the relevant Section, subject to the applicable limit stated in the Appendix to Tender. The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

**Reduction of
Liquidated
Damages**

47.2 If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking-Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

Taking-Over Certificate 48.1 When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the Contractor, with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, is required to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of -Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified. Similarly, in accordance with the procedure set out in Sub-Clause

Taking Over of Sections or Parts 48.2 48.1, the Contractor may request and the Engineer shall issue a Taking-Over Certificate in respect of:

- (a) any Section in respect of which a separate Time for Completion is provided in the Appendix to Tender,
- (b) any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or
- (c) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the Contractor as a temporary measure).

Substantial Completion of Parts 48.3 If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, the Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and,

upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

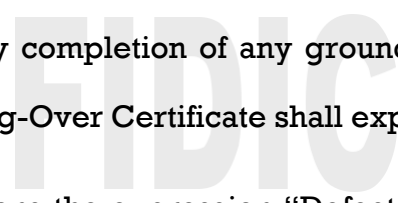
Surfaces
Requiring
Reinstatement
Defects Liability

48.4 Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such Taking-Over Certificate shall expressly so state.

Defects Liability
Period

49.1 In these Conditions the expression "Defects Liability Period" shall mean the defects liability period named in the Appendix to Tender, calculated from:

- (a) the date of completion of the Works certified by the Engineer in accordance with Clause 48, or
 - (b) in the event of more than one certificate having been issued by the Engineer under Clause 48, the respective dates so certified,
- and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.



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| Completion of Outstanding Work and Remedying Defects | 49.2 | <p>To the intent that the Works shall, at or as soon as practicable after the expiration of the Defects Liability Period, be delivered to the Employer in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer, the Contractor shall:</p> <p>(a) complete the work, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and</p> <p>(b) execute all such work of amendment, reconstruction, and remedying defects, shrinkages or other faults as the Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to its expiration, instruct the Contractor to execute.</p> |
| Cost of Remedying Defects | 49.3 | <p>All work referred to in Sub-Clause 49.2 (b) shall be executed by the Contractor at his own cost if the necessity thereof is, in the opinion of the Engineer, due to:</p> <p>(a) the use of materials, Plant or workmanship not in accordance with the Contract,</p> <p>(b) where the Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or</p> <p>(c) he neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract.</p> <p>If, in the opinion of the Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.</p> |
| Contractor's Failure to Carry Out Instructions | 49.4 | <p>In case of default on the part of the Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy</p> |

to the Employer.
If any defect, shrinkage or other fault in the Works appears at any time prior to the end of the Defects Liability Period, the Engineer may instruct the Contractor, with copy to the Employer, to search under the directions of the Engineer for the cause thereof. Unless such defect, shrinkage or other fault is one for which the Contractor is liable under the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount in respect of the costs of such search incurred by the Contractor, which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the Employer. If such defect, shrinkage or other fault is one for which the Contractor is liable, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case remedy such defect, shrinkage or other fault at his own cost in accordance with the provisions of Clause 49.

Alterations, Additions and Omissions

Variations 51.1 The Engineer shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

- (a) increase or decrease the quantity of any work included in the Contract,
- (b) omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor),

- (c) change the character or quality or kind of any such work,
- (d) change the levels, lines, position and dimensions of any part of the Works,
- (e) execute additional work of any kind necessary for the completion of the Works, or
- (f) change any specified sequence or timing of construction of any part of the Works.

No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 52.

Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

Instructions for Variations 51.2 The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities.

Valuation of Variations 52.1 All variations referred to in Clause 51 and any additions to the Contract Price which are required to be determined in accordance with Clause 52 (for the purposes of this Clause referred to as “varied work”), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

Power of Engineer 52.2 Provided that if the nature or amount of any varied work relative to the nature or amount of the whole of the Works or to any part thereof, is such that,

to Fix Rates

in the opinion of the Engineer, the rate or price contained in the Contract for any item of the Works is, by reason of such varied work, rendered inappropriate or inapplicable, then, after due consultation by the Engineer with the Employer and the Contractor, a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such other rate or price as is, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

Provided also that no varied work instructed to be done by the Engineer pursuant to Clause 51 shall be valued under Sub-Clause 52.1 or under this Sub-Clause unless, within 14 days of the date of such instruction and, other than in the case of omitted work, before the commencement of the varied work, notice shall have been given either:

- (a) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price, or
- (b) by the Engineer to the Contractor of his intention to vary a rate or a price

Variations Exceeding 15 per cent **52.3**

If, on the issue of the Taking-Over Certificate for the whole of the Works, it is found that as a result of:
(a) all varied work valued under Sub-Clauses 52.1 and 52.2, and

(b) all adjustments upon measurement of the estimated quantities set out in the Bill of Quantities, excluding Provisional Sums, dayworks and adjustments of price made under Clause 70,

but not from any other cause, there have been additions to or deductions from the Contract Price which taken together are in excess of 15 per cent of the "Effective Contract Price" (which for the purposes of this Sub-Clause shall mean the Contract Price, excluding Provisional Sums and allowance for dayworks, if any) then and in such event (subject to any action already taken under any other Sub-Clause of this Clause), after due consultation by the Engineer with the Employer and the Contractor, there shall be added to or deducted from the Contract Price such further sum as may be agreed between the Contractor and the Engineer or, failing agreement, determined by the Engineer having regard to the Contractor's Site and general overhead costs of the Contract. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer. Such sum shall be based only on the amount by which such additions or deductions shall be in excess of 15 per cent of the Effective Contract Price.

Daywork 52.4 The Engineer may, if in his opinion it is necessary or desirable, issue an instruction that any varied work shall be executed on a daywork basis. The Contractor shall then

be paid for such varied work under the terms set out in the daywork schedule included in the Contract and at the rates and prices affixed thereto by him in the Tender.

The Contractor shall furnish to the Engineer such receipts or other vouchers as may be necessary to prove the amounts paid and, before ordering materials, shall submit to the Engineer quotations for the same for his approval.

In respect of such of the Works executed on a daywork basis, the Contractor shall, during the continuance of such work, deliver each day to the Engineer an exact list in duplicate of the names, occupation and time of all workmen employed on such work and a statement, also in duplicate, showing the description and quantity of all materials and Contractor's Equipment used thereon or therefor other than Contractor's Equipment which is included in the percentage addition in accordance with such daywork schedule. One copy of each list and statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor.

At the end of each month the Contractor shall deliver to the Engineer a priced statement of the labour, materials and Contractor's Equipment, except as aforesaid, used and the Contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually rendered. Provided always that if the Engineer considers that for any reason the sending of such lists or statements by the Contractor, in accordance with the foregoing provision, was impracticable he shall nevertheless be entitled to authorise payment for such work, either as daywork, on being satisfied as to the time employed and the labour, materials and Contractor's Equipment used on such work, or at such value therefor as shall, in his opinion, be fair and reasonable.

Procedure for Claims

Notice of Claims 53.1 Notwithstanding any other provision of the Contract, if the Contractor intends to claim any additional payment pursuant to any Clause of these Conditions or otherwise, he shall give notice of his intention to the Engineer, with a copy to the Employer, within 28 days after the event giving rise to the claim has first arisen.

Contemporary 53.2 Upon the happening of the event referred to in Sub-Clause 53.1, the Contractor

Records shall keep such contemporary records as may reasonably be necessary to support any claim he may subsequently wish to make. Without necessarily admitting the Employer's liability, the Engineer shall, on receipt of a notice under Sub-

Clause 53.1, inspect such contemporary records and may instruct the Contractor to keep

any further contemporary records as are reasonable and may be material to the claim of which notice has been given. The Contractor shall permit the Engineer to inspect all records kept pursuant to this Sub-Clause and shall supply him with copies thereof as and when the Engineer so instructs.

**Substantiation
of Claims**

53.3

Within 28 days, or such other reasonable time as may be agreed by the Engineer, of giving notice under Sub-Clause 53.1, the Contractor shall send to the Engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based. Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Engineer may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. In cases where interim accounts are sent to the Engineer, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event. The Contractor shall, if required by the Engineer so to do, copy to the Employer all accounts sent to the Engineer pursuant to this Sub-Clause.

**Failure
to Comply**

to

53.4

If the Contractor fails to comply with any of the provisions of this Clause in respect of any claim which he seeks to make, his entitlement to payment in respect thereof shall not exceed such amount as the Engineer or any arbitrator or arbitrators appointed pursuant to Sub-Clause 67.3 assessing the claim considers to be verified by contemporary records (whether or not such records were brought to the Engineer's notice as required under Sub-Clauses 53.2 and 53.3).

**Payment
of Claims**

of

53.5

The Contractor shall be entitled to have included in any interim payment certified by the Engineer pursuant to Clause 60 such amount in respect of any claim as the Engineer, after due consultation with the Employer and the Contractor, may consider due to the Contractor provided that the Contractor has supplied sufficient particulars to enable the Engineer to determine the amount due. If such particulars are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such particulars may substantiate to the satisfaction of the Engineer. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the

Employer.

Contractor's Equipment, Temporary Works and Materials

- Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works** **54.1** All Contractor's Equipment, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent of the Engineer. Provided that consent shall not be required for vehicles engaged in transporting any staff, labour, Contractor's Equipment, Temporary Works, Plant or materials to or from the Site.
- Employer not Liable for Damage** **54.2** The Employer shall not at any time be liable, save as mentioned in Clauses 20 and 65, for the loss of or damage to any of the said Contractor's Equipment, Temporary Works or materials.
- Customs Clearance** **54.3** The Employer will use his best endeavours in assisting the Contractor, where required, in obtaining clearance through the Customs of Contractor's Equipment, materials and other things required for the Works.
- Re-export of Contractor's Equipment** **54.4** In respect of any Contractor's Equipment which the Contractor has imported for the purposes of the Works, the Employer will use his best endeavours to assist the Contractor, where required, in procuring any necessary Government consent to the re-export of such Contractor's Equipment by the Contractor upon the removal thereof pursuant to the terms of the Contract.

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| Conditions of Hire of Contractor's Equipment | 54.5 | With a view to securing, in the event of termination under Clause 63, the continued availability, for the purpose of executing the Works, of any hired Contractor's Equipment, the Contractor shall not bring on to the Site any hired Contractor's Equipment unless there is an agreement for the hire thereof (which agreement shall be deemed not to include an agreement for hire purchase) which contains a provision that the owner thereof will, on request in writing made by the Employer within 7 days after the date on which any termination has become effective, and on the Employer undertaking to pay all hire charges in respect thereof from such date, hire such Contractor's Equipment to the Employer on the same terms in all respects as the same was hired to the Contractor save that the Employer shall be entitled to permit the use thereof by any other contractor employed by him for the purpose of executing and completing the Works and remedying any defects therein, under the terms of the said Clause 63. |
| Costs for the Purpose of Clause 63 | 54.6 | In the event of the Employer entering into any agreement for the hire of Contractor's Equipment pursuant to Sub-Clause 54.5, all sums properly paid by the Employer under the provisions of any such agreement and all costs incurred by him (including stamp duties) in entering into such agreement shall be deemed, for the purpose of Clause 63, to be part of the cost of executing and completing the Works and the remedying of any defects therein. |
| Incorporation of Clause in Subcontracts | 54.7 | The Contractor shall, where entering into any subcontract for the execution of any part of the Works, incorporate in such subcontract (by reference or otherwise) the provisions of this Clause in relation to Contractor's Equipment, Temporary Works or materials brought on to the Site by the Subcontractor. |
| Approval of Materials not Implied | 54.8 | The operation of this Clause shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer. |
| Quantities | 55.1 | Measurement The quantities set out in the Bill of Quantities are the estimated quantities for the Works, and they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligations under the Contract. |
| Work to | 56.1 | The Engineer, shall except as otherwise stated, ascertain and |

be determine by
measurement the value of the Works in accordance with the
Measured Contract and the
Contractor shall be paid that value in accordance with Clause 60.
The Engineer
shall, when he requires any part of the Works to be measured,
give reasonable
notice to the Contractor's authorised agent, who shall:

(a) forthwith attend or send a qualified representative to assist the Engineer in making such measurement, and

(b) supply all particulars required by the Engineer.

should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of such part of the Works. For the purpose of measuring such Permanent Works as are to be measured by records and drawings, the Engineer shall prepare records and drawings as the work proceeds and the Contractor, as and when called upon to do so in writing, shall, within 14 days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If the Contractor does not attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor, within 14 days of such examination, lodges with the Engineer notice of the respects in which such records and drawings are claimed by him to be incorrect. On receipt of such notice, the Engineer shall review the records and drawings and either confirm or vary them.

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| Method of Measurement | 57.1 | The Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract. |
| Breakdown of Lump Sum Items | 57.2 | For the purposes of statements submitted in accordance with Sub-Clause 60.1, the Contractor shall submit to the Engineer, within 28 days after the receipt of the Letter of Acceptance, a breakdown for each of the lump sum items contained in the Tender. Such breakdowns shall be subject to the approval of the Engineer. |
| | | Provisional Sums |
| Definition of “Provisional Sum” | 58.1 | “Provisional Sum” means a sum included in the Contract and so designated in the Bill of Quantities for the execution of any part of the Works or for the supply of goods, materials, Plant or services, or for contingencies, which sum may be used, in whole or in part, or not at all, on the instructions of the Engineer. The Contractor shall be entitled to only such amounts in respect of the work, supply or contingencies to which such Provisional Sums relate as the Engineer shall determine in accordance with this Clause. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer. |
| Use of Provisional Sums | 58.2 | In respect of every Provisional Sum the Engineer shall have authority to issue instructions for the execution of work or for the supply of goods, materials, Plant or services by: (a) the Contractor, in which case the Contractor shall be entitled to an amount equal to the value thereof determined in accordance with Clause 52, and (b) a nominated Subcontractor, as hereinafter defined, in which case the sum to be paid to the Contractor therefor shall be determined and paid in accordance with Sub-Clause 59.4. |
| Production of Vouchers | 58.3 | The Contractor shall produce to the Engineer all quotations, invoices, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums, except where work is valued in accordance with rates or prices set out in the Tender. |
| | | Nominated Subcontractors |
| Definition of “Nominated Subcontractors” | 59.1 | All specialists, merchants, tradesmen and others executing any work or supplying any goods, materials, Plant or services for which Provisional Sums are included in the Contract, who may have been or be nominated or selected or approved by |

the Employer or the Engineer, and all persons to whom by virtue of the provisions of the Contract the Contractor is required to subcontract shall, in the execution of such work or the supply of such goods, materials, Plant or services, be deemed to be subcontractors to the Contractor and are referred to in this

Contract as “nominated Subcontractors”.

Nominated Subcontractors ;

59.2

The Contractor shall not be required by the Employer or the Engineer, or be deemed to be under any obligation, to employ any nominated Subcontractor against whom the Contractor may raise reasonable objection, or who declines to

Objection to Nomination

enter into a subcontract with the Contractor containing provisions:

(a) that in respect of the work, goods, materials, Plant or services the subject of the subcontract, the nominated Subcontractor will undertake towards the Contractor such obligations and liabilities as will enable the Contractor to discharge his own obligations and liabilities towards the Employer under the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities, and

(b) that the nominated Subcontractor will save harmless and indemnify the Contractor from and against any negligence by the nominated Subcontractor, his agents, workmen and servants and from and against any misuse by him or them of any Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

Design Requirements to be Expressly Stated

59.3 If in connection with any Provisional Sum the services to be provided include any matter of design or specification of any part of the Permanent Works or of any Plant to be incorporated therein, such requirement shall be expressly stated in the Contract and shall be included in any nominated Subcontract. The nominated Subcontract shall specify that the nominated Subcontractor providing such services will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities.

Payments to Nominated Subcontractors

59.4 For all work executed or goods, materials, Plant or services supplied by any nominated Subcontractor, the Contractor shall be entitled to:
(a) the actual price paid or due to be paid by the Contractor, on the instructions of the Engineer, and in accordance with the subcontract;
(b) in respect of labour supplied by the Contractor, the sum, if any, entered in the Bill of Quantities or, if instructed by the Engineer pursuant to paragraph (a) of Sub-Clause 58.2, as may be determined in accordance with Clause 52; and
(c) in respect of all other charges and profit, a sum being a percentage rate of the actual price paid or due to be paid calculated, where provision has been made in the Bill of Quantities for a rate to be set against the relevant Provisional Sum, at the rate inserted by the Contractor against that item or, where no such provision has been made, at the rate inserted by the Contractor in the Appendix to Tender and repeated where provision for such is made in a special item provided in the Bill of Quantities for such purpose.

Certification of Payments to Nominated Subcontractors

59.5 Before issuing, under Clause 60, any certificate, which includes any payment in respect of work done or goods, materials, Plant or services supplied by any nominated Subcontractor, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments, less retentions, included in

previous certificates in respect of the work or goods, materials, Plant or services of such nominated Subcontractor have been paid or discharged by the Contractor. If the Contractor fails to supply such proof then, unless the Contractor:

(a) satisfies the Engineer in writing that he has reasonable cause for withholding or refusing to make such payments, and

(b) produces to the Engineer reasonable proof that he has so informed such nominated Subcontractor in writing,

the Employer shall be entitled to pay to such nominated Subcontractor direct, upon the certificate of the Engineer, all payments, less retentions, provided for in the nominated Subcontract, which the Contractor has failed to make to such nominated Subcontractor and to deduct by way of set-off the amount so paid by the Employer from any sums due or to become due from the Employer to the Contractor.

Provided that, where the Engineer has certified and the Employer has paid direct as aforesaid, the Engineer shall, in issuing any further certificate in favour of the Contractor, deduct from the amount thereof the amount so paid, direct as aforesaid, but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

Certificates and Payment

Monthly 60.1 The Contractor shall submit to the Engineer after the end of each month six

Statements copies, each signed by the Contractor's representative approved by the Engineer in accordance with Sub-Clause 15.1, of a statement, in such form as the Engineer may from time to time prescribe, showing the amounts to which the Contractor considers himself to be entitled up to the end of the month in respect of:

- (a) the value of the Permanent Works executed,
- (b) any other items in the Bill of Quantities including those for Contractor's Equipment, Temporary Works, dayworks and the like,
- (c) the percentage of the invoice value of listed materials, all as stated in the Appendix to Tender, and Plant delivered by the Contractor on the Site for incorporation in the Permanent Works but not incorporated in such Works,
- (d) adjustments under Clause 70, and
- (e) any other sum to which the Contractor may be entitled under the Contract or otherwise.

Monthly Payments 60.2 The Engineer shall, within 28 days of receiving such statement, deliver to the Employer an Interim Payment Certificate stating the amount of payment to the Contractor which the Engineer considers due and payable in respect of such statement, subject:

- (a) firstly, to the retention of the amount calculated by applying the Percentage of Retention stated in the Appendix to Tender, to the amount to which the Contractor is entitled under paragraphs (a), (b), (c) and (e) of Sub-Clause 60.1 until the amount so retained reaches the Limit of Retention Money stated in the Appendix to Tender, and
- (b) secondly, to the deduction, other than pursuant to Clause 47, of any sums which may have become due and payable by the Contractor to the Employer.

Provided that the Engineer shall not be bound to certify any payment under this Sub-Clause if the net amount thereof, after all retentions and deductions, would be less than the Minimum Amount of Interim Payment Certificates stated in the Appendix to Tender.

Notwithstanding the terms of this Clause or any other Clause of the Contract no amount will be certified by the Engineer for payment until the performance security, if required under the Contract, has been provided by the Contractor and approved by the Employer.

Payment of 60.3 (a) Upon the issue of the Taking-Over Certificate with respect to the whole of the

Retention Money Works, one half of the Retention Money, or upon the issue of a Taking-Over

Certificate with respect to a Section or part of the Permanent Works only such proportion thereof as the Engineer determines having regard to the relative value of such Section or part of the Permanent Works, shall be certified by the Engineer for payment to the Contractor.

- (b) Upon the expiration of the Defects Liability Period for the Works the other half of the Retention Money shall be certified by the Engineer for payment to the Contractor. Provided that, in the event of different Defects Liability Periods having become

applicable to different Sections or parts of the Permanent Works pursuant to Clause 48, the expression "expiration of the Defects Liability Period" shall, for the purposes of this Sub-Clause, be deemed to mean the expiration of the latest of such periods. Provided also that if at such time there shall remain to be executed by the Contractor any work instructed, pursuant to Clauses 49 and 50, in respect of the Works, the Engineer shall be entitled to withhold certification until completion of such work of so much of the balance of the Retention Money as shall, in the opinion of the Engineer, represent the cost of the work remaining to be executed.

Correction of 60.4
correction or

Certificates modification in any previous Interim Payment Certificate which shall have been issued by him and shall have authority, if any work is not being carried out to his satisfaction, to omit or reduce the value of such work in any Interim Payment Certificate.

| | | |
|--------------------------------|-------------|--|
| Statement at Completion | 60.5 | <p>Not later than 84 days after the issue of the Taking-Over Certificate in respect of the whole of the Works, the Contractor shall submit to the Engineer six copies of Statement at Completion with supporting documents showing in detail, in the form approved by the Engineer:</p> <p>(a) the final value of all work done in accordance with the Contract up to the date stated in such Taking-Over Certificate,</p> <p>(b) any further sums which the Contractor considers to be due, and</p> <p>(c) an estimate of amounts which the Contractor considers will become due to him under the Contract.</p> <p>The estimated amounts shall be shown separately in such Statement at Completion. The Engineer shall certify payment in accordance with Sub-Clause 60.2.</p> |
| Final Statement | 60.6 | <p>Not later than 56 days after the issue of the Defects Liability Certificate pursuant to Sub-Clause 62. 1, the Contractor shall submit to the Engineer for consideration six copies of a draft final statement with supporting documents showing in detail, in the form approved by the Engineer:</p> <p>(a) the value of all work done in accordance with the Contract, and</p> <p>(b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.</p> <p>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 reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed (for the purposes of these Conditions referred to as the "Final Statement").</p> <p>If, following discussions between the Engineer and the Contractor and any changes to the draft final statement which may be agreed between them, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer an Interim Payment Certificate for those parts of the draft final statement, if any, which are not in dispute.</p> <p>The dispute may then be settled in accordance with Clause 67.</p> |
| Discharge | 60.7 | <p>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</p> |

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|--|-------------|---|
| | | <p>discharge shall become effective only after payment due under the Final Payment Certificate issued pursuant to Sub-Clause 60.8 has been made and the performance security referred to in Sub-Clause 10.1, if any, has been returned to the Contractor.</p> |
| Final Payment Certificate | 60.8 | <p>Within 28 days after receipt of the Final Statement, and the written discharge, the Engineer shall issue to the Employer (with a copy to the Contractor) a Final Payment Certificate stating:</p> <p>(a) the amount which, in the opinion of the Engineer, is finally due under the Contract or otherwise, and</p> <p>(b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled other than under Clause 47, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.</p> |
| Cessation of Employer's Liability | 60.9 | <p>The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or execution of the Works, unless the Contractor shall have included a claim in respect thereof in his Final Statement and (except in respect of matters or things arising after the issue of the Taking-Over Certificate in respect of the whole of the Works) in the Statement at Completion referred to in Sub-Clause 60.5.</p> |

Time for Payment 60.10 The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other term of the Contract, shall, subject to Clause 47, be paid by the Employer to the Contractor within 28 days after such Interim Payment Certificate has been delivered to the Employer, or, in the case of the Final Payment Certificate referred to in Sub-Clause 60.8, within 56 days, after such Final Payment Certificate has been delivered to the Employer. In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor interest at the rate stated in the Appendix to Tender upon all sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to the Contractor's entitlement under Clause 69 or otherwise.

Approval only by Defects Liability Certificate 61.1 Only the Defects Liability Certificate, referred to in Clause 62, shall be deemed to constitute approval of the Works.

Defects Liability Certificate 62.1 The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer and delivered to the Employer, with a copy to, the Contractor, stating the date on which the Contractor shall have completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction. The Defects Liability Certificate shall be given by the Engineer within 28 days after the expiration of the Defects Liability Period, or, if different defects liability periods shall become applicable to different Sections or parts of the Permanent Works, the expiration of the latest such period, or as soon thereafter as any works instructed, pursuant to Clauses 49 and 50, have been completed to the satisfaction of the Engineer. Provided that the issue of the Defects Liability Certificate shall not be a condition precedent to payment to the Contractor of the second portion of the Retention Money in accordance with the conditions set out in Sub-Clause 60.3.

Unfulfilled Obligations 62.2 Notwithstanding the issue of the Defects Liability Certificate the Contractor and the Employer shall remain liable for the fulfilment of any obligation incurred under the provisions of the Contract prior to the issue of the Defects Liability Certificate which remains unperformed at the time such Defects Liability Certificate is issued and, for the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties to the Contract.

Remedies

Default of Contractor 63.1 If the Contractor is deemed by law unable to pay his debts as they fall due, or enters into voluntary or involuntary bankruptcy, liquidation or dissolution (other than a voluntary liquidation for the purposes of amalgamation or

reconstruction), or becomes insolvent, or makes an arrangement with, or assignment in favour of, his creditors, or agrees to carry out the Contract under a committee of inspection of his creditors, or if a receiver, administrator, trustee or liquidator is appointed over any substantial part of his assets, or if, under any law or regulation relating to reorganization, arrangement or readjustment of debts, proceedings are commenced against the Contractor or resolutions passed in connection with dissolution or liquidation or if any steps are taken to enforce any security interest over a substantial part of the assets of the Contractor, or if any act is done or event occurs with respect to the Contractor or his assets which, under any applicable law has a substantially similar effect to any of the foregoing acts or events, or if the Contractor has contravened Sub-Clause 3. 1, or has an execution levied on his goods, or if the Engineer certifies to the Employer, with a copy to the Contractor, that, in his opinion, the Contractor:

- (a) has repudiated the Contract,
- (b) without reasonable excuse has failed
 - (i) to commence the Works in accordance with Sub-Clause 4. 1. 1, or
 - (ii) to proceed with the Works, or any Section thereof, within 28 days after receiving notice pursuant to Sub-Clause 4. 1,

- (c) has failed to comply with a notice issued pursuant to Sub-Clause 37.4 or an instruction issued pursuant to Sub-Clause 39.1 within 28 days after having received it,
- (d) despite previous warning from the Engineer, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the Contract, or
- (e) has contravened Sub-Clause 4.1,

then the Employer may, after giving 14 days' notice to the Contractor, enter upon the Site and the Works and terminate the employment of the Contractor without thereby releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and authorities conferred on the Employer or the Engineer by the Contract, and may himself complete the Works or may employ any other contractor to complete the Works. The Employer or such other contractor may use for such completion so much of the Contractor's Equipment, Temporary Works and materials as he or they may think proper.

Valuation at Date of Termination 63.2

The Engineer shall, as soon as may be practicable after any such entry and termination by the Employer, fix and determine ex parte, or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute, and shall certify:

- a) what amount (if any) had, at the time of such entry and termination, been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract, and
- (b) the value of any of the said unused or partially used materials, any Contracto's Equipment and any Temporary Works.

Payment after Termination 63.3

If the Employer terminates the Contractor's employment under this Clause, he shall not be liable to pay to the Contractor any further amount (including damages) in respect of the Contract until the expiration of the Defects Liability Period and there after until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum (if any) as the Engineer may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount exceeds the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable

accordingly.

Assignment of Benefit of Agreement 63.4 Unless prohibited by law, the Contractor shall, if so instructed by the Engineer within 14 days of such entry and termination referred to in Sub-Clause 63.1, assign to the Employer the benefit of any agreement for the supply of any goods or materials or services and/or for the execution of any work for the purposes of the Contract, which the Contractor may have entered into.

Urgent Remedial Work 64.1 If, by reason of any accident, or failure, or other event occurring to, in, or in connection with the Works, or any part thereof, either during the execution of the Works, or during the Defects Liability Period, any remedial or other work is, in the opinion of the Engineer, urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such work, the Employer shall be entitled to employ and pay other persons to carry out such work as the Engineer may consider necessary. If the work or repair so done by the Employer is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof.

Special Risks

No Liability for Special Risks 65.1 The Contractor shall be under no liability whatsoever in consequence of any of the special risks referred to in Sub-Clause 65.2, whether by way of indemnity or otherwise, for or in respect of:

- (a) destruction of or damage to the Works, save to work condemned under the provisions of Clause 39 prior to the occurrence of any of the said special risks,
- (b) destruction of or damage to property, whether of the Employer or third parties, or
- (c) injury or loss of life.

Special Risks 65.2 The special risks are:

(a) the risks defined under paragraphs (a), (c), (d) and (e) of Sub-Clause 20.4, and

(b) the risks defined under paragraph (b) of Sub-Clause 20.4 insofar as these

relate to the country in which the Works are to be executed.

Damage to Works
65.3
by Special
Risks

If the Works or any materials or Plant on or near or in transit to the Site, or any of the Contractor's Equipment, sustain destruction or damage by reason of any of the said special risks, the Contractor shall be entitled to payment in accordance with the Contract for any Permanent Works duly executed and for any materials or Plant so destroyed or damaged and, so far as may be required by the Engineer or as may be necessary for the completion of the Works, to payment for:

(a) rectifying any such destruction or damage to the Works, and

(b) replacing or rectifying such materials or Contractor's Equipment,

and the Engineer shall determine an addition to the Contract Price in accordance

with Clause 52 (which shall in the case of the cost of replacement of Contractor's

Equipment include the fair market value thereof as determined by the Engineer)

and shall notify the Contractor accordingly, with a copy to the Employer.

Projectile, Missile
65.4

Destruction, damage, injury or loss of life caused by the explosion or impact, whenever and wherever occurring, of any mine, bomb, shell, grenade, or other projectile, missile, munition, or explosive of war, shall be deemed to be a consequence of the said special risks.

Increased Costs
65.5
arising from
Special Risks

Save to the extent that the Contractor is entitled to payment under any other provision of the Contract, the Employer shall repay to the Contractor any costs of the execution of the Works (other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 39 prior to the occurrence of any special risk) which are howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war, but the Contractor shall, as soon as any such cost comes to his knowledge, forthwith notify the Engineer thereof. The Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of the Contractor's costs in respect thereof which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the

**Outbreak
War**

of

65.6

Employer.

If, during the currency of the Contract, there is an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall, unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works. Provided that the Employer shall be entitled, at any time after such outbreak of war, to terminate the Contract by giving notice to the Contractor and, upon such notice being given, the Contract shall, except as to the rights of the parties under this Clause and Clause 67, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

Removal of Contractor's Equipment on Termination 65.7 If the Contract is terminated under the provisions of Sub-Clause 65.6, the Contractor shall, with all reasonable dispatch, remove from the Site all Contractor's Equipment and shall give similar facilities to his Subcontractors to do so.

Payment if Contract Terminated 65.8 If the Contract is terminated as aforesaid, the Contractor shall be paid by the Employer, insofar as such amounts or items have not already been covered by payments on account made to the Contractor, for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

- (a) the amounts payable in respect of any preliminary items referred to in the Bill of Quantities, so far as the work or service comprised therein has been carried out or performed, and a proper proportion of any such items which have been partially carried out or performed;
- (b) the cost of materials, Plant or goods reasonably ordered for the Works which have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials, Plant or goods becoming the property of the Employer upon such payments being made by him;
- (c) a sum being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works insofar as such expenditure has not been covered by any other payments referred to in this Sub-Clause;
- (d) any additional sum payable under the provisions of Sub-Clauses 65.3 and 65.5;
- (e) such proportion of the cost as may be reasonable, taking into account payments made or to be made for work executed, of removal of Contractor's Equipment under Sub-Clause 65.7 and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country of registration or to other destination, at no greater cost; and
- (f) the reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.

Provided that against any payment due from the Employer under this Sub-Clause, the Employer shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Contractor's

Equipment, materials and Plant and any other sums which, at the date of termination, were recoverable by the Employer from the Contractor under the terms of the Contract. Any sums payable under this Sub-Clause shall, after due consultation with the Employer and the Contractor, be determined by the Engineer who shall notify the Contractor accordingly, with a copy to the Employer.

Release from Performance

Payment in Event If any circumstance outside the control of both parties arises after
66.1 the issue of the Letter of Acceptance which renders it impossible or unlawful for either or both parties to fulfil his or their contractual obligations, or under the law governing the Contract the parties are released from further performance, then the parties shall be discharged from the Contract, except as to their rights under this Clause and Clause 67 and without prejudice to the rights of either party in respect of any antecedent breach of the Contract, and the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 65 if the Contract had been terminated under the provisions of Clause 65.

of Release from Performance

Settlement of Disputes

Engineer's 67.1 If a dispute of any kind whatsoever arises between the Employer and the

Decision Contractor in connection with, or arising out of, the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or other termination of the Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Engineer, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the eighty-fourth day after the day on which he received such reference the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this Clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Works with all due diligence and the Contractor and the Employer shall give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided, in an amicable settlement or an arbitral award.

If either the Employer or the Contractor be dissatisfied with any decision of the Engineer, or if the Engineer fails to give notice of his decision on or before the Eighty-fourth day after the day on which he received the reference, then either the Employer or the Contractor may, on or before the seventieth day after the day on which he received notice of such decision, or on or before the seventieth day after the day on which the said period of 84 days expired, as the case may be, give notice to the other party, with a copy for information to the Engineer, of his intention to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to Sub-Clause 67.4, no arbitration in respect thereof may be commenced unless such notice is given.

If the Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notice of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the seventieth day after the day on which the parties received notice as to such decision from the Engineer, the said decision shall become final and binding upon the Employer and the Contractor.

Amicable 67.2 Where notice of intention to commence arbitration as to a dispute has been

Settlement given in accordance with Sub-Clause 67.1, the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless

the parties otherwise agree, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

Arbitration 67.3 Any dispute in respect of which:

- (a) the decision, if any, of the Engineer has not become final and binding pursuant to Sub-Clause 67. 1, and
- (b) amicable settlement has not been reached within the period stated in Sub-Clause 67.2,

shall be finally settled, unless otherwise specified in the Contract, under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed under such Rules. The said arbitrator/s shall have full power to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Engineer related to the dispute.

Neither party shall be limited in the proceedings before such arbitrator/s to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision pursuant to Sub-Clause 67.1. No such decision shall disqualify the Engineer from being called as a witness and giving evidence before the arbitrator/s on any matter whatsoever relevant to the dispute.

Arbitration may be commenced prior to or after completion of the Works,
provided that the obligations of the Employer, the Engineer and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the Works.

Failure to Comply with Engineer's Decision 67.4 Where neither the Employer nor the Contractor has given notice of intention to commence arbitration of a dispute within the period stated in Sub-Clause 67.1 and the related decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with Sub-Clause 67.3. The provisions of Sub-Clauses 67.1 and 67.2 shall not apply to any such reference.

Notices

Notice to Contractor 68.1 All certificates, notices or instructions to be given to the Contractor by the Employer or the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the Contractor's principal place of business or such other address as the Contractor shall nominate for that purpose.

Notice to Employer and Engineer 68.2 Any notice to be given to the Employer or to the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the respective addresses nominated for that purpose in Part 11 of these Conditions.

Change of Address 68.3 Either party may change a nominated address to another address in the country where the Works are being executed by prior notice to the other party, with a copy to the Engineer, and the Engineer may do so by prior notice to both parties.

Default of Employer

Default of Employer 69.1 In the event of the Employer:
(a) failing to pay to the Contractor the amount due under any certificate of the Engineer within 28 days after the expiry of the time stated in Sub-Clause 60.10, within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract,
(b) interfering with or obstructing or refusing any required approval to the issue of any such certificate,
(c) becoming bankrupt or, being a company, going into liquidation, other than

for the purpose of a scheme of reconstruction or amalgamation, or
(d) giving notice to the Contractor that for unforeseen economic reasons it is

impossible for him to continue to meet his contractual obligations, the Contractor shall be entitled to terminate his employment under the Contract

by giving notice to the Employer, with a copy to the Engineer. Such termination

shall take effect 14 days after the giving of the notice.

Upon the expiry of the 14 days' notice referred to in Sub-Clause 69.1, the

**Removal of 69.2
Contractor's**

Contractor shall, notwithstanding the provisions of Sub-Clause 54.1, with all reasonable despatch, remove from the Site all Contractor's Equipment brought by him thereon.

Equipment

Payment

In the event of such termination the Employer shall be under the same obligations

on 69.3

Termination

to the Contractor in regard to payment as if the Contract had been terminated

under the provisions of Clause 65, but, in addition to the payments specified in

Sub-Clause 65.8, the Employer shall pay to the Contractor the amount of any loss

or damage to the Contractor arising out of or in connection with or by

consequence of such termination.

| | | |
|---|-------------|--|
| Contractor's Entitlement to Suspend Work | 69.4 | <p>Without prejudice to the Contractor's entitlement to interest under Sub-Clause 60.10 and to terminate 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 28 days after the expiry of the time stated in Sub-Clause 60.10 within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract, after giving 28 days' prior notice to the Employer, with a copy to the Engineer, suspend work or reduce the rate of work.</p> <p>If the Contractor suspends work or reduces the rate of work in accordance with the provisions of this Sub-Clause and thereby suffers delay or incurs costs the Engineer shall, after due consultation with the Employer and the Contractor, determine:</p> <p>(a) any extension of time to which the Contractor is entitled under Clause 44, and</p> <p>(b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.</p> <p>Where the Contractor suspends work or reduces the rate of work.</p> |
| Resumption of Work | 69.5 | <p>having given notice in accordance with Sub-Clause 69.4, and the Employer subsequently pays the amount due, including interest pursuant to Sub-Clause 60.10, the Contractor's entitlement under Sub-Clause 69.1 shall, if notice of termination has not been given, lapse and the Contractor shall resume normal working as soon as is reasonably possible.</p> |
| Changes in Cost and Legislation | | |
| Increase or Decrease of Cost | 70.1 | <p>There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labour and/or materials or any other matters affecting the cost of the execution of the Works as may be determined in accordance with Part II of these Conditions.</p> |
| Subsequent Legislation | 70.2 | <p>If, after the date 28 days prior to the latest date for submission of tenders for the Contract there occur in the country in which the Works are being or are to be executed changes to any National or State Statute, Ordinance, Decree or other Law or any regulation or bye-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation or bye-law which causes additional or reduced cost to the Contractor,</p> |

other than under Sub-Clause 70.1, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price-and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

Currency and Rates of Exchange

**Currency
Restrictions**

71.1 If, after the date 28 days prior to the latest date for submission of tenders for the Contract, the Government or authorised agency of the Government of the country in which the Works are being or are to be executed imposes currency restrictions and/or transfer of currency restrictions in relation to the currency or currencies in which the Contract Price is to be paid, the Employer shall reimburse any loss or damage to the Contractor arising therefrom, without prejudice to the right of the Contractor to exercise any other rights or remedies to which he is entitled in such event.

**Rates of
Exchange**

72.1 Where the Contract provides for payment in whole or in part to be made to the Contractor in foreign currency or currencies, such payment shall not be subject to variations in the rate or rates of exchange between such specified foreign currency or currencies and the currency of the country in which the Works are to be executed.

Currency 72.2 Where the Employer has required the Tender to be expressed in a single currency

Proportions but with payment to be made in more than one currency and the Contractor has stated the proportions or amounts of other currency or currencies in which he requires payment to be made, the rate or rates of exchange applicable for calculating the payment of such proportions or amounts shall, unless otherwise stated in Part II of these Conditions, be those prevailing, as determined by the Central Bank of the country in which the Works are to be executed, on the date 28 days prior to the latest date for the submission of tenders for the Contract, as has been notified to the Contractor by the Employer prior to the submission of tenders or as provided for in the Tender.

Currencies of 72.3 Where the Contract provides for payment in more than one currency, the proportions or amounts to be paid in foreign currencies in respect of Provisional Sums shall be determined in accordance with the principles set forth in Sub-Clauses 72.1 and 72.2 as and when these sums are utilised in whole or in part in accordance with the provisions of Clauses 58 and 59.

Payment for Provisional Sums

PRINT UNTIL 31 JANUARY 1950

**SECTION IV
CONDITIONS OF CONTRACT PART II
(CONDITIONS OF PARTICULAR APPLICATION)**

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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 the ***National Environment Management Authority*** represented by ***CARITAS Nyeri***.
- (iv) The said “Engineer” shall be ***Mr. Martin M. Nderi*** 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

Sub-Contracting is not applicable for this tender.

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.

10.3 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 11 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-Ul-Fitr | |

29

| | |
|---------------|-----------------------------|
| Moi Day | (10 th October) |
| Kenyatta 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 Engineer's Registration Board of Kenya in accordance with the Laws of Kenya cap. 530 or have equivalent status approved by the Engineer 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 off 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 advise 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.

Add the following sub-clause 49.5 to this Clause:-

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 **Daywork**

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 authorised 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 ratio 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.

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Add the following paragraph after the last paragraph of sub-clause 67.3:

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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 subclause:-

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.

69.5 **Resumption of Work**

In line 3 of this Sub-Clause delete the Words “Sub-Clause 60.10” and replace with “Sub-Clause 60.7”

Changes in Cost and Legislation

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, statue, 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, Statue, 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

See Appendix I

Notes for preparing Specifications

- 1.0 Specifications must be drafted to present a clear and precise statement of the required standards of materials and workmanship for tenderers to respond realistically and competitively to the requirements of the Employer and ensure responsiveness of tenders. The Specifications should require that all materials, plant and other supplies to be incorporated in the permanent Works be new, unused, of the most recent or current models and incorporating all recent improvements in design and materials unless provided otherwise in the Contract. Where the Contractor is responsible for the design of any part of the permanent Works, the extent of his obligations must be stated.
- 2.0 Specifications from previous similar projects are useful and it may not be necessary to re- write specifications for every works contract.
- 3.0 There are considerable advantages in standardizing **General Specifications** for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation and water supply. The General Specifications should cover all classes of workmanship, materials and equipment commonly involved in construction works, although not necessarily to be used in a particular works contract. Deletions or addenda should then adapt the General Specifications to the particular Works.
- 4.0 Care must be taken in drafting Specifications to ensure they are not restrictive. In the specifications of standards for materials, plant and workmanship, existing Kenya Standards should be used as much as possible, otherwise recognized International Standards may also be used.
- 5.0 The Employer should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in tender documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential tenderers.

The Employer should provide a description of the selected parts of the Works with appropriate reference to Drawings,

Specifications, Bills of Quantities, and Design or Performance criteria, stating that the alternative solutions shall be at least structurally and functionally equivalent to the basic design parameters and Specifications.

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

6.0 Health Care and Welfare

In addition to providing, equipping and maintaining adequate first aid stations throughout the works in accordance with the Laws of Kenya, the Contractor shall provide and maintain on Site during the duration of the Contract, a fully equipped dispensary. This shall be with a qualified Clinical Officer/Nurse who shall offer the necessary medical advice on AIDS/HIV and related diseases to the Engineer's and Contractor's Site staff. The Contractor shall allow for this in the rates and be responsible for all site welfare arrangements at his own cost.

SECTION VI

DRAWINGS

Actual Drawings have been provided separately and are to be downloaded together with this tender document.

List of Drawings

| No. | Description |
|------------|---------------------------------|
| 01 | Layout plan |
| 02 | Intake works |
| 03 | Main gravity line |
| 04 | Main pan layout |
| 05 | Main pan cross sections |
| 06 | Main Pan details |
| 07 | Draff off tower |
| 08 | Pan 2 Layout and cross sections |
| 09 | Distribution line A |
| 10 | Distribution line B and C |
| 11 | Distribution line D and E |
| 12 | Valve Chamber details |
| 13 | 225m cu tanks |

SECTION VII – BILLS OF QUANTITIES

See Appendix II

Notes for preparing Bills of Quantities

1.0 Preamble To Bill of Quantities

- a) The Bill of Quantities shall form part of the Contract Documents and is to be read in conjunction with the Instructions to Tenderers, Conditions of Contract Parts I and II, Specifications and Drawings.
- b) The brief description of the items in the Bill of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed descriptions given in the conditions of Contract and Specifications for the full direction and description of work and materials.
- c) The Quantities set forth in the Bill of Quantities are estimated and provisional, representing substantially the work to be carried out, and are given to provide a common basis for tendering and comparing of Tenders. There is no guarantee to the Contractor that he will be required to carry out all the quantities of work indicated under any one particular item or group of items in the Bill of Quantities. The basis of payment shall be the Contractor's rates and the quantities of work actually done in 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.

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

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

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

- l)
 - (a) Hard material, in this Contract, shall be defined as the material which, in the opinion of the Engineer, require blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for their removal, and which cannot be extracted by ripping with a dozer tractor of at least 150 brake horse power (112 kilowatt) with a single, rear-mounted, hydraulic ripper. Boulders of more than 0.2m³ occurring in soft material shall be classified as hard material.

 - (b) Soft material shall be all material other than hard material.

2.0 The objectives of the Bills of Quantities are;

- (a) to provide sufficient information on the quantities of Works to be

performed to enable tenders to be prepared efficiently and accurately;
and

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

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

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

(a) Preliminaries.

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

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

(b) Work Items

- (i) The items in the Bills of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing or any other special characteristics may give rise to different methods of construction or phasing of the Works or considerations of cost. General items common to all parts of the Works may be grouped as a separate section in the Bills of Quantities.
- (ii) The brief description of the items in the Bill of Quantities should in no way modify or supersede the detailed descriptions given in the Contract drawings, Conditions of Contract and Specifications.
- (iii) Quantities should be computed net from the Drawings, unless directed otherwise in the Contract, and no allowance should be made for bulking, shrinkage or waste. Quantities should be rounded up or down where appropriate.

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

| <i>Unit</i> | <i>Abbreviation</i> | <i>Unit</i> | <i>Abbreviation</i> |
|--------------------------|------------------------|-------------------|--------------------------|
| cubic meter | m ³ or cu m | millimeter | mm |
| hectare | ha | month | mon |
| hour | h | number | nr |
| kilogram | kg | square meter | m ² or sq m |
| lump sum | sum | square millimeter | mm ² or sq mm |
| meter | m | week | wk |
| metric ton (1,000 kg) | t | | |

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

(c) Daywork Schedule

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

- (i) a list of the various classes of labour, and materials for which basic Daywork rates or prices are to be inserted by the tenderer, together with a statement of the conditions under which the Contractor will be paid for Work executed on a Daywork basis; and
- (ii) a percentage to be entered by the tenderer against each basic Daywork Subtotal amount for labour, materials and plant representing the Contractor's profit, overheads, supervision and other charges.

(d) Provisional Quantities and Provisional Sums

- (i) Provision for quantity contingencies in any particular item or class of Work with a high expectation of quantity overrun should be made by entering specific “Provisional Quantities” or “Provisional Items” in the Bills of Quantities, and *not* by increasing the quantities for that item or class of Work beyond those of the Work normally expected to be required. To the extent not covered above, a general provision for physical contingencies (quantity overruns) should be made by including a “Provisional Sum” in the Summary of the Bills of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a “Provisional Sum” in the Summary of the Bills of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises.
- (ii) Provisional Sums to cover specialized works normally carried out by Nominated Sub Contractors should be avoided and instead Bills of Quantities of the specialised Works should be included as a section of the main Bill of Quantities to be priced by the Main Contractor. The Main Contractor should be required to indicate the name (s) of the specialised firms he proposes to engage to carry out the specialized Works as his approved domestic sub-contractors. Only Provisional Sums to cover specialized Works by statutory authorities should be included in the Bills of Quantities.
- (iii) Unless otherwise provided in the Contract, the Provisional Sums included in the Bills of Quantities should always be expended in whole or in part at the discretion of the Engineer after full consultation with the Employer.

(e) Summary

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

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
- (xi) Confidential Business Questionnaire
- (x) Statement of Foreign Currency Requirements
- (xi) Schedule of Materials;- Basic Prices
- (xii) Schedule of Labour;- Basic Prices
- (xiii) Schedule of Plant and Equipment
- (xiv) Details of Sub-Contractors
- (xv) 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

FORM OF INVITATION FOR TENDERS

_____ [date]

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

Dear Sirs:

Reference: _____ [Contract Name]

You have been prequalified to tender for the above project.

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

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

Upon payment of a non-refundable fee of Kshs _____

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

_____ [address and location]

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

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

Yours faithfully,

_____ Authorised Signature

_____ Name and Title

FORM OF TENDER

TO: _____ [Name of Employer] _____ [Date]
_____ [Name of Contract]

Dear Sir,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of Kshs. _____ [Amount in figures] Kenya Shillings _____ [Amount in words]
2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Project Manager’s notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender until _____ [Insert date], and it shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this _____ day of _____ 20 _____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of
_____ [Name of Employer]
of _____ [Address of Employer]

Witness; Name _____

Address _____

Signature _____

Date _____

APPENDIX TO FORM OF TENDER

(This appendix forms part of the tender)

| CONDITIONS OF CONTRACT | CLAUSE | AMOUNT |
|---|---------------|--|
| Tender Security (Bank Guarantee only) | | <i>2% of the tender price</i> |
| Amount of Performance Security (Unconditional Bank Guarantee) | 10.1 | <i>5 percent of Tender Sum in the form of Unconditional Bank Guarantee</i> |
| Program to be submitted | 14.1 | <i>Not later than 21 days after issuance of Order to Commence</i> |
| Cash flow estimate to be submitted | 14.3 | <i>Not later than 21 days after issuance of Order to Commence</i> |
| Minimum amount of Third Party Insurance | 23.2 | <i>Kshs.10,000,000</i> |
| Period for commencement, from the Engineer's order to commence | 41.1 | <i>21days</i> |
| Time for completion | 43.1 | <i>9 months</i> |
| Amount of liquidated damages | 47.1 | <i>Kshs.10,000 per day</i> |
| Limit of liquidated damages | 47.1 | <i>Cost of works not completed</i> |
| Defect Liability period | 49.1 | <i>6 Months</i> |
| Percentage of Retention | 60.5 | <i>10% of Interim Payment Certificate</i> |
| Limit of Retention Money | 60.5 | <i>10% of Contract Price</i> |
| Minimum amount of interim certificates | 60.2 | <i>Contract value/Time for completion in months</i> |
| Time within which payment to be made after Interim Payment Certificate signed by Engineer | 60.8 | <i>30 days</i> |
| Time within which payment to be made after Final Payment Certificate signed by Engineer | 60.8 | <i>45 days</i> |
| Appointer of Arbitrator | 67(3) | Chief Justice of The Republic of Kenya |
| Notice to Employer and Engineer | 68.2 | The Employers address is: <i>Director General, National Environment Management Authority, P.O. Box 67839-00200, NAIROBI.</i> The Engineer's address is: <i>Chief Engineer National Environment Management Authority, P.O. Box 67839-00200, NAIROBI.</i> |

| | | |
|--|--|--|
| | | |
|--|--|--|

Signature of Tender.....

Date.....

LETTER OF ACCEPTANCE
[letterhead paper of the Employer]

_____ [date]

To: _____
 [*name of the Contractor*]

 [*address of the Contractor*]

Dear Sir,

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

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

Authorized Signature

Name and Title of Signatory

Attachment : Agreement

FORM OF AGREEMENT

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

WHEREAS THE Employer is desirous that the Contractor executes

_____ (*name and identification number of Contract*) (hereinafter called "the Works") located
at _____ [*Place/location of the Works*] and the Employer has
accepted the tender submitted by the Contractor for the execution and completion of
such Works and the remedying of any defects therein for the Contract Price of
Kshs _____ [*Amount in figures*], Kenya
Shillings _____ [*Amount in words*].

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
 - (i) Letter of Acceptance
 - (ii) Form of Tender
 - (iii) Conditions of Contract Part I
 - (iv) Conditions of Contract Part II and Appendix to Conditions of Contract
 - (v) Specifications
 - (vi) Drawings
 - (vii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in

consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name _____

Address _____

Signature _____

[ii] Name _____

Address _____

Signature _____

FORM OF TENDER SECURITY

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

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

[date]

[signature of the Bank]

[witness]

[seal]

(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.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____
(Amend accordingly if provided by Insurance Company)

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ [name of Employer] _____ (Date)
_____ [address of Employer]

Gentlemen,

Ref: _____ [name of Contract]

In accordance with the provisions of the Conditions of Contract of the above-mentioned Contract, We, _____ [name and Address of Contractor] (hereinafter called "the Contractor") shall deposit with _____ [name of Employer] a bank guarantee to guarantee his proper and faithful performance under the said Contract in an amount of Kshs. _____ [amount of Guarantee in 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: _____

31. 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-See Name and Address in the Invitation to Tenderers*)

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 License 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..... | | | | |

Part 2(c) – Registered Company:

Private or public.....

State the nominal and issued capital of the Company-

Nominal Kshs.....

Issued Kshs.....

Give details of all directors as follows:

| Name in full . | Nationality. | Citizenship Details*. | Shares. |
|----------------|--------------|-----------------------|---------|
|----------------|--------------|-----------------------|---------|

| | | | |
|----|-------|-------|-------|
| 1. | | | |
|----|-------|-------|-------|

| | | | |
|----|-------|-------|-------|
| 2. | | | |
|----|-------|-------|-------|

| | | | |
|----|-------|-------|-------|
| 3. | | | |
|----|-------|-------|-------|

| | | | |
|----|-------|-------|-------|
| 4. | | | |
|----|-------|-------|-------|

Part 2(d) – Interest in the Firm:

Is there any person / persons in (Name of Employer) who has interest in this firm? Yes/No.....(Delete as necessary)

I certify that the information given above is correct.

| | | |
|---------|-------------|--------|
| | | |
| (Title) | (Signature) | (Date) |

* Attach proof of citizenship

STATEMENT OF FOREIGN CURRENCY REQUIREMENTS

(See Clause 60[5] of the Conditions of Contract)

In the event of our Tender for the execution of _____
_____ (name of Contract) being accepted, we
would require in accordance with Clause 21 of the Conditions of
Contract, which is attached hereto, the following percentage:

(Figures)..... (Words).....

of the Contract Sum, (Less Fluctuations) to be paid in foreign
currency.

Currency in which foreign exchange element is required:

.....
.....

Date: The Day of 20.....

Enter 0% (zero percent) if no payment will be made in foreign
currency.

Maximum foreign currency requirement shall be
_____ (percent) of the Contract Sum, less Fluctuations.

(Signature of Tenderer)

SCHEDULE OF MATERIALS;-BASIC PRICES
(Ref: Clause 70 of Conditions of Contract)

| Material | Unit | Origin And Price | | | Transportation Cost From Source Of Origin | |
|-------------------------------------|----------------|-------------------|----------|-------|---|--------------|
| | | Country Of Origin | Supplier | Price | Mode | Price (KSHS) |
| Cement | Kg | | | | | |
| Lime | Kg | | | | | |
| Sand | Ton | | | | | |
| Aggregate | Ton | | | | | |
| Hardcore | Ton | | | | | |
| 350 x 225mm dressed quarry stones | M ² | | | | | |
| 300 x 225mm dressed quarry stones | M ² | | | | | |
| 225 x 225mm dressed quarry stones | M ² | | | | | |
| Formwork | M ² | | | | | |
| Bituminous paint | L | | | | | |
| Chain link fence mesh | M ² | | | | | |
| Concrete fencing post 2.7m long | No | | | | | |
| Barbed wire 12 ^{1/2} gauge | | | | | | |
| Diesel | L | | | | | |
| Regular Petrol | L | | | | | |
| Super Petrol | L | | | | | |
| Oil and Lubricants | L | | | | | |
| Structural steel | Kg | | | | | |
| Gabion Mesh | M2 | | | | | |
| Reinforcement Steel | Kg | | | | | |
| 12" Ø flanged GI pipe | M | | | | | |
| 10" Ø flanged GI pipe | M | | | | | |
| 8" Ø flanged GI | M | | | | | |

| | | | |
|---|----|--|--|
| pipe | | | |
| 6" Ø flanged GI pipe | M | | |
| 4" Ø flanged GI pipe | M | | |
| 3" Ø flanged GI pipe | M | | |
| 300mm Ø UPVC class 'C' pipes | M | | |
| 250mm Ø UPVC class 'C' pipes | M | | |
| 200mm Ø UPVC class 'C' pipes | M | | |
| 150mm Ø UPVC class 'C' pipes | M | | |
| 110mm Ø UPVC class 'C' pipes | M | | |
| 80mm Ø UPVC class 'C' pipes | M | | |
| 12" Ø flanged sluice valve | No | | |
| 10" Ø flanged sluice valve | No | | |
| 8" Ø flanged sluice valve | No | | |
| 6" Ø flanged sluice valve | No | | |
| 4" Ø flanged sluice valve | No | | |
| 8" Ø non return valve | No | | |
| 12" Ø GI flanged bell mouth | No | | |
| 12" Ø GI flanged bend | No | | |
| 3" Ø GI flanged bell mouth | No | | |
| 3" Ø GI flanged bend | No | | |
| Steel fabricated Coarse screen | No | | |
| Steel fabricated fine screen | No | | |
| 300mm Ø UPVC long radius bend | No | | |
| 300mm Ø PVC/GI Flexible VJ coupling adaptor | No | | |
| 300x80 mm Ø Flanged Tee | No | | |

| | | | |
|--|----|--|--|
| 80x25mm Ø GI reducer 25mm Ø gate valve | No | | |
| 25mm Ø GI Nipple | No | | |
| 25mm Air valve | No | | |
| 80mm Ø sluice valve | No | | |
| 300x250 mm GI Ø Flanged Tee | No | | |
| 8" (250mm) Ø flanged sluice valve | No | | |
| 8" (250mm) Ø non return valve | No | | |
| 250mm Ø PVC/GI Flexible VJ coupling adaptor | No | | |
| 250x100 mm GI Ø Flanged Tee | No | | |
| 100mm Ø Flanged GI bend | No | | |
| 100mm Ø PVC/GI Flexible VJ coupling adaptor | No | | |
| 80mm Ø GI bend | No | | |
| 80mm Ø UPVC long radius bend | No | | |
| 80mm Ø GI plug | No | | |
| 80mm Ø PVC/GI Flexible VJ coupling adaptors | No | | |
| 80x80 mm Ø Flanged Tee | No | | |
| 25mm Ø gate valve | No | | |
| 25mm Ø GI Nipple | No | | |
| 25mm Air valve | No | | |
| 250mm Ø VJ couplings | No | | |
| 250mm Ø UPVC bend | No | | |
| 250mm Ø GI Equal Tee | No | | |
| 250mm Ø non return valve | No | | |
| 250x200mm Ø GI Flanged reducer | No | | |
| 200mm Ø PVC/GI Flexible VJ coupling adaptors | No | | |
| 150mm Ø PVC/GI | No | | |

| | | | |
|--|----|--|--|
| Flexible VJ coupling adaptors | | | |
| 200x150mm Ø reducer | No | | |
| 150mm Ø UPVC bend 200x80 mm Ø Flanged Tee | No | | |
| 80mm Ø sluice valve | No | | |
| 150mm x 100mm Ø GI Tee | No | | |
| 150mm Ø sluice valve | No | | |
| 100mm Ø sluice valve | No | | |
| 100mm Ø PVC/GI Flexible VJ coupling adaptors | No | | |
| 100mm Ø UPVC bend | No | | |
| Manhole cover 450x650mm | No | | |
| 750mmX750mm access locable steel manhole cover | No | | |
| 5.5m long mild steel galvanized cat ladder | No | | |
| 4.5m long mild steel galvanized cat ladder | No | | |
| 150x100 mm Ø flanged reducing socket | No | | |
| 100mm Ø 90° flanged GI bend | No | | |
| 75mm Ø 90° Bend | No | | |
| 75mm Ø G.S socket | No | | |
| 75mm Ø. G.S Flange | No | | |

| | | | |
|---|----|--|--|
| 75 x 100mm Ø Reducing socket | No | | |
| 100mm Ø ball valve | No | | |
| 100mm Ø G.I flanged bend | No | | |
| 200X150mm reducing socket with puddle flanges | No | | |
| Lockable steel gate overall 4 m x 2m high | No | | |

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

CERTIFICATE OF TENDERER'S VISIT TO SITE

This is to certify that

[Name/s].....

.....

Being the authorized representative/Agent of [Name of Tenderer]

.....

.....

participated in the organized inspection visit of the site of the works for the **(Name of Contract:**)

..... day of.....20.....

Signed.....

(Employer's Representative)

.....

NOTE: This form is to be completed whether the site visit is made at the time of the organized site or privately organized.

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 authorised 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)

OTHER SUPPLEMENTARY INFORMATION

1. Financial reports for the last five years, balance sheets, profit and loss statements, auditors' reports etc. List them below and attach copies.

2. Evidence of access to financial resources to meet the qualification requirements. Cash in hand, lines of credit etc. List below and attach copies of supporting documents

3. Name, address , telephone, telex, fax numbers of the Tenderer's Bankers who may provide reference if contacted by the Employer.

4. Information on current litigation in which the Tenderer is involved.

| OTHER PARTY (IES) | CAUSE OF DISPUTE | AMOUNT INVOLVED (KSHS) |
|-------------------|------------------|------------------------|
| | | |

I certify 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

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

Description of Works And Location

This Contract is for the construction of the proposed Small holder irrigation project in Thome, Laikipia County. The project site is Thome village, Matanya Sub location, Tigithi location, Laikipia Central Sub- County, Laikipia County. The project is 17 km from Nanyuki Town.

Extent of the Works

The works to be executed under this Contract comprises:

- i. Rehabilitating the existing water intake works to meet the requirements of WRA.**
- ii. Procuring and laying a 9.3km, diameter main gravity pipeline ranging from 300mm diameter to 110mm diameter in size to transport water over the project area**
- iii. Constructing of 1no. 25,000m³ water storage pan**
- iv. Constructing of 3no 225m³ capacity masonry tanks**
- v. Constructing water distribution pipelines (approx. 2.6km)**

Access to the site

Access to site is by Kiganjo-Nanyuki road and branch to the left at Narumoru on Narumoru – Nyahururu road and travel for about 10km and then turn right to Matanya – Nanyuki murrum road for about 5km to the project site. Alternatively you can travel along Kiganjo- Nanyuki road to Nanyuki and branch to the left just after passing the equator to the project site about 17 km away through Matanya shopping centre before arriving at the project site.

Provision of equipment material and labor

The Contractor shall provide all equipment, transport, materials and labour necessary for the satisfactory completion of the works in compliance with the specifications herein. The Engineer reserves the right to inspect plant and materials prior to Contractor selection, and may reject plant or material that in his/her opinion is substandard or inappropriate. The Contractor shall provide full descriptions of all plants to be deployed for these works. The Contractor shall present method statements describing in detail the proposed approach to work.

The Contractor shall provide summary detail of the experience of key personnel to be deployed for these works.

Occupation of site

The Employer will provide land on which the works shall be constructed. The Contractor shall be given possession of such parts of the site that he requires for activities related to construction works including storage of raw materials, equipment. The Contractor shall not enter upon or occupy with men, tools, equipment and materials any land other than the land or right of way provided by the Employer

Diligent performance

The Contractor shall at all times perform the Works diligently and in accordance with sound professional practice. He/she shall not proceed from one stage of works to another without the express permission of the Engineer.

Decisions regarding temporary halt, discontinuing of any element or part of any element of these works, or abandonment of these works, shall be discussed jointly between the Contractor and the Engineer before any further actions are authorized by the Engineer. The Engineer's decision shall be final.

The Engineer will require a written submission justifying any steps taken by the successful bidder without the Engineer's approval. An unsatisfactory explanation shall lead to non-payment for works undertaken without prior agreement, and may be included for consideration as liquidated damages.

Drawings

The project drawings shall comprise

- a. The drawings provided in volume V issued for Tender
- b. Such other drawings and/or sketches as are issued from time to time by the Engineer to deal with design modifications in response to on-site conditions.

Record drawing

As the work proceeds the Contractor shall markup „As Built“ details on a set of prints of the Contract Drawings modified to portray the works as actually constructed and issue to the Engineer’s representatives for approval within 7 days of completion of the works covered by each drawing.

Level datum

It shall be the responsibility of the Contractor before commencing work to obtain from the Engineer in writing the values and locations of the benchmarks to be used in these works. All temporary benchmarks shall be referred thereto.

The Contractor shall construct such temporary benchmarks as the Engineer may direct and shall agree the levels thereof with the Engineer. The establishment of such temporary benchmarks shall be deemed part of the Contractor's responsibility in setting out the works.

The reduced levels are shown on the drawing are believed but not guaranteed to be correct. In the event of any discrepancies between the drawing and the specification, the specification shall have precedence over the drawing.

Setting out

The Contractor shall appoint and employ the necessary qualified and experienced staff to set out the works accurately.

The Contractor shall establish and locate all lines and levels and be responsible for the correct location of all works.

Where directed by the Engineer, the Contractor shall take such levels and dimensions as may be required for the purposes of measurement before disturbance of the ground. These shall be agreed between the Contractor and the Engineer in writing before any ground surface is disturbed or covered up. Any work commenced without taking the

said levels and dimensions shall be measured on the Engineer's reckoning of their values before disturbance. The Engineer's decision on this matter shall be final.

Construction and checking of work

The Contractor shall be solely responsible for and shall provide all labour, tools, lifting tackle, and other equipment required for the construction and checking of the works. No operative shall be allowed to execute any type of work which is normally carried out by a skilled trade's man, unless the operative is thoroughly experienced and proficient in the trade concerned. Supervisors and operatives may be required to demonstrate their proficiency or produce certificates of competence to the satisfaction of the Engineer.

As each part of the work is carried out, it shall be subject to the approval of the Engineer

Office for Engineer

The Contractor is required to provide the Office within 4 weeks for Engineer's Representative from the date of Commencement of Work.

The Office shall be of a design and construction approved by the Engineer and shall be constructed of strong, durable and weather proof materials with walls, ceilings and floors adequately insulated against heat and cold. The Office shall have a floor area of at least 30 square metres, and shall be provided with equipment and furniture detailed under the following clauses. The floor shall be concrete float finish and shall be at least 200mm above surrounding ground level.

The Office shall have burglar proofing to all windows and external doors. The Resident Engineer's Office shall be separate from the Contractor's Yard and shall be situated in a compound fenced with 1.5m chain link fence on cedar posts complete with gate including padlock and chain. Hard-standing and access drives (not exceeding 20% of the area of the compound) shall be provided within the compound and constructed with murrum or other stable road making materials. The areas so provided shall be shaped to falls to provide adequate drainage and incidental kerbing and outfall drainage shall be provided where necessary, a lean-to corrugated iron shelter shall be provided as covered parking. All equipment and furnishings detailed under this Clause shall be provided by the Contractor. All the equipment and furnishings will revert to the Employer at the end of the Contract.

The Contractor shall arrange for the provision of airtime for the exclusive use of the Engineer's Representative and his Staff. The Contractor shall include in the sum for

provision of the Office Equipment and Furnishings. Provision shall also be made by the Contractor for all necessary gas, electricity, kerosene, water, light, attendance and stationery required in connection with execution of the Contract. The Engineer's Representative's Office shall be regularly and properly cleaned to the satisfaction of the Resident Engineer. A messenger and tea boy / office cleaner shall be provided by the Contractor exclusively for the Engineer's Office. Security Guards shall be provided for day and night security at this Office. The Office, furniture and equipment shall be insured against fire, theft and natural calamity.

Provision for Engineer's Office

The offices shall be suitably furnished with the following as minimum requirements (all shall revert to the employer at the end of Project):

| <u>Furniture / Equipment</u> | <u>Quantity</u> |
|--|-----------------|
| Writing Desk without Locks | 2 Nr |
| High Back Chairs with arm rests | 2 Nr |
| Wooden Conference Table, 2.0m x 1.2m | 1 Nr |
| Office chairs without arm rests | 6 Nr |
| Visitors Chairs without arm rests | 3 Nr |
| Lockable Steel Cupboard (Size 1m x 1.8m x 0.5m deep) | 1 Nr |
| Office paper punch | 2 Nr |
| Pin board 2.4m x 1.2m | 1Nr |
| Office Tray (3 tier) | 2 Nr |
| Heavy Duty Stapler | 1 Nr |
| 'Casio' or similar small portable electronic calculator 1 Nr | 1 Nr |
| First Aid kit (for 10 persons) in Metal Box | 1 Nr |
| Small office scissor | 1Nr |

| | |
|---|------|
| Wastepaper baskets | 3Nr |
| Electric kettle (capacity 1.8 litres) 1 | 1Nr |
| Coffee/Tea making facility including crockery for all supervisory staff 4 Nr. and 8 additional guests | 1 Nr |
| Wooden book shelves 2.0m x 1.5m 1 Nr | 1Nr |
| Laptop – “DELL” Latitude 155000 Series, E5540 Intel Core i5 4200U (1.6 to 2.6 GHz, 4th Generation) Processor, 8GB DDR3L, Memory 500GB (5,400Rpm) SATA HDD, 15.6” Antiglare LED Backlit, DVD +/- RW, Integrated Full HD Camera with Microphone, INTEL 4400 HD on Board Graphic Card, Bluetooth, WLAN, Primary 6-cell 65W/HR LI-ION, Windows 8.1 Professional. | 1Nr |
| Printer / Photocopier / Scanning Machine – Nashua Tec Model MPC 205/AO 20 Pages per minute, B/W and Colour, A3/A4 Size Paper or approved equivalent. Include for maintenance contract for the duration of the Contract. | 1 Nr |
| Stand-alone A4 Laser Printer HP or approved equivalent | 1 Nr |
| Wall Clock | 1 Nr |
| Flashlights (battery powered) | 2 Nr |
| Digital Camera (Sony or approved equivalent) | 1 Nr |
| USB Flash Disk, 32GB and above | 1 Nr |
| External Hard Disk Drive, 500GB and above | 1 Nr |

Maintenance and Attendance to the Engineer’s Office

Stationery required per month is as follows (Stationery to be approved every month by the Resident Engineer before ordering):

| Stationery | Quantity |
|--|-----------------|
| Photocopy paper A4 | 1 Ream |
| Photocopy paper A3 | 1 Ream |
| Biro pens blue/black | ½ Doz |
| Clutch Pencils | 2 Nr |
| Box files | 4 Nr |
| Spiral files | ½ Doz |
| Document Wallets | 2Nr |
| Spirals (various sizes of Reports) | ½ Doz |
| Embossed (hardback cover) | ½ Doz |
| Perspex covers | ½ Doz |
| Cellotape (medium) | 1No |
| Masking tape (medium) | 1No |
| Staples. | 2Pkt |
| Paper clips (various sizes) | 2Pkt |
| C-DR (Pack of 12) | 1Pkt |
| Pencil leads(0.5/0.7) | 1 Set |
| Highlighters (set of all colours) | 1 Set |
| A4 hardcover notebooks | 2Nr |
| A6 hardcover notebooks | 2Nr |
| Soft Pencil Erasers (Staedtler or equivalent) 1 Nr | 2Nr |
| A4 Carbon papers | 1 Doz |
| Batteries for flashlights | 2 Set |
| Black ink cartridge/ toner for the A4 printer | 1Set |
| Colour and Black ink cartridges for the A3 printer | 1Set |

In addition, the Contractor to supply clean towels, soap, lavatory paper, disinfectant and cleaning materials, coffee/tea, milk, sugar, drinking water, refreshments, etc. These items are to be provided and maintained throughout the Contract Period, adequate for 2 Supervision Staff and 8 additional guests. The List of Provisions and Consumables to be given by the Resident Engineer every month.

The Contractor will also be responsible for the following services for each office:

- i) Payment for all services including water, electricity, Airtime and Internet;
- ii) Guarding of the premises (24 hour security services);
- iii) Maintaining insurance against theft of equipment and other materials from the offices;
- iv) Service, maintain / repair office equipment and appliances;

The cost of all the above services shall be included by the Contractor under the relevant items in Bill No. 1 – Preliminaries and General for Maintenance and Attendance for the Resident Engineer's Offices. Apart from the consumables, the rest of the office and equipment will revert to the Employer at the end of the Contract.

Secretary / Office Assistant

The Contractor shall maintain a Secretary/Office for the exclusive use of the Resident Engineer for the duration of the Contract. The Secretary shall be English speaking, with a minimum 5 years' experience in secretarial / office administration work. The Secretary shall be conversant with standard office computer hardware and software (MS-Word, Excel, PowerPoint, etc). The Secretary shall be interviewed and tested by the Resident Engineer prior to deployment on the Works.

The Secretary/Office Assistant is to be paid by the Contractor (including NSSF, NHIF, etc) but will report directly to the Resident Engineer for day to day instructions. (messenger / tea boy / office cleaner) shall also be provided by the Contractor exclusively for the Resident Engineer's Office.

Project Supervision Vehicle

The Contractor shall service and maintain the vehicle to be used for supervision of the Contract by the Resident Engineer and his staff. The vehicle shall be provided by the employer. The Contractor shall ensure that the vehicle is serviced and maintained in good condition to the satisfaction of the Resident Engineer or his authorized representative so that the Resident Engineer shall at all times have the vehicle available for use in good serviceable condition. In the event of the vehicles being unserviceable for whatsoever reason, the Contractor shall provide an alternative vehicle at his own cost of the same model in compliance with the provisions of this clause. The cost for such replacement vehicle shall be covered by his rates. Payments for maintenance shall include for provision of fuels, lubricants and tyres, all regular maintenance, minor and major repairs, including those occasioned by accidental damage from whatever cause arising, and everything else necessary to satisfy fully the requirements of this Clause. The vehicles will revert back to the Employer at the end of the Contract.

Survey Equipment

Listed below are the principal items of survey equipment to be made available for exclusive use by the Resident Engineer during the whole duration of Project Implementation. All equipment shall be as new and with all necessary carrying containers, manuals, insurances, etc. The Equipment to revert to Contractor at completion of all Works.

| Equipment | Quantity |
|--|-----------------|
| Automatic Level (Wild or Similar) with tripod legs and metric staff, complete with carrying case | 1Nr |
| 3 metre ranging rods | 6Nr |
| Hard hats | 3 Sets |
| 5 metre retractable pocket steel tapes | 1Nr |
| 30 metre metal tapes | 1Nr |
| 100 metre metal tapes | 1Nr |
| Hammer 3kg | 1Nr |

The Contractor shall also supply pegs, crayons, spray paint, nails and all other items required for setting out and measuring the work.

The Contractor shall provide the services of a Surveyor and two Chainmen as and when requested for the sole use of the Resident Engineer and Engineer's Representative for the whole period of the Contract.

The cost for provision of the above for use of the Resident Engineer is deemed to be covered in the Bidder's Rates.

Survey equipment

The Contractor shall provide for the sole use of the Engineers representative the survey equipment and appliance and these shall revert to the Contractor upon completion of the Contract.

The Contractor shall provide all labor and materials as may be required by the Engineer representative for survey work in connection with works.

Maintain Survey/ Field Equipment

The Contractor shall be responsible for maintaining the survey and field equipment throughout the Contract Period, including replacement of items damaged during the normal course of the Works.

The Contractor shall provide all such labour and assistance as may be required by the Engineer for checking the Contractor's setting out and/or survey.

The Contractor shall make available such labour, materials, equipment and consumables as the Engineer may require from time to time, for inspections and tests in connection with the Works

Supervision and labor

The Contractor will be required to maintain a competent supervising engineer and staff on Site throughout the construction period until completion of the works, and thereafter as may be required during the Defects Liability Period. The Engineer shall give prior approval to the appointment of this supervising engineer and shall have the authority to withdraw this approval at any time in accordance with the Conditions of Contract.

All staff and labour employed on the works shall be employed in accordance with the labour and employment laws and regulations of the Republic of Kenya

Contractor's site offices

The Contractor shall advise the Engineer at which of his offices any notices may be served in accordance with the Conditions of Contract.

Language of correspondence and records

All communication from Contractor to the Engineer and the Engineer's Representative shall be in English language.

All site books, time sheets, records, notes drawings, documents, specifications etc. shall be in English language

Contractor's duty staff & offices

At least one responsible senior representative of the Contractor shall be immediately available at all times and he shall be on site during normal working hours.

To such representative shall be delegated full authority to confer with Engineer's Representatives or his deputy and to take all steps and to issue all those instructions which may be required in an emergency to ensure the safety of all personnel of the works and of all the Employer's and other property on the site and in the immediate vicinity thereof. The Engineer's Representative may from time to time at his discretion after taking into consideration all the prevailing conditions allow some relaxation of this clause but such relaxation shall be made only with his written permission and subject to any special conditions which he may then require.

The Contractor shall provide and maintain at the site, offices for the use of representative and to which written instructions by the Engineer's Representative can

be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

Accommodation for workmen

Where the Contractor wishes to construct camp to accommodate his labour, the following requirements shall be adhered to and shall also be subject to the requirement made by the Relevant Government Administration or any local Authority.

Demolition of Contractor's temporary structures

The Engineer may at any time before the end of the period of maintenance give the Contractor notice in writing to demolish and remove those buildings and works which are no longer required, whereupon the title to such buildings and works and materials connected therewith shall revert to the Contractor. After the demolition and removal of building and works as required by the Engineer and Contractor shall level, clear, restore and make good the sites and surrounding ground and fill in and compact all latrines, drains, pits and similar works leaving the satisfaction of the Engineer's Representative.

Public Relations

The Contractor shall designate within his site organization competent staff whose responsibility shall be to ensure good relations.

The location of all yards, stores, workshops, offices, etc. shall be agreed beforehand with the Engineer's Representatives and shall be such as to avoid obstruction and nuisance to public and/or the client.

The Contractor shall provide and maintain at or near the site suitable and sufficient shelters, mess rooms, washrooms, latrines etc. as are necessary and customary, to the satisfaction of the Engineer and in accordance with the law and regulations of the relevant authorities.

Definition and use of the Site

Definition of the Site

The Site shall include all those areas of land which, being public or private:

Issued by the National Environment Management Authority (NEMA)

- Areas being provided by the Employer for the construction of the permanent works.
- Areas
- Being provided by the Employer for temporary works, including camps, offices and stores.

Are acquired, leased, or operated by the Contractor as borrow pits or spoil tips for the permanent works, including all access roads.

Use of the Site

Access to the Site is gained from public and private roads. The Contractor shall be responsible for cleaning and maintaining all existing roads affected by his work while he is on Site. He shall also be responsible for repairing and making good any damage to these roads. If the Contractor, his Sub -Contractors or suppliers, causes the damage, then the repairs will be at his own cost.

The Contractor shall be responsible for the construction, maintenance and repair of any temporary Site roads.

The lands and other places outside the Site, which are the property of or under the control of the Employer, shall not be used except with the approval of the Engineer.

The Contractor shall promptly remove any vehicle, wagon, barge or vessel or any other obstruction under his control, which the Engineer may require to be moved for any purpose. The Contractor shall remove such obstruction promptly upon receiving such instruction and at his own cost, unless the Engineer shall decide otherwise.

The Contractor shall maintain access for the inspection, operation and maintenance of any of the Employer's assets within the Site or elsewhere.

The Contractor shall not use any portion of the Site for any purpose not connected with the works unless the written permission of the Engineer has been obtained.

Possession of the Site

The Contractor shall restrict his activities to those areas of the Site adjacent to the works being executed and shall avoid any encroachment upon lands outside the areas for which possession has been given. Any trespass or damage or any claim arising from

such encroachment shall be the Contractor's sole responsibility and he shall hold the Employer indemnified against all claims arising from such trespass or damage.

Interference with existing works

The Contractor shall not interfere in any way, with any existing works, be it the property of the Employer or of a third party, whether such works has been shown to the Contractor by the Engineer, except where such interference is specifically described as part of the works, either in the Contract or in instructions from the Engineer to take over such works.

Maintenance of natural environment

Disfigurement of the natural environment of the area during construction must be kept to a minimum and special care shall be taken to avoid permanent damage. Needless adverse effects on the local ecology shall be avoided. Bushes and trees shall not be cut except where necessary for the execution of the Works, and then only after the sanction of the Engineer has been obtained.

The Engineer shall have authority to require removal from the Project of any personnel who willfully neglect these matters.

Quality of Materials and Workmanship

All materials shall comply with the appropriate Standard Specifications and to the approval of the Engineer unless otherwise required hereinafter.

The Contractor, shall, before placing any order of materials, manufactured articles or machinery for incorporation in the works, submit for the approval of the Engineer the names of the suppliers from whom he proposes to obtain such materials, manufactured articles or machinery, together with a list of the same, giving the origin, quality, weight, strength, description and other relevant details. No materials, manufactured articles or machinery shall be ordered or obtained from any suppliers not approved in writing by the Engineer.

All materials shall be delivered to the Site a sufficient period of time before they are required for use in the works, to enable the Engineer to take such samples as he may wish for testing and approval.

Notwithstanding the fact that approval has been given to the source of supply, the Engineer may forbid the use of any materials if, upon delivery, they are found to be defective, or he considers them unsuitable for incorporation in the works. Such rejected materials shall be removed from the site forthwith.

The Contractor may propose alternative materials of equivalent quality to those specified, and subject to the Engineer's approval, such materials may be used in the works.

The Contractor shall have no claim against the Employer in respect of any financial loss which he may suffer as a result of the rejection of any such materials, and he shall also bear the cost of removing them from the Site.

The Engineer shall have the right to inspect materials and plant for the permanent works during the course of manufacture. The Contractor shall arrange for the right of access to manufacturing premises for the Engineer and his staff during normal working hours. The Contractor shall give the Engineer sufficient notice to allow him to observe the testing of any materials for the works at the place of manufacture. The Engineer shall also be given the opportunity to inspect any material or plant in their completed state before packing for transport to the site.

If requested by the Engineer, the Contractor shall provide the Engineer with copies of orders for the supply of goods or materials required for the works.

Rejected materials and defective work

Materials or work which, in the opinion of the Engineer, do not comply with the Specification, shall be classified as rejected materials or defective work, and shall be cut out and removed from the works and replaced as directed by the Engineer.

Alternatives

The Contractor's main Bid shall comply fully with the Specification.

The Contractor is however at liberty to include alternative materials, items of Plant or methods of construction for which he claims advantages to those indicated in the Specification and Drawings, provided the modes of operation and methods of construction are fully described and are at least equal to those shown on the Drawings or Implied in the Specification.

The Contractor shall submit manufacturer's detailed descriptions of alternatives and he shall draw attention to any aspect of each component that does not fully comply with the

requirements of this Specification. These detailed descriptions, including any departure from the requirements of the Specification may, after approval by the Engineer, be included among the Contract documents and each item shall be in accordance with the description of it. Approval of a manufacturer's description shall not include approval of any departure from the requirements of the Specification unless the Engineer in writing specifically approves the departure.

Where materials, Plant or methods of construction differ from those specified, the Contractor shall submit with his Bid drawings showing any amendments of system design necessary to suit the alternative. The Engineer will either approve these drawings or issue others if he approves the components concerned.

The Engineer however, may not necessarily accept any alternative put forward. Existing works and services

The Contractor shall acquaint himself with the positions of all existing works before any excavation is commenced. He will be held responsible for any damage, however caused, in the course of the execution of the works, to such existing works and services. Any damage caused shall be made good at the Contractor's expense.

Such existing works and services, where exposed by the execution of the works, shall be properly shored, hung-up and supported to the satisfaction of the Engineer and of the authority concerned. The Contractor shall exercise special care when refilling trenches or other excavations around such existing services. Stop cock boxes, water meters and the like shall not be covered up.

Poles supporting cables and the like adjacent to the works shall be kept securely in place until the works are completed and shall then be made as safe and permanent as before.

Notwithstanding the foregoing requirements and without lessening the Contractor's responsibility, the Contractor shall inform the Engineer immediately any existing works have been exposed and shall comply with any requirements of the authority concerned.

Only when and as directed by the Engineer shall the position of existing works or services be changed by the Contractor to meet the requirements of the proposed work.

The Contractor shall make adequate provision so that when carrying out his work, no interference, damage or pollution is caused to highways and footpaths, or to any mains, drains, sewers, and the like or other parts of the works.

Wherever loads have to be carried over ground in which pipes, valves, culverts, and the like are buried, the Contractor shall take all precautions including where necessary, the provision and use of sleepered roads, light gauge railways or other means to prevent damage occurring to such underground works.

The Contractor shall not store any plant or materials or spoil heaps over existing water mains, or in such positions that interference with access to the mains, control valves and the like is created. Approval by the Engineer to the means of protection employed shall not relieve the Contractor of any responsibility in respect of damage occasioned by his operations.

The laying of pipe work, ducts, drains and the like shall be arranged so as to cause as little disruption, to traffic or public movement as possible with the smooth operation of existing works.

When breaking out and making good existing structures, the Contractor shall disturb the existing structures as little as possible. All structures shall be made good with materials similar to those used in the existing works, or such materials which are considered by the Engineer to be of similar appearance and suitable in all other respects.

Overhead power lines

Where work is being carried out in the vicinity of overhead power lines, the Contractor shall be responsible for ensuring that all persons working in such areas are aware of the safe working distances in the vicinity of high voltage overhead power lines especially when cranes or other large masses of steel are in the vicinity of the power lines.

The Contractor's attention is drawn to BS 162, which gives safe clearance for various voltages.

The Contractor shall take all necessary precautions to ensure the safety of his employees and all other persons where work is being carried out near overhead power lines.

Existing access

Existing access to lands, property and all other places shall be maintained by the Contractor for the duration of the works to the Engineer's satisfaction.

Excavation across roads and tracks

Before excavating across any public or private road or track, the Contractor shall give the Engineer ten days notice of his attention to excavate and shall include, in writing, the precautions he proposes to take for the continuance of passage and safety of traffic, and details of the warning signs and lights to be provided and operated. The excavation shall not commence until the written approval of the Engineer has been given.

Liaison with police and other officials

The Contractor shall keep in close contact with the police and other officials in the areas concerned regarding their requirements for the control of workmen, movement of traffic, or other matters and shall provide all assistance and facilities which may be required by such officials in the execution of their duties.

Preservation of trees

No tree shall be removed without prior written permission of the Engineer who will limit the removal of trees to the minimum necessary to accommodate the permanent works.

If trees are removed or damaged by the Contractor or his employees, without approval, then the Contractor shall replace such trees.

Replacement trees shall be not less than two years of age, obtained from a reputable nursery and of a species approved by the Engineer.

The Contractor shall plant, water and ensure that the replacement trees are properly established.

General protection

It shall be the Contractor's responsibility to ascertain the existence of all improvements and facilities which may be damaged by its operations, under or above ground, and he shall protect such facilities which are not to be removed. Such objects which are damaged by the Contractor's operations shall be replaced or restored to a condition as good as when the Contractor entered upon the work, at no cost to the Employer. Damage to existing roads caused by the Contractor's equipment or operations shall be repaired by the Contractor at no cost to the Employer.

Protection from water

The Contractor shall keep the whole of the works free from water and shall be deemed to have included for all pumping, shoring, temporary drains, sumps and other measures and provisions necessary for such purposes and for clearing away and making good to the satisfaction of the Engineer any damage caused thereby.

Protection against fires

The Contractor is advised that, at all times, it is necessary to guard against fires starting within the Site or in the environs thereof, particularly as the result of the works or from the actions of his employees. The Contractor shall have available, at all times; a trained fire-fighting team provided with adequate fire-fighting equipment and shall deal with all fires on the Site howsoever caused.

Site security

The Contractor will be responsible for the security of works and of site installations during the Contract Period. He must provide fencing, watch and lighting as he deems necessary.

Description of material and workmanship

The following apply to all sections thereafter.

(a) Materials

Materials, commodities, components and equipment are to be new and unused unless otherwise specified. Handle, store, fix and protect all commodities with care to ensure that they are in perfect condition when incorporated into permanent work and handed over on completion

(b) Manufactures recommendations

Handle, store and fix every commodity strictly in accordance with the printed or written recommendations of the manufacturers and/or suppliers. Supply the engineer with copies of the manufacturer's recommendations. Inform the engineer if the manufacturer's recommendations conflict with any other specified requirements and obtain his instructions before proceeding.

(c) Standards

Where commodities or workmanship are specified by reference to Kenya Bureau of Standards (KS), or British Standards (BS), or Code of practice (CP), or international (ISO) or any other standard, such standards are deemed to be the latest published at the time of tendering. The Contractor will be deemed to have read and understood the standards specified, and no claim for lack of knowledge will be allowed. Substitution of commodities or standards of workmanship complying with other standards may be allowed at the discretion of the Engineer, but application for permission for such substitution must be made in writing in sufficient time to allow adequate irrigation. The Contractor must obtain Certificate of compliance with the standards and supply to the Engineer on request.

Water and power for use on the works

The Contractor shall be solely responsible for the location, procurement and maintenance of a water supply adequate in quality and quantity to meet his obligations under the Contract.

The Contractor shall be solely responsible for the location and continuity of the supply of water for use on the works. Supplies may be derived from boreholes, rivers and streams, but shall in all cases be to the Engineer's approval. The abstraction of water from any sources shall not interfere with any permanent water supply. The Contractor shall be solely responsible for the transporting of water from its source to the point at which it is required for construction purposes, and in such quantities and quality as to enable the works to proceed without hindrance due to the shortage of adequate water supplies.

The Contractor shall take care to avoid unnecessary use of water and to prevent any water running to waste.

The Contractor shall make his own arrangements for power supplies and shall be solely responsible for the location, procurement and maintenance of a power supply, adequate to meet his obligations under the Contract.

Fuel supplies

The Contractor shall arrange for obtaining, storing and distributing all fuel oils required for the completion of the works.

Telephone and communications

The Contractor shall obtain suitable means of communications during the course of the Contract. The use of radio communications may be permitted but the Contractor shall be responsible for obtaining all the necessary permits and licenses.

Sanitation

The Contractor shall provide adequate sanitation and refuse collection and disposal facilities complying with state laws and local by-laws for all houses offices workshops, and the like, erected on the site, all to the satisfaction of the Engineer.

The toilet facilities provided at the site by the Contractor shall be made available, free of charge, to the employees of the Contractor and any of his Sub Contractors.

The Contractor shall warn his employees and Sub Contractors that any employee found fouling the site shall be removed from the site immediately in accordance with the Conditions of Contract.

First aid and medical services

The Contractor shall provide and maintain all equipment necessary to render first aid in case of accidents, snakebites or other emergencies. This equipment shall be kept in readiness at the sites of the works, at camps and wherever the Contractor's staff may regularly live and work. The Contractor shall ensure that there are persons available at all such places with knowledge of simple first aid procedures and able to administer snakebite treatment.

Health checks

The Employer may arrange for the taking of swabs, urine and stool samples from all persons who will be working in and around the works, to ensure that all such persons are free from contagious diseases.

The Employer will pay all medical costs incurred in the taking and analyses of these samples. The Contractor shall make his employees available during normal working hours for undergoing the above mentioned health checks. Reasonable notice will be given.

The Contractor shall keep records in respect of all his employees, showing the dates on which health checks have been and will be carried out.

Every employee whom the Contractor intends to engage on the works shall, in addition to being available for the above tests, successfully undertake a test for typhoid and paratyphoid at an approved hospital or medical centre. The medical certificate for each employee shall be submitted to the Engineer before the employee shall be allowed on Site.

Inspections by the Engineer during the Defects Liability Period

The Engineer will give the Contractor due notice of his intention to carry out any inspection during the defects liability period. The Contractor shall, upon receipt of such notice, 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 take note of all matters and things to which the Engineer shall direct his attention.

Health and safety

General

The Contractor shall use his best endeavor to ensure, so far as is reasonably practicable and to the satisfaction of the Engineer, the health, safety and welfare at work of his employees, including those of his Sub-Contractors, and of all other persons on the Site. His responsibilities shall include:

- i. Provision and maintenance of safe and properly illuminated Contractor's Equipment;
- ii. Establishment of safe and well-illuminated systems of working;
- iii. Provision of protective clothing and equipment;
- iv. Establishment of first aid stations, staffed and equipped to provide information, instruction, training and supervision on all aspects of safety and health on site;
- v. Appointing as Safety Officer one of his senior staff who shall have specific knowledge of safety regulations and have had experience of safety precautions on similar works and who shall advise the Contractor on all aspects of safety and health on Site;

Provision and maintenance of safe access to all work areas on the Site;

- vi. Provision of adequate sanitary facilities and maintenance of these in a clean and hygienic state for use by all persons employed by the Employer, Engineer, Contractor or other Contractors on the Site;
- vii. Measures to control flies, mosquitoes and pests in both working and recreational areas including chemical spraying, if necessary, in compliance with the rules and regulations of the Employer;
- viii. Reporting details of any accident to the Site Safety Officer as soon as possible after its occurrence;
- ix. Reasonable prevention of non-site personnel from entering the work areas.

Safety Equipment and Training

The Contractor shall provide:

- a) All necessary breathing apparatus, safety harnesses and any other equipment required to ensure safe working of all his personnel on Site;
- b) Test certificates for all safety equipment;
- c) Proof that all relevant personnel have received appropriate training.

Noise Control

The Contractor will be required to employ well maintained plant on site at all times and shall undertake all works strictly in accordance with the recommendations of BS 5228 standards (all parts) Noise Control on Construction and Open Sites or other equivalent agreed standards.

Health and Safety Plan

The Contractor is required to produce a health and safety plan covering the hazards that may apply during the Contract, the rules and standards to be used in assessing risk and in undertaking work and the methods that he will employ to ensure compliance with his plan.

The Health and Safety Plan shall include details of the following:

- Details of all potential risks and the proposals for dealing with such hazards;

- Controls to regulate risks that occur during all construction, testing and commissioning activities;
- Measures to avoid health risk in connection with the use, handling, storage and transportation of hazardous and harmful substances;
- Safety equipment and training proposals in respect of equipment referred to above.

Sign Boards

Before the erection of any signboards or posters by the Contractor, the Contractor shall obtain the approval of the Employer and the Engineer to the size, location and wording of such sign boards or posters.

Building Regulations

All buildings erected by the Contractor upon the Site and campsite or sites and the layout of the buildings shall comply with the Laws of Kenya and all local by-laws as far as they are applicable.

Progress Photographs

Photographs showing the progress of the works shall be taken by a competent photographer every month from positions to be selected by the Engineer.

Special photographs showing particular features of the works or matters of interest concerning the works or their surroundings shall also be taken from time to time as and when required by the Engineer.

Photographs shall not be less than 120 mm x 90 mm and shall be inscribed with the date when taken and a brief description or title.

All negatives shall be numbered; retained on the site and on completion of the works the negatives shall become the property of the Employer.

Contractor's Tracked Equipment

The Contractor's tracked equipment may not be run on any public or private road without the written permission of the owner or authority concerned.

Site Meetings

The Contractor shall be obliged to attend all site meetings at the appointed time.

Samples

The Contractor shall submit to the Engineer samples of materials to be used in the works, the samples must be fairly representative of the bulk to be supplied or used. Samples should be subject to relevant tests before submission and Test Certificate should accompany the samples

Testing of water retaining structures

All water retaining structures shall be tested for water tightness on completion in the following manner. The structure shall be filled with water in stages and held at each water level as the Engineer may require. Shall any dampness or leaking occur at any stage the water shall be drawn and the defects remedied to the satisfaction of the Engineer. The procedures shall be continued and finally the structure shall be allowed to remain full for seven days. Should any dampness or leakage or any other defects occur they shall be made good to the satisfaction of the Engineer and the structure retested until the water tightness is approved by the Engineer.

Cleansing and Sterilization of Water Retaining Structures

The inside of all potable water retaining structures and all interior pipe work and fittings shall be thoroughly cleaned and washed after the water tightness has been approved by the Engineer.

The structures shall be filled to overflow level with clean water containing 20 parts per million of chlorine and left shall be drained away and the structures for a period of at least 24hours. The chlorinated water refilled with clean water from which samples shall be taken for analysis to the instructions of the Engineer. If any of results of the analysis are unsatisfactory the sterilisation process shall be repeated until the results of the tests are satisfactory.

Substantial Completion

Substantial completion will mean the works are capable of being fully used by the employer in accordance with the intent of the design standards.

Test on Completion

On commissioning of the works the Contractor shall have on site personnel to ensure that all the plant is working satisfactorily. The personnel shall be on site for a minimum of 7 days or for such time as required to determine that the equipment is operating to the satisfaction of the Engineer

Site Clearance upon Completion of Works

On completion of the works, the Contractor shall clear the site and remove all temporary buildings, equipment and debris. The Contractor shall level off and grade all areas used for haul roads and all building, store and workshop areas. The whole of the site shall be left in a clean and tidy condition.

EARTHWORKS

Conditions of Site

Before carrying out any work on the site the site shall be jointly inspected in conjunction with the Engineers representative to establish its general condition which shall be agreed and recorded in the writing.

Details to be recorded shall include location of all boundary and survey beacons, the condition of buildings surfaces, roads, tracks existing structures, services, fences and other information related to the site and elsewhere which may be affected by the Contractor operations.

In the case of way leaves for mains and pipelines the boundary of the way leaves shall be decided by the employer and the Contractor shall provide, erect and maintain in position from commencement to final completion of all works and all reinstatements in every section substantial timber stakes or similar approved timber markers not less than 1.5m high indicating position of every beacon at 100m or such other interval as the Engineer's representative may require.

In the event of any boundary or survey beacon being disturbed or displaced as a result of the Contractors operations the Contractor shall forthwith at his own expense replace the beacon and shall employ the services of an approved licensed Surveyor for this purpose.

Clearing site

The Contractor shall use methods approved by the Engineer to clear trees, bushes and vegetation from areas to be occupied by the permanent structures required for the Works.

The Contractor shall demolish, break up and remove buildings, walls, gates, fences, advertisements and other structures and obstructions, grub up and remove trees, hedges, bushes and shrubs and clear the site of the works at such time, and to the extent required by the Engineer. The materials so obtained shall so far as suitable be reserved and stacked for re use as directed; all rubbish and materials not for use shall be destroyed or removed from the site, as directed by the Engineer. Unless otherwise stated elsewhere, all other materials which are cleared shall become the property of the Contractor.

Where top soil has to be excavated this shall be removed and stacked on site. After completion of construction, it shall be spread over the disturbed ground, any surplus being disposed of as directed by the Engineer.

Underground structures and chambers where required to be demolished, shall be demolished to depths shown on the Drawings or as directed. They shall be properly cleaned out and back filled and compacted with suitable material to the direction and approval of the Engineer.

Vegetation

No allowance will be made for the cutting and removal of the crops, grass, weeds and similar vegetation. The cost of all such work will be held to be included in the rates entered in the bill of Quantities for excavation.

Bushes and Small Trees

All bushes and small trees, the main stem of which is less than 500 mm girth at 1 meter above ground level shall be uprooted (unless otherwise directed by the Engineer) and burnt or otherwise disposed of as directed by the Engineer.

Hedges

Where directed by the Engineer hedges shall be uprooted and disposed of by burning.

Felling Trees

Where directed by the Engineer, trees shall be uprooted or cut down as near to the ground level as possible and the rates entered in the Bills of Quantities shall include for cutting down, removing branches and foliage, cutting useful timber into suitable lengths, loading, transporting not more than 1 km and stacking or disposing of all as directed by the Engineer. For the purpose of measurement trees cut down shall be classified according to their girth at 1 meter above ground level, the cost of grubbing roots shall be deemed to be recovered by the rate for felling trees.

Grubbing-Up Roots

Stumps and trees roots shall, unless otherwise directed, be grubbed up, blasted, burnt or removed and disposed of in approved dumps to be provided by the Contractor. Where directed by the Engineer, the holes resulting from grubbing up shall be filled with approved materials, which shall be deposited and compacted in layers not exceeding 225 Mm loose depth, to the same dry density as that of the adjoining soil. For the purpose of measurement, trees roots shall be classified according to the mean diameter of the stump measured across the cut.

Structures

Structures shall not be demolished unless specified or directed. Methods of demolition shall be approved.

Ground levels

Following the completion of site clearance and before the commencement of any earthworks, the site shall be surveyed in conjunction with the Engineers representative to establish existing ground levels and these agreed ground levels and these agreed ground levels shall form the basis for the calculation of quantities of any subsequent excavation and filling.

GENERAL EXCAVATION CLAUSES

Advance notification of proposed methods

The Contractor shall submit for the consent of the Engineer detailed proposals for methods, dewatering and safety arrangements in respect of each major or critical section of excavation, including drilling and blasting where appropriate. Except as may

be otherwise agreed, the proposals shall be presented at least four weeks before the intended start date and the Engineer shall comment on the proposals within 2 weeks. Only after the receipt and revision of these proposals as may be requested, and with the written consent of the Engineer, shall the Contractor commence the excavation work to which the proposals refer.

The Engineer shall not unreasonably withhold consent and will request revisions of proposals only if he considers that an acceptable end result would otherwise be unlikely. The Contractor shall not subsequently vary the agreed procedure, except in detail, without having obtained the written consent of the Engineer to the change.

No consent as described above shall relieve the Contractor of his responsibility for carrying out his operations in a workmanlike manner and as safely as is reasonably possible to the lines and levels shown on the Drawings or as instructed by the Engineer.

Mechanical Excavation

A mechanical excavator shall be employed by the Contractor only if the sub soil is suitable and will allow the timbering of the trenches or other excavations to be kept sufficiently close to ensure that no slips falls or disturbances of the ground take place or there are no pipes, mains or other services or property which may be disturbed or damaged by its use.

When mechanical excavators are used a different depth of materials sufficient depth of materials shall be left over the bottom of excavations to ensure that the ground at formation level is not damaged or disturbed in any way. The excavation shall then be completed to formation level by hand.

Excavation for pipe laying

The width of trench excavated for any size of pipe shall be a minimum required for efficient working after allowance has been made for timbering and for shuttering and shall be to the approval of the Engineer. Minimum sizes for different pipe diameters are as shown below;

| | | | |
|--------------------|-----|-----|-----|
| Pipe diameter (mm) | 100 | 250 | 300 |
| Trench width (mm) | 550 | 650 | 750 |

In the first instance the trench shall be excavated to within 1250mm of its formation and proper grade pegs shall then be set in the bottom of the trench by the Contractor for the accurate taking out of the rest of the excavation. Excavations shall then be completed by hand to provide a uniform and solid bearing for pipes throughout their entire length.

The bottom of the trench shall be smooth and shall be free from stones and other projections. Joint holes shall be as small a size as possible.

If instructed by the Engineer the Contractor shall be required to excavate the pipe trench to a depth of 100mm below the invert of the pipe and refill with compacted granular. Fill to provide a smooth and uniform bed for the pipes. Payment for such additional excavation and additional refilling will be made at the tendered rates.

The materials excavated from trenches shall be laid compactly at the sides of the trench except where in the opinion of the Engineer's representative this would so obstruct any road or footpath as to prevent passage of traffic or pedestrians. In such cases the Contractor shall excavate material at such distances to the specifications of the Engineer.

Excavation for Foundations Thrust and Anchor Blocks

Excavation for foundation and for anchor and thrust blocks shall be to such depths as the Engineer may direct and no concrete or other material shall be placed until formation has been examined and approved.

The engineer may direct that a layer of excavation of not less than 75mm thick shall be left undisturbed and subsequently taken out by hand immediately before concrete or other material is placed. Similarly such concrete or other material placed in contact with the side face of an excavation the Engineer may direct that the final 75mm thickness of excavation be left undisturbed and subsequently take out neatly to profile by hand.

Areas of excavation which are to receive a layer of concrete as screening under the structural concrete shall be covered with the screening immediately the excavation has been completed.

DE-WATERING OF EXCAVATIONS

The Contractor shall maintain all excavations free from water, irrespective of its source, to the extent necessary for the execution of the Works or in the interests of safety, and to the satisfaction of the Engineer. He shall provide, install, operate and maintain all necessary appliances and Plant for this purpose.

The Contractor shall take all necessary precautions at points of discharge of water to avoid flooding or damage to the Works, adjoining works or property and to avoid pollution of watercourses.

Cuttings, embankments and borrow areas shall be drained so as to be free of standing water which would have adverse effects on the permanent works. All drains and ditches shall be properly maintained. The Contractor shall replace any material which, in the opinion of the Engineer, has been adversely affected by water.

The dewatering of excavations immediately prior to concreting shall not be commenced until at least one standby pump is on hand.

Remedial Work

Any damage resulting from the Contractor's operations during excavation, including damage to foundations and excavated surfaces shall be repaired at the expense of the Contractor and to the satisfaction of the Engineer.

Safety of Excavations and Persons

SAFETY OF EXCAVATIONS

The Contractor shall take full responsibility for the stability and safety of all excavation works and methods of construction including temporary support of excavated surfaces, diversion of water, pumping etc. He shall assume full responsibility for the safety and prevention of injury to personnel and for damage. His safety provisions shall comply with relevant local regulations and the requirements of Clause 1.35.

The Contractor shall provide and install handrails all necessary temporary supporting works such as timbering, shoring, anchorages and the like wherever such support is required. All support arrangements must be to the approval of the Engineer, who may order such support to be strengthened or altered if it is considered necessary in the interests of the work or to safeguard against accidents to workmen.

If the Contractor wishes to batter and/or cut back the face of an excavation in order to eliminate or reduce the quantity of timbering and shoring required, he shall obtain permission from the Engineer. Both the slope and the extent to which such battering is to be carried out must be agreed with the Engineer before excavation is commenced.

Timbering and shoring shall be so designed and constructed that, if necessary, it can be inserted as excavations proceed and safely withdrawn as backfilling is raised. Wallings and struts shall be suitably positioned to permit pipes and other materials to be installed in the excavations. No temporary supports shall remain in excavations after backfilling unless approved by the Engineer.

If slips of material occur in any part of the excavations during the execution of the Works or during the Defects Liability Period, the necessary remedial works shall be executed to the approval of the Engineer. Such remedial work shall be at the Contractor's expense in cases where the Engineer considers that the Contractor has not exercised reasonable preventive measures.

xxvii. Classification of Excavated Material

Classification of excavation material shall be as in the Ministry of Public Works Standard Specification (MoWSS) section 5.

- (a) Class 1: "Rock" or Hard Materials shall include all material in which in the opinion of the Engineer requires blasting or the use of metal wedges or the use of compressed air drill for its removal or cannot be extracted by ripping with a tractor of less than 180 hp. And rear mounted heavy ripper. Individual boulders greater than 0.2m³ in volume shall be included in this class when their nature and size are such that they cannot be removed without recourse to one of these methods.

When a portion of excavation contains 75% or more by volume of boulders of this order such portion shall be considered as class 1 material throughout.

- (b) Class 2: "Normal" or Soft Materials shall include all material which in the opinion of the Engineer does not require blasting or metal wedges and sledge hammers, or compressed air drilling or rooting or ripping.
- (c) Class 3: "Compacted Gravel" or "Decomposed rock" shall include all material such as consolidated murrum and decomposed stratified rock, stones or boulders than 0.2m³ in volume which are harder than soft or normal material in that they may be extracted by ripping as defined in Class 1, or in confined spaces by hand excavation using compressor tools, provided all other reasonable steps to the satisfaction of the of the Engineer have been taken to facilitate the removal by the other methods.
- (d) "Waterlogged Material" Material of Class 2 and 3 that is excavated in a waterlogged condition and necessitates de-watering and pumping operations provided all reasonable precautions have been taken by the Contractor to dewater that material to the satisfaction of the Engineer.

In the event of a dispute as to the classification of a material, the decision of the Engineer shall be final. The Engineer shall be empowered to require rock to be excavated without explosives and payment will be made accordingly.

xxviii. Limits of Excavation

The surfaces exposed by open cut excavation against which concrete is to be placed shall be excavated to the lines shown on Drawings or as required by the Engineer. No material shall remain within the outline of structural concrete. Elsewhere in open cut, the excavation shall be to the lines and levels shown on the Drawings or as required by the Engineer except that local points of undisturbed hard rock may be permitted to extend within the required lines of excavation where approved by the Engineer.

REVISION OF LIMITS

During the progress of the work, the Engineer may find it necessary or desirable to revise the required lines and levels of any part of the excavations because of the conditions disclosed by the excavations or for any other reason. When the Contractor is advised of such revision before the excavation of such part has been commenced to the lines and levels shown on the Drawings, the revised excavation will be paid for at the billed rate for the main excavation. If, however, such revision requires additional excavation to be made after the excavation of such part has already been carried out to a point where the normal procedure for the main excavation cannot reasonably be used, the additional work shall be carried out as specified and will be paid for under the Contractual provisions for variations. This will include removal of rock and filling of resultant voids which, in the opinion of the Engineer, could not reasonably have been anticipated and are beyond the control of the Contractor.

EXCAVATION IN EXCESS

The Contractor shall not deliberately excavate beyond the lines and levels shown on the Drawings or designated by the Engineer (as above or otherwise) without prior written approval. Any deliberate excavation beyond the required lines and levels which is performed by the Contractor for any purpose (such as for working space) shall be at the expense of the Contractor. If such excavation should, in the opinion of the Engineer, require to be backfilled, such backfilling shall be done at the Contractor's expense to the satisfaction of the Engineer with grade 10 concrete or compacted granular or other approved fill material similar to the to the original formation level and/or dimensions as the Engineer require. Beneath load bearing structures, foundations and other reinforced concrete work, the filling to any over-excavation shall be of the same quality concrete as that required for the associated concrete structure unless the Engineer permits leaner concrete.

Where it is intended that concrete be cast against the side of excavated material the Contractor may alternatively propose to the Engineer to over-excavate, back shutter

and backfill, but the Engineer will be under no obligation to accept the proposal and, subject to the conditions listed in the notes on measurement, no extra payment will be made if the alternative proposal is accepted.

Refilling of Excavations

All re-filing of excavations and trenches shall be thoroughly compacted in layers not exceeding 150mm. compacted thickness and by means which will not damage the works.

Hard Filling

Hard filling shall consist of approved clean mixed ballast, broken stone and or concrete. All the material shall be broken so as to pass through 75mm diameter ring. Fill shall be free from earth, clay, vegetation and other organic matter and shall contain no broken plaster mortar or other rubbish. It shall be laid in 300mm. layers each layer being properly spread and thoroughly compacted with rollers and/or rammers.

Refilling of Pipe Trenches

Filling around and for 300mm over the top of pipe shall be completed by hand using approved hand rammers and suitable material obtained from excavations. Materials for such refilling shall be free from stones greater 25mm.

Free Draining Fill

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

Graded Gravel for Drains

Graded gravel surround to drains shall be clean washed stone or crushed hard rock graded between 20mm and 5mm.

Hardcore

Hardcore for use in foundations and paved areas shall consist of sound hard stone or broken rock or concrete derived from excavations demolition of structures and shall be

75mm in size. Sufficient but not excessive blinding material of smaller sizes may be used at the discretion of the Engineer.

Pumice Filling of Roof

Insulation of for the horizontal reservoir roof shall be of broken pumice or such other stone as the Engineer may approve which has been washed, screened so as to eliminated dust and small particles. Pumice shall be distributed evenly and raked true to falls and to uniform finished thickness.

Sources of Fill Materials

The Contractor shall obtain the necessary general fill materials for construction of the works from excavations required to be undertaken for the permanent works.

Other fill materials such as sand, graded aggregate and rock fill for use as fill materials and all road works materials shall be obtained by the Contractor from sources to be approved by the Engineer.

The Contractor is required to provide details of his proposed source of fill materials within upon award of Contract. Irrespective of the details provided above, the Contractor will be entirely responsible for ensuring that the materials supplied meet the requirements of the Specification including for any necessary crushing, blending or other preparation.

Acceptance by the Engineer of the source of any material in no way will not be deemed to imply approval by the Engineer of the material to be supplied, nor shall approval of a potential borrow area be construed as constituting approval of all materials contained therein.

The Contractor will be responsible for obtaining all necessary approvals and temporary way leaves in connection with the obtaining of fill materials at his own cost.

The Contractor shall carry out at his own expense such sub-surface investigations, and obtain and submit such samples as are required by the Engineer, to enable the Engineer to assess the suitability of the materials in any proposed borrow area for use as fill. The Contractor shall keep accurate records approved by the Engineer of any test pits, trenches or drill holes which he makes for the purpose of investigating fill materials and a copy of such records shall be submitted to the Engineer immediately after completion of the test pit, trench, or drill hole. Samples recovered from such test

pits, test trenches and drill holes and submitted to the Engineer for approval will be tested at the expense of the Contractor.

The Contractor shall give the Engineer not less than 14 days notice of his intention to develop any potential borrows area or quarry.

Excavated Material Suitable for Re-Use

Depending on its nature and quality, excavated material will either be:-

- Re-used as fill or backfill;
- taken to spoil.

The Contractor shall select materials as required and use his skills to avoid unnecessary waste of potentially usable materials.

Re-used material

Where the Contractor has been informed that the intention is that excavated material is to be re-used elsewhere in the Works, the Contractor shall ensure that his excavation techniques result in material suitable for the particular re-use requirement which is described.

In order to achieve particular materials the Contractor shall be prepared to sort materials into different stockpiles, which he must maintain in an uncontaminated condition. Any contaminated material shall be abandoned and replaced at the Contractor's expense. The Contractor may be required to cart the excess contaminated material to spoil or dispose them in-situ as directed by the Engineer. No extra costs will be paid to the Contractor for complying with such instructions. In executing the instructions issued by the Engineer, the Contractor will be required to give effect to the environmental concerns specified in Clause 1.19 hereof.

In all such cases it will be to the Contractor's advantage to phase as far as possible the excavation work to suit the construction in which the excavated material is to be re-used, particularly as no additional payment for double-handling of materials will be made.

Requirements specific to excavations for particular parts of the works Trenches, manholes and confined foundations

Confined and narrow excavations, such as for trenches and manholes, shall be excavated with particular care and attention to adequacy of temporary strutting because trench collapses are one of the commonest causes of death and injury on construction sites. The dangers inherent in inadequate supervision of such work, particularly in water-bearing ground or damp conditions, cannot be over-emphasized. Continuous dewatering may be necessary in water-bearing ground.

Excavated material shall be cast or moved to a position sufficiently far away from the edge of the trench that instability of the trench wall (supported or otherwise) will not be called into question.

Excavated material which will clearly be unsuitable as backfill shall be removed to spoil as soon as possible after being excavated.

The widths of trenches for pipes shall be of the minimum required or as shown on the Drawings. Trenches shall not be so narrow that the pipe cannot be properly installed and jointed. Neither shall they be of excessive width or with battered sides because this will increase the loading on an unprotected pipe. At pipe joint locations the trench shall be widened and deepened to leave the joints unsupported so that they can be properly made and inspected. In Class 2 material an extra 150 mm over the depth for Class 1 material shall be excavated and replaced by pipe bedding material.

Supports shall be left in permanently when so directed when they are removed; the removal shall be done progressively as backfilling proceeds and in stages so that no voids are left.

Excavations at or near the toes of cuttings or embankment slopes shall be carried out in such a manner that there is no excavation into the slopes. In such trenches the pipe run shall be completed and backfilled at the end of each day's work unless otherwise agreed with the Engineer.

Structures

The Contractor shall excavate such that concrete and other structures may be formed to the lines and levels shown on the Drawings or as instructed by the Engineer. He shall increase the dimensions above the minima required in the interests of safety if so directed by the Engineer. In the course of the excavation work, the surrounding material shall be preserved in the soundest possible condition.

Excavation for foundations in Class 1 material shall be made to approximately 0.5 m above the levels shown on the Drawings. Final trimming shall be delayed until shortly before foundation preparation is due to commence.

During the course of blasting operations where, in the opinion of the Engineer, action is necessary to avoid damage to adjoining material or to adjacent structures, the Engineer may instruct the Contractor to reduce the explosive charges or to use other methods such as pre-splitting or cushion blasting or to cease using explosives altogether and to continue by other means such as use of hydraulic breakers or line drilling.

Excavated surfaces which will remain permanently exposed shall be finished off in a neat and workmanlike manner and graded to provide adequate drainage. Rocky material liable to become detached from such surfaces shall either be removed (and holes backfilled where practicable) or anchored.

Excavated surfaces on or against which concrete structures will be cast shall be trimmed so that there are no projections within the permissible limits and cleaned to remove loose, soft or foreign materials by hand, air and water jets or other effective means. Unless shown otherwise on the Drawings or directed by the Engineer, the Contractor shall cast all in situ concrete structures against the excavated side surface in Class 2 material. Thus, when excavating in Class 2 material, excavation lines shall be kept as close as possible to the actual structural requirements.

Where the Contractor over-excavates sides of excavations by an additional width exceeding 500 mm, the Engineer shall be empowered to direct the Contractor to use formwork at his own expense to achieve the final surfaces of in situ concrete structures.

Disposal of excavated material

Material which has to be excavated in order to execute the Works, but is unsuitable for construction purposes or which is surplus to requirements as fill, shall be kept separate from other materials and not allowed to cause contamination of material required for use in the Works. Such unwanted material shall be disposed of by spreading the material in layers in designated spoil areas as directed by the Engineer. The material shall be compacted to the maximum practicable extent by routing the haulage traffic over the area. Permanent spoil areas visible after completion shall be shaped to follow existing contours such that the tips blend in with the local topography. Such disposal areas shall be kept neat and tidy. Surfaces shall be finished and graded to the extent necessary to provide surface drainage, and grassed to prevent future erosion of the materials.

Procedure on completion of excavation

Upon substantial completion of excavation, the excavated surface shall be cleared of spoil sufficiently to allow inspection by the Engineer. Final clearing and surface preparation procedures shall not commence until the Engineer has approved the excavated level. Neither shall any excavated surface for the Permanent Works be covered until the Contractor has obtained the approval of the Engineer. The Contractor shall at his own expense uncover any excavation which has been covered without such approval.

Where the material replaced in an excavation is other than the material removed, supports shall be removed before or during filling and in such a way that the material from the walls of the excavation does not contaminate the replacement material.

Excavated surfaces which are to have fill material or concrete placed upon them shall be prepared as specified elsewhere.

Site investigation

The Contractor will be deemed to have made all necessary site investigations at the time of tender.

Drilling and blasting

The use of explosives by the Contractor shall at all times and in all respects be in accordance with BS 5607 and local regulations. Prior approval of the Engineer must be obtained and the method of blasting approved if the Contractor wishes to remove rock by blasting. The handling and use of explosives must comply with the explosives act or the department of mines and geology regulations. All necessary precautions to prevent injury or damage to person or property must be taken.

Before any blasting operation is commenced, the Contractor shall submit for approval such details as the Engineer may require, including drilling, charging and firing patterns and, when requested, calculations indicating the anticipated level of shock waves reaching nearby structures and works.

The Contractor shall use explosives for blasting in connection with the work only at such times and places and in such manner as the Engineer may approve, but such approval shall not relieve the Contractor from his responsibilities for injury, loss, inconvenience to persons, damage to the Works or to adjoining structures, roads etc., by the use of

explosives. The Contractors blasting foremen shall have suitable experience to the approval of the Engineer and a current blasting license for the type of work required.

The Contractor shall be entirely liable for any accident which might occur and shall meet any necessary compensation for injury or damage caused to persons, animals, works or property. The Engineer shall have the power to limit or prohibit blasting in areas where, in his opinion, the use of explosives would have adverse effects or has been carried out in a reckless manner. In the event of such limitation or prohibition, the Contractor shall have no claim against the Employer for delay.

Where there is a possibility of shattering the rock to an unacceptable degree or damaging concrete already placed, the Engineer may order the Contractor to cease blasting and to excavate the rock by hydraulic breakers, line drilling or other approved methods.

Except as otherwise approved by the Engineer, no bench height in rock shall exceed 6 m. Blasting shall be carefully controlled as approved by the Engineer to preserve the rock beyond the required lines and levels in the soundest possible condition by such means as limiting the size of the charges, varying the size and spacing of the drill holes, and using delays. Any unstable or shattered material beyond such lines and levels shall be removed immediately to the satisfaction of the Engineer.

Where material of a particular grading is required to be produced from solid material for use in the Works, the Contractor shall adjust his procedures as may be necessary.

Stability of exposed rock faces

Earlier clauses, concerning excavation generally, have already made it clear that the Contractors support measures shall be approved by the Engineer but that such approval will not relieve the Contractor of any of his Contractual responsibilities.

As rock excavation proceeds, the Contractor shall scale and remove from the surfaces of any excavation all loose, overhanging or otherwise dangerous rock. Permanent excavated slopes shall be carefully scaled to stabilize the surfaces to the satisfaction of the Engineer, and berms shall be maintained free of fallen rock.

If deemed necessary following excavation, natural and excavated surfaces of rock shall be supported by the most appropriate of rock bolts where required or approved by the Engineer. Temporary support measures shall be applied as soon as possible after excavation and in any case within 2 weeks of agreement that they are required.

Preparation of excavated surfaces

General procedures

As a general rule, foundation areas upon which fill is to be placed without any special measures are to be of material of equal competence to the initial layer of superimposed fill material.

After completion of excavation to the satisfaction of the Engineer, the exposed surfaces shall be cleared of all loose, softened or otherwise unsuitable material to the satisfaction of the Engineer.

Where filling or concrete is to follow, such preparation work will be carried out immediately before covering the excavation and the approval of the Engineer obtained before placement commences. The Contractor shall take all necessary measures to prevent any subsequent damage to or contamination of a cleaned and prepared surface, and shall maintain the surface in an acceptable condition until the commencement of the next stage of work.

Further procedures for class 1 materials

Where the surface exposed at foundation level is Class 1 material suitable to receive whatever is to be placed upon it, no further treatment will be required, other than compaction of exposed horizontal surfaces where considered necessary by the Engineer. The Contractor's excavated profile will be deemed to have taken account of any settlement resulting from compaction and no payments will be made for additional fill resulting from such compaction settlement.

Where, however, the replacement of unsuitable material below the nominal founding level is instructed, the foundation shall be brought back to the correct level as instructed by the Engineer. The replacement material will depend on the type of works concerned. The Contractor is advised that the Engineer will pay particular attention to the density and strength of exposed foundation materials and may order excavation of materials below the level indicated on the drawings together with its replacement in a re-compacted state. Any shortfall in material resulting from an increase in density of the sub foundation layer will be made up from material excavated from the foundation area above and compacted in the excavation to raise the sub foundation layer to the design profile. Payments for such work will be based on unit rates for excavation and filling as provided in the bill of quantities and shall be additional to the payments for preparation of surfaces which will be based on the final excavation profile instructed by the Engineer, including any over excavation as detailed above.

Particular items for preparation of surfaces to receive membrane linings (e.g. hold up pond linings) are included elsewhere in the specification.

Further procedures for class 2 materials

Where the surface is to be prepared to receive fill or concrete, surface cracks, crevices and fissures shall be cleaned by using hand tools, air hoses and water jets to remove loose material to a depth where sound material is encountered or until the depth cleaned out is at least four times the width of the surface opening, whichever is the lesser. After cleaning, the surfaces shall be prepared using appropriate methods as directed by the Engineer.

Particular requirements for concrete structures

Where the excavated surface is Class 1 material, the procedure shall be as already described.

Where the excavated surface is Class 2 material, the Contractor shall employ such measures as brushing, washing and air hosing to clean the surfaces to the satisfaction of the Engineer. Concrete of the grade directed by the Engineer (normally that of the adjoining part of the structure) shall be used for backfilling over break below foundation level at the Contractors expense unless another method is agreed to be acceptable.

Materials for filling

Sources

The Contractor shall submit to the Engineer for approval sufficient samples to determine whether each intended source meets the requirements for quality. No materials may be placed as fill without approval regarding the source. Notwithstanding any such approval, the Contractor shall be entirely responsible for ensuring that only material complying with the Specification is placed in the fill. The Engineer may at any time withdraw his approval of a source if he considers that the material from that source is no longer satisfactory for use in the Works.

The Engineer may refuse to approve a source of material proposed by the Contractor if he considers that other more suitable sources are available.

The Contractors attention is drawn also to Specification Clause 3.3.9 concerning the source of fill materials.

Material for general filling

Materials for general filling shall comprise suitable material excavated from the works which are, in the opinion of the Engineer, suitable for such use. The Contractor shall condition the material to obtain the moisture contents required for placing and compaction. The grading limits and other required properties not stated herein will be shown on the drawings.

Unless otherwise indicated, material will be classified "unsuitable" for general filling if it is:

- (a) clay or silt with an organic content exceeding 12% when tested under the relevant clauses of BS 1377
- (b) clay having a liquid limit exceeding 80 and/or plasticity index exceeding 55;
- (c) susceptible to spontaneous combustion;
- (d) Domestic or industrial refuse and any other material which, by virtue of its physical or chemical composition or moisture content, will not compact to form a long term stable fill.

Suitable material shall comprise all that which is acceptable in accordance with the requirements of the Specification, is within the specified limits of moisture content, is approved by the Engineer and will compact to form a long term stable slope as directed or shown on the Drawings. Where grading envelopes are given, the material shall lie within the grading zone required for the proposed location and shall moreover have a grading curve reasonably parallel to the given envelope i.e. it shall be neither gap-graded nor single-sized.

Graded aggregate filters

Graded aggregates for use as a filter layer in the construction of the holdup ponds and for use as fill in other areas shall comprise aggregates of a similar quality to that specified for concrete construction works as defined in Specification Section 6 and shall be graded according to the details indicated on the drawings.

Rock fill

Rock fill for use in layers in embankments or other areas as erosion protection (e.g. hold up ponds) shall comprise competent, approved rock graded in size within the grading envelopes indicated on the drawings. The individual pieces of rock fill shall be sound, hard, dense and durable to the approval of the Engineer.

General requirements for filling

During placement of fill in foundation areas where seepage is occurring, the Contractor shall direct such seepage away from placement operations. Fill should then be placed and compacted in such areas as quickly as possible.

The Contractor shall construct the fill areas only with materials meeting the specified requirements. The fill shall be free from sizeable lenses, pockets and layers of material which are substantially different in grading from the surrounding material. Materials of widely different grading shall not be placed adjacent to each other.

Fill material shall be loaded, transported, placed and spread in the fill areas in such a manner that excessive segregation is avoided. Any material placed which does not meet the requirements shall be removed, remixed, blended or otherwise reworked at the expense of the Contractor to produce a material which does satisfy the specified requirements whether or not such material has been covered by other fill material.

The Contractor shall construct the fill areas by placing, spreading and compacting the fill material in continuous layers which extend over the entire surface area at that level and are approximately horizontal although they shall have sufficient falls to prevent ponding of rainwater.

The Contractor shall complete each layer of fill placed up to abutment contacts and ensure that compaction as specified is carried out adjacent to abutments. He shall not allow fill at abutment contacts either to lag behind or to get ahead and form feather edges.

All fill materials shall be leveled after spreading to obtain a surface free from irregularities, bumps and depressions. Except where space is limited, fill shall be placed by routing the hauling and spreading units over the fill area and, as far as is practicable, the hauling units shall be so routed that they do not follow the same paths but run evenly over the surface of the fill.

During the placing, spreading and leveling of materials, the Contractor shall remove all particles of rock or boulders which are large enough to interfere with the compaction of the layer of material.

The Contractor shall place, spread and level the fill material in such a manner as to achieve layers which are uniformly thick. Except as otherwise agreed, the thickness of material in each layer after compaction shall be 0.15 m.

xlvi. Compaction definitions

Unless otherwise stated, earthworks compaction will be assessed with respect to the values of maximum dry density and optimum moisture content as determined by the 2.5 kg rammer method described in BS 1377.

xlvi. Moisture conditioning

Moisture conditioning for compaction purposes may be required in the material to be used.

During filling operations, the Contractor shall maintain the moisture content of the fill within a range of 75% to 105% of the Standard Proctor Test optimum moisture content. Prior to dumping and spreading any layer, the surface of the previous layer shall be checked to ensure that the surface has not dried out or become desiccated. If the surface of the previous layer has dried out, the Contractor shall at his own expense lightly scarify and apply water to bring the moisture content within the range required.

Material which is too wet shall be removed from the fill or the moisture content reduced to the designated limits by any methods which will allow the water to evaporate from the fill material if the weather conditions are such that this can be achieved.

Where the fill material is too dry, water shall be added to the material by controlled sprinkling and disc-harrowing or other approved methods to blend the added water uniformly throughout the material as required. If this addition of moisture results in the fill material becoming too wet, it shall be dealt with as described above.

Equipment used to apply water to fill materials shall do so uniformly. Water bowsers shall be equipped with positive shutoff valves such that no leakage will result from the nozzles when the equipment is not operating. Any leaks that do occur shall be repaired immediately. The Contractor shall have in constant attendance during placing and spreading operations a suitable water bowser, a disc harrow or similar device and equipment suitable for lightly scarifying fill surfaces.

Compaction: end-product requirements

The Contractor shall blend, condition, transport, deposit and compact the fill material so that it has the correct moisture content and grading immediately before compaction and the correct relative density after compaction.

Material shall be placed in layers of compacted thickness to suit the compacting equipment but not exceeding 250 mm unless otherwise agreed with the Engineer. For smooth-wheeled rollers the thickness shall not exceed 150 mm.

Unless otherwise stated the layers of fill material shall be compacted to a relative dry density of not less than 95% relative compaction. Laboratory compaction tests shall be conducted by the Contractor at his own cost in conjunction with in situ density tests to be agreed by the Engineer.

If the Contractor's compacting equipment is not capable of producing the minimum required dry density, or if the number of passes required by the Contractor's equipment to produce the required density is in excess of 12 passes, the Engineer may require the Contractor to provide and use alternative equipment. Only when the Engineer is satisfied that the equipment and number of passes are satisfactory will the Contractor be permitted to start placing and compacting the fill. The minimum number of passes to be expected is 10 if a tamping foot roller is used and 6 if a pneumatic tiered or vibratory roller is used.

Once the compaction equipment and the requisite number of passes have been approved by the Engineer these shall not be altered without agreement.

Compaction equipment shall be kept clean and maintained in good working order.

Each layer of fill shall be compacted by passing the compaction equipment over it the required number of times such that every part of the layer is covered by the compaction equipment to complete a pass. The routing of all plant shall be so arranged as to avoid concentration and over-compaction.

A pass shall mean one traverse of the wheel of a compactor across the surface of a layer in one direction only. To achieve one coverage when compacting by means of a towed pneumatic-tyred roller, 2 passes will normally be required with the roller so routed that on the second pass the tyres of the roller cover the areas between the tyre tracks of the first pass.

For compaction by vibratory rollers, an overlap of 150 mm shall be maintained between adjacent passes of the roller and this overlap shall be maintained where drums are towed in multiple arrangements behind a single tractor.

The Contractor shall take every precaution when operating compaction equipment in the neighbourhood of structures or the foundation of the embankment not to damage the structures or disturb the foundation. Any such damage or disturbance shall be repaired by the Contractor at his own expense.

1. Trial embankments

The Engineer may order that trial embankments be carried out to verify the maximum layer thickness and number of passes for the particular material and items of equipment intended to be used. Where such trial embankments are within areas of filling, no additional payment will be made.

Testing

General

The Contractor shall have available all necessary testing equipment to ensure that at all times he is fully aware of the moisture and density characteristics of fill materials. In addition to the laboratory method of moisture determination, suitable field apparatus which will give a quick reading shall be employed by the Contractor. With this equipment a constant check shall be made by the Contractor on the moisture contents of all materials about to be placed or compacted. The results shall be correlated in the early stages of the Contract against laboratory test results using the fill material to be placed.

All testing equipment for fill materials shall be provided by the Contractor at his own cost.

Testing of fill materials shall be carried out by the Contractor at his own cost.

The methods of testing outlined in BS 1377 will be used unless other testing techniques are expressly required by the Engineer.

It will be necessary to adjust the frequency of testing as work proceeds in order to suit the variations in fill placing rates and areas covered. As a very general guide, the Contractor may expect as a minimum that, for each material placed as fill on an area on which work occupies a whole shift, a test of compacted fill for density, grading and moisture content will be required once per layer per shift. The Engineer shall be

empowered to increase the frequency if he considers this necessary in the interests of the quality of the work or if the area concerned is of above-average importance or sensitivity.

Further control tests in borrow areas and stockpiles shall be carried out as necessary to check that the material being placed, or about to be placed, meets the requirements of the Specification, to optimize placing destinations and to identify unsuitable material.

Whenever the Contractor conducts tests on materials used or to be used as fill, he shall immediately make the results of his tests available to the Engineer, who will have access to and may take over or supervise any portion of such sampling and testing, in addition to any sampling and testing he may conduct independently.

When requested by the Engineer, test pits for quality control shall be excavated to depths not exceeding 1 m and shall be backfilled by the Contractor with fill material similar to that excavated. The Contractor shall render such assistance as is necessary to enable pitting, sampling and testing to be carried out expeditiously. The Contractor is advised that no separate payments will be made for such test pits as the Engineer may request nor for the backfilling thereof and is advised to allow for a minimum of 50 such pits to be provided in fill areas during the Contract. However, if the tests fail, the Contractor will provide further test pits required by the Engineer to enable him draw the required conclusion. The extra pits shall be issued at the Contractor's expense

Construction joints in fill

Construction joints shall not be used in fill areas where there is a practicable alternative.

The sloping face of construction joints, whether required or approved by the Engineer, shall not be steeper than 1 in 1.75 and, during placement, the material shall be compacted as close as practicable to the exposed face of the construction joint.

Prior to placing a layer of fill materials against previously placed fill in any construction joint, the surface of the material previously placed in the area of the joint shall be cut back a horizontal distance of not less than 1.5 m beyond that required to expose a dense face satisfactory to the Engineer.

The Contractor shall do everything necessary as required by the Engineer to match and bond the materials placed against a construction joint into the previously placed material in order to achieve a dense homogeneous fill across the construction joint.

Suspension and resumption of operations

The Contractor shall suspend fill placing operations whenever inclement weather conditions are such that the material cannot be placed and compacted at the optimum moisture content and to densities equal to those which would be achieved under normal conditions. If fill placement is suspended because of precipitation or impending precipitation or for any other reason, the surface of impervious fill materials shall be graded and rolled smooth to seal the surface and to avoid unnecessary absorption of moisture. Payment will not be made for standing time consequent upon inclement weather.

Where operations have been suspended, the effects of rain or other adverse conditions shall be assessed before placing is resumed. Prior to resumption of fill placement, any material not conforming to the specified requirements shall be removed or reconditioned until it is suitable. Equipment shall not otherwise be allowed to travel or work on the fill, except for necessary removal, until it has dried sufficiently to prevent excessive rutting and to allow the equipment to operate satisfactorily.

Dressing of outer faces

The Contractor shall dress the outer faces of fill areas and other filled areas to form a neat, uniform, workmanlike appearance and shall use for this purpose a hydraulically operated backhoe or other approved equipment. To achieve a uniform compacted density to the extreme edges of the fill area, the Contractor shall at his own expense overfill the fill areas, compact to the edge and subsequently trim the faces to the required lines indicated on the drawings. The Contractor is advised that this particular requirement will be applied to all exposed faces of filled areas. The dressing of the faces shall be completed as the work proceeds and the Contractor shall ensure that any areas requiring dressing are at all times within the operating range of the equipment.

Special compaction

In areas which are inaccessible to the normal compaction equipment or which require special compaction for other reasons e.g. around structures or instrumentation, the Contractor shall use special hand or other suitable compactors, approved by the Engineer, to achieve the desired compaction. In general such compaction shall be used near concrete structures, against irregular rock surfaces or in zones of very limited area. The fill shall be forced into all irregular depressions and corners.

Where special compaction is required, the fill material shall be placed in layer thickness approved by the Engineer but not exceeding 150 mm. Compaction by special methods shall be carried out, as agreed by the Engineer, to achieve dry densities equivalent to those being achieved in adjacent areas by normal compaction methods.

Equipment used for special compaction shall be hand-guided heavy duty mechanical tampers, hand-guided vibratory rollers, hand methods or other such compaction arrangements suited to working in confined spaces as may be approved by the Engineer.

Tolerances

The Contractor shall construct embankments, fill areas and any required zones therein such that maximum local deviations from the finished outside slope surface of the embankment do not exceed 0.2 m measured at right angles to the surface. In addition:

- a. The finished outside slope surface shall not be uniformly lower than the required lines;
- b. The top surface shall not be less than the required dimensions;
- c. Where an embankment has berms, the levels of the berms shall not be lower than the required elevations;
- d. All finished slopes shall drain effectively in accordance with the arrangements shown on the Drawings;
- e. The Contractor must allow for any settlement that may take place during the course of construction. If the Engineer envisages that there will be some post-construction settlement, the levels of the Drawings will indicate and allow for such settlement and the Contractor shall build to those levels and will be paid for so doing. The level of the finished surface shall nowhere be lower than that prescribed.

Protection and maintenance

The Contractor shall maintain all fill in a satisfactory condition until the completion of the work.

He shall shape the surface and take such steps as are necessary to avoid ponding of water on the fill or contamination of the fill by traffic or other causes, and shall at all

times keep the surface and slopes of the fill areas free from rubbish, rejected or unsuitable material, and waste materials.

Backfilling of excavations

Backfilling of areas excavated to remove unsuitable material below formation level shall normally be with Class 1 material acceptable to the Engineer. In marshy areas the Contractor may be instructed to use, rock fill in compacted layers or other special methods to produce a surface which will remain stable when fill is placed on it and compacted.

Fill material used for backfilling excavations shall be approved Class 1 material free from large clods, large rocks, rubbish and other undesirable constituents. Where free-draining material is shown on the Drawings, all layers thereof shall be of consistent quality.

Backfill material shall normally be selected by the Contractor from excavated material at the Site which he has set aside for this purpose. When suitable backfill material cannot be obtained in this manner, it shall be obtained by the Contractor from another borrow source and brought to the Site. Both the source and the type of material to be used will be subject to approval by the Engineer.

Procedure

Unless otherwise agreed, backfilling shall be carried out in layers not exceeding 150 mm after compaction. Each layer shall be watered to the approximate optimum moisture content and thoroughly compacted uniformly over the full area of each layer to the density of the surrounding ground. Unless otherwise instructed, vibrating plate or similar compaction equipment shall be used in confined areas. Where appropriate the final layer of backfill shall be neatly finished to accord with the surrounding ground levels and any settlement which occurs shall be made good by re-compacting and the addition of further compacted backfill.

MATERIALS

Pipes and fittings

- i. The approval in writing or otherwise by the Engineer of any materials shall not in any way whatsoever relieve the Contractor from any liability or obligation under the Contract and no claim by the Contractor on account of the failure, insufficient or unsuitability of any such materials will be entertained.

- ii. All items shall be suitable for water works purposes and for use with cold water installation and operation being in a tropical climate.
- iii. All items hereinafter specified shall be to such other Standard or Specification which in the opinion of the Engineer provides for a quality of material and workmanship not inferior to the Standard Reference Number (SRN) quoted. The Standard or Specification must be submitted to the Engineer for approval before commencement of work.
- iv. All ferrous pipes and fittings shall be coated with bituminous protective paint suitable for use in and transport through a tropical climate.
- v. The Contractor shall supply to the Employer a certificate stating that each item supplied has been subjected to the tests hereinafter laid down and conforms in all respects to the said Specifications.
- vi. The Contractor shall provide adequate protection to all piping, flanged items and valves so as to guard effectively against damage in transit and storage and ingress for foreign matter inside the valves.
- vii. All pipe work and fittings shall be subjected to a work hydrated test pressure, which shall be not less than twice the maximum operating pressure.
- viii. The Contractor should exercise diligence to provide the best material
- ix. Where applicable the manufacture's Specification should accompany all offers. The name of the manufacturer must in every case be stated.
- x. Where necessary the Contractor shall provide rubber gaskets all other bolts, nuts etc. to undertake jointing at fittings etc.
- xi. Any article required under this Contract. Which are found to be faulty due to a crack, flaw or any other reason or is not in accordance with the specification stipulated will not be accepted nor will the Employer be liable for any charges in respect of such an article. Where any such rejected article can, in the opinion of the Engineer, be rendered usable, the Contractor may deal with it accordingly and include it in the Contract at a price to be mutually agreed. Straight pipes which have been cut will be accepted provided the length is not less than 4 meters or two thirds of the standard length whichever is the lesser and will be priced pro-rata.

- xii. Wherever possible, sample of pipes and fittings shall be submitted for approval of the Engineer prior to the Contractor obtaining the total requirements.

Un-plasticized uPVC pipes

The maximum sustained working pressures to which the pipes and fittings will be subjected is based on water at temperature of 20 degrees centigrade.

The Contractor shall submit full details of the pipes he intends to supply.

The pipes up to and including 40mm diameter can be of a solvent weld type. The pipe shall be supplied with interchangeable sockets preformed at the factory and of such internal diameter that it takes the plain end of the pipe with the same nominal diameter.

The joint shall sustain the end thrust to which the pipe shall be subjected. The Contractor shall supply sufficient quantity of the cleaner and adhesive, which shall be required to make the joints with the pipes.

The pipes of 50mm diameter and over shall consist of a grooved socket at one end of the pipe.

The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe.

The sealing medium, which shall seat in the groove, shall be a rubber ring.

If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking on the socket area a reinforcing sleeve of the same material as the pipe.

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

The joints shall take 10% deformation of the spigot at the point where it enters the socket without leakage from the pipe when subjected to the test pressure specified for the pipe. Thermal expansion of the pipe shall be capable of linear deflection up to 3 degrees.

The sealing ring shall be of first grade natural rubber and the physical properties of the mix.

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

The Contractor shall submit full details of the type of joint offered and a full description of the method of jointing.

The fitting shall have the same type of joint as for the pipes to be used. The Contractor shall submit full details of the materials dimensions and test pressures of the fittings offered.

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

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

Special care shall be taken in transit, handling and storage to avoid any damage to the ends.

Pipes and fittings shall be marked at no greater than one meter intervals showing their class and diameter.

Pre- cast concrete units

Pre-cast concrete covers to be pre-cast units for use in the works, whether instructed under the Contract or proposed by the Contractor.

Formwork for pre-cast units

Moulds shall be so constructed that they do not suffer distortion or dimensional changes during use and are tight against loss of cement grout of fines from the concrete.

Moulds shall be set up on firm foundations so that no settlement occurs under the weight of the fresh concrete.

Moulds shall be constructed so that units may be removed from them without sustaining any damage.

Release agents used for remolding shall not stain the concrete or affect its properties.

Reinforcement for pre-cast units

Reinforcement in pre-cast units shall comply with general requirements and those of Clause 6.1. When preformed cages are used the cages shall be made up on jigs to ensure dimensional accuracy and shall be carefully supported within the mould in such a way that they cannot move when concrete is placed. Reinforcement may be tack welded where bars cross to provide rigidity in the cage but reinforcement shall not be welded.

Cover to main reinforcement shall be as shown on the drawings, or if not shown shall be not less than 25mm or the diameter of the bar, whichever is the greater. Cover on distribution steel shall not be less than 15mm or the diameter of the bars.

Bars may be placed in pairs provided that there are no laps in the paired lengths.

Casting of Units

Concrete for pre-cast units shall comply with Clause 5.9 using the class of concrete specified on the drawings.

The area in which units are cast shall be adequately protected from the weather so that the process is not affected by rain, sun or drying winds.

Curing Pre-cast Units

Requirements for curing shall be generally as set out in Clause 5.11

The Contractor shall ensure that units do not suffer any loss of moisture or sudden changes of temperature for at least four days after casting. If a water spray is used for curing, the water shall be at a temperature within 5 degrees centigrade of the temperature of the unit being cured.

If the Contractor proposes curing at elevated temperatures, the method shall be subject to the agreement of the Engineer and shall include means whereby units are heated and subsequently cooled evenly without sudden changes of temperature.

Dimension tolerances of pre-cast units

Units shall be accurately formed to the dimensions shown on the drawings unless closer tolerances are called for by the Engineer.

Surface finish of pre- cast units

The formed faces of Pre- cast units shall be finished on class of finish is specified on the drawings.

Free faces shall be finished to class UF2 unless another class of finish is specified on the drawings.

In cases where a special finish is required a trial panel shall be constructed by the Contractor which after approval by the Engineer shall be kept available for inspection at the place of casting and production units shall thereafter match the approved pattern.

Those parts of the unit which are to be joined to other units or other units or to in situ concrete shall be brushed with a stiff brush before the concrete has fully hardened. Alternatively, if the concrete has been allowed to harden the surface shall be roughened by sand blasting or by the used of a needle gun.

Handling and storage pre- cast units

Pre- cast units shall be handled in a manner which will not cause damage of any kind and shall be stored on a hard impermeable base.

Pre-stressed units and large Pre- cast normally reinforced units shall be handled and stored so that no stresses shall be induced in excess of those which they will incur in their final positions in the works unless they have been designed to resist such stresses.

Units shall be provided with adequate lifting holes or loops, placed in the location shown on the drawings or agreed by the Engineer and they shall be lifted only by such holes or loops. Where it is not possible to provide holes or loops, suitable sling positions shall be indicated in paint on the units.

Units shall be marked indelibly with the reference number and date of casting and shall be stacked on suitable packers which will not damage the concrete or stain the surfaces. Not more than two packers shall be placed under each unit and these shall be located either at the position of the permanent support points or in positions such that the induced stresses in the unit will be a minimum.

Testing pre- cast units

Pre- cast units shall be capable of safely sustaining the loads which they have been designed to carry. The Contractor shall subject units selected by the Engineer to load

tests simulating the working conditions. Detailed of such tests shall be agreed between the Engineer and the Contractor.

In case of units subjected to bending loads the test piece shall be supported at full span and a loading equivalent to 1.25 times the sum of the live and dead loads which were assumed in the design shall be maintained for one hour without the appearance of any signs of distress. The recovery one hour after the removal of load shall be not less than 75 per cent of the full load deflection.

If the unit fails to meet the above requirement, further tests shall be carried out on two more units. If either of these fails the whole batch of the unit will be rejected.

If the Engineer so requires, a test of destruction shall also be carried out which on units subject to bending shall be as follows:

The unit shall be supported at full span and a load applied in increments instructed by the Engineer up to 95 per cent of the designed ultimate load. This load shall be held for 15 minutes without failure of the unit. The deflection at the end of this period shall be not more than 1/40th of the span. The load shall then be further increased until failure occurs.

If the unit fails to sustain the required load for the prescribed period or if the deflection exceed the specified amount the Engineer may order two further tests, and if either of these fail, the batch of units which they represent may be rejected.

Submission of samples

As soon as possible after the Contract has been awarded, the Contractor shall submit to the Engineer a list of the suppliers from whom he proposes to purchase the materials necessary for the execution of the Works. Each supplier must be willing to admit to the Engineer or his representatives, to his premises during ordinary working hours for the purpose of obtaining samples of the materials in question. Alternatively, if desired by the Engineer, the Contractor shall deliver the samples of the materials to the Engineer's office without charge.

The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no source of supply shall be changed without the Engineer's prior approval once a supplier, source or material has been approved.

Samples of materials approved will be retained at the Engineer's office until the completion of the Contract. Samples may be tested to destruction.

All materials delivered to site otherwise they shall be rejected, specifying tests etc. to ensure Quantities must be at least equal in all respects to approved samples; No special payment will be made for compliance with clauses quality control etc. Unless specifically itemized in Bills of quantities.

Materials for concrete

General

The Contractor shall submit to the Engineer full details for all material, which he proposes to use for making concrete. No concrete shall be placed in the works until the Engineer has approved the materials of which it is composed. Approved materials shall not thereafter be altered or substituted by other materials without the consent of the Engineer.

Cement

Cement shall be free flowing and free of lumps. It shall be supplied in the manufacturer's sealed unbroken bags or in bulk. Bagged cement shall be transported in vehicles with effective means of ensuring that it is protected for the weather.

Bulk cement shall be transported in vehicles or in containers built and equipped for the purpose.

Cement in bags shall be stored in a suitable weatherproof structure of which the interior shall be dry and well ventilated at all times. The floor shall be raised above the surrounding ground level and shall be so constructed that no moisture rises through it.

Each delivery of cement in bags shall be stacked together in one place. The bags shall be closely stacked so as to reduce air circulation but shall not be stacked against an outside wall. If pallets are used, they shall be constructed so that bags are not damaged during handling and stacking. No stack of cement bags shall exceed 3m in height. Different types of cement in bags shall be distinguished by visible markings and shall be stored in separate stacks.

Cement from broken bags shall not be used in the works.

Cement in bags shall be used in order in which it is delivered.

Bulk cement shall be stored in weatherproof silos, which shall bear a clear indication of the type of cement contained in them. Different types of cement shall not be mixed in the same silo.

The Contractor shall provide sufficient storage capacity on site to ensure that his anticipated programme of work is not interrupted due to lack of cement.

Cement which has become hardened or lumpy or fails to comply with the Specifications in any way shall be removed from the site.

All cement for any one structure shall be from the same source.

All cement used in the Works shall be tested by the manufacturer or the Contractor in a laboratory acceptable to the Engineer. The Contractor shall supply two copies of each certificate to the Engineer.

Each set of tests carried out by the manufacturer of Contractor shall relate to not more than one day's output of each cement plant, and shall be made on samples taken from cement which is subsequently delivered to the site. Alternatively, subject to the agreement of the Engineer's the frequency of testing shall be one set of tests for every 200 tons of cement delivered to site from each cement plant.

Cement which is stored on site for longer than one month shall be retested at an approved laboratory for every 200 tones, and at monthly intervals thereafter.

Cement which does not comply with the Specification shall not be used in Works and it shall be disposed of by the Contractor.

The Contractor shall keep full records of all data relevant to the manufacturer, delivery; testing and use of all cement used in the works and shall provide the Engineer with two copies thereof.

Fine aggregate

Fine aggregate shall be clean hard and durable and shall be natural sand, crushed gravel sand or crushed rock sand. All the material shall pass through a 5mm standard sieve. In order to achieve an acceptable grading, it may be necessary to blend materials from more than one source.

The fine aggregate shall not contain iron pyrites or iron oxide, It shall not contain mica, shale, coal or other laminar, soft or porous materials or organic matter unless the

Contractor can show by comparative tests, on finished concrete, that the presence of such materials does not adversely affect the properties of the concrete.

Other properties shall be as out below:-

Content passing a 75 micron standard sieve shall not exceed 3 per cent for natural of crushed gravel sand of 15 per cent for crushed rock sand.

Chlorides soluble in a 10 per cent solution by weight of nitric acid shall not exceed 0.05 per cent by weight expressed as chloride ion when tested, subject also to the further restriction given in the note on total chloride content in sub-clause 4.5 (d)

Sulphates soluble in a 10 per cent solution by weight of hydrochloric acid shall not exceed 0.4 per cent by weight expressed as SO when tested, subject also to the further restriction given in the note on total sulphates content in sub-clause 4.5(d)

Soundness: after five cycles of the test in AASHO ----- or an approved equivalent the aggregate shall not show a weight loss of more than 10 per cent.

Organic impurities:

If the test for presence of organic impurities in aggregates described below shows that more than a trace of organic impurities is present, the fine aggregate shall not be used in the works unless the Contractor can show by tests on finished concrete that the presence of organic impurities does not adversely affect the properties of the concrete.

Test for presence of organic impurities aggregates:

This test is designed to indicate the presence of organic impurities in aggregates used for making concrete.

A 350 cc graduated bottle shall be filled to the 120 cc mark with a sample of the aggregate liquid after shaking gives a total volume of 200 cc. The bottle shall be stopped, shaken thoroughly and allowed to stand for 24 hours. If, after 24 hour, the colour of the solution is no darker than a pale brown, the aggregate under test may be deemed satisfactory.

Coarse aggregate

Coarse aggregate shall be clean and durable crushed rock, crushed gravel or natural gravel. The material shall not contain any iron pyrites, iron oxides, flaky or laminated material, hollow shells coal or other soft or porous material, or organic matter unless the

Contractor can show the comparative tests on finished that the presence of such materials does not adversely affect the properties of the concrete. The pieces shall be angular rounded or irregular.

Coarse aggregate shall be supplied in the nominal sizes called for in the Contract and shall be graded for each nominal size.

Other properties shall be as set out below:-

The proportions of clay silt and other impurities passing a 75 micron standard sieve shall be no more than one per cent by weight.

The content of hollow and flat shells shall not be such as will adversely affect the concrete quality when tested. The total content of aggregate shall not be more than the following.

40mm nominal size and above 2% of dry weight

20mm nominal size 5% of dry weight

10mm nominal size 15% of dry weight.

Chlorides soluble in a 10 per cent solution by weight of nitric acid shall not exceed 0.03 per cent by weight, expressed as chloride ion when tested but subject also to the further restriction under the percent solution by weight of hydrochloric acid shall not exceed 0.4 per cent by weight expressed as 50g when tested subject also to the further restriction given in the total sulphates content hereunder.

Soundness: After 5 cycles of the test in AASHO T104 or approved equivalent, the aggregate shall not show a weight loss of more than 12 per cent.

When tested in accordance with Test C289 of the American Society for Testing of Materials or approved equivalent, the aggregate shall be non-reactive.

Flakiness Index when tested shall be as set out hereunder:

For 40mm stone and above, not more than 40

For 20mm stone and below, not more than 35

If the Flakiness Index of the coarse aggregate varies by more than five units from the average value of the aggregate used in the approved trial mix, then a new set of trial

mixes shall be carried out if the workability of the mixes has been adversely affected by such variations.

Impact value: Not more than 45 per cent when tested.

Ten per cent fines value: Not less than 50kN when tested.

Shrinkage: When mixed with other ingredients in the approved proportions for concrete and tested, the shrinkage factor shall not exceed 0.05 per cent.

Organic impurities: If the test for presence of organic impurities in aggregate shows that more than a trace of organic impurities is present, the aggregate shall not be used in the works unless the Contractor can show by tests on finished concrete that the presence of organic impurities does not adversely affect the properties of the concrete.

Water absorption: The aggregate shall not have water absorption of more than 2.5 per cent when tested.

Aggregate Crushing value (ACV): not more than 35 per cent

Los Angeles Abrasion (LAA): not more than 50 per cent.

NOTE: Total chloride and sulphates content:

Total chloride content, expressed as chloride ion, arising from all ingredients in a mix including cement, water and admixtures shall not exceed the following limits, expressed as percentage of the weight of cement in the mix:-

For pre stressed, concrete, steam cured concrete or concrete containing sulphates cement: 0.05 per cent.

The total sulphates content expressed as 50g of all the ingredients in a mix including cement, water and admixtures shall not exceed 0.4 per cent by weight of the aggregate or 4.0 per cent by weight of the aggregate or 4.0 per cent of the weight of cement in the mix whichever is the lesser.

Testing aggregates

Acceptance testing

The Contractor shall deliver to the Engineer samples containing not less than 50kg of any aggregate which he proposes to use in the Works and shall supply such further samples as the Engineer may require. Each sample shall be clearly labelled to show its origin and shall be accompanied by all information.

Tests to determine compliances of the aggregates with the requirements of Sub-Clause 7.5 (c) and (d) shall be carried out by the Contractor in laboratory acceptable to the Engineer. If the tested materials fail to comply with the specification, further tests shall be made in the presence of the Contractor and the Engineer and acceptance of the material shall be based on such tests.

A material shall be accepted if not less than three consecutive sets of test results show compliance with the Specification.

Compliance testing

The Contractor shall carry out routine testing of aggregate for compliance with the Specification during the period that concrete is being produced for the Works.

The tests set out below shall be performed on aggregate from each separate source on the basis of one set of tests for each day on which aggregates are delivered to site provided that no set of tests shall represent more than 250 tonnes of fine aggregate not more than 500 tonnes of coarse aggregate, and provided also that the aggregate are of uniform quality, if the aggregate are of uniform quality, if the aggregate from any source is variable, the frequency of testing shall be increased as instructed by the Engineer.

In addition to the above routine tests, the Contractor shall carry out the water content of the concrete as required by the specification.

Moisture content: as frequently as may be required in order to control the water content of the content of the concrete as required by the Specification.

Chloride content: As frequently as may be required to ensure that the proportion of Chlorides in the aggregate do not exceed the limit stated in the Specification.

The Contractor shall take account of the fact that when the chloride content is variable it may be necessary to test every load in order to prevent excessive amounts of chloride contaminating the concrete. For this purpose the Contractor shall use the rapid field test (the Quanta test). In the event of disagreement regarding the results of the field test, the chloride content of the aggregate shall be determined in the laboratory (the volhard test).

Delivery and storage of aggregates

Aggregate shall be delivered to site in clean and suitable vehicles. Different types of sizes of aggregate shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that contamination of the aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged so that, as far as possible rapid drying out in hot weather is prevented in order to avoid sudden fluctuation in water content. Storage of fine aggregates shall be arranged so that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

Water for concrete and mortar

Seawater or brackish water containing more than 1000 ppm chloride ion or 2000 ppm sulphate ion shall not be used for mixing or curing concrete.

Water shall be clean and free from harmful matter.

The Contractor shall carry out tests to establish compliances with the specification.

Building stone

All building stones shall be capable of withstanding when wet a crushing stress of 1.4kg /sq.mm. The source of stone shall be approved by the Engineer and stone supplied there from shall be free from Magadi, overburden, mudstone, cracks, sand holes, veins, laminations or other imperfections.

The stone shall be chisel dressed into true rectangular blocks, with each surface even and at right angles to all adjoining surface, to the size specified. For exposed stonework the maximum permissible variation of any of the specified dimensions shall be 6mm

provided that cut stone, supplied as rock face stone may be hammer dressed on one face only or on one face and one end if in other respects it conforms to this specification. Stones shorter than 375mm will not be accepted.

Unless the Engineer allows otherwise, the Contractor shall at his own expense provide and dress four 100mm cubes of stone for testing.

The stone shall be sound when tested except that:-The treatment shall be repeated for 10 cycles only and

The second criterion of failure shall be amended to allow for a loss of weight of not more than 20kg of its original weight.

Stone Dust

Stone dust for building shall be blacktrap screened to the following grading:-

| | |
|-----------------------|------------|
| Passing 10mm sieve | 100% |
| Passing No. 4 sieve | 85% - 100% |
| Passing No. 100 sieve | 5% - 25% |

Murram

Murram shall be from an approved source quarried so as to exclude vegetable matter, loam, topsoil or clay. The California Bearing Ratio of the murram, as determined for a sample compacted to maximum density 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.

Water for cement treated materials

If water for the works is not available from the Employer's supply, the Engineer's approval must be obtained regarding the source of supply and manner of its use. Water to be used with cement or lime shall be free from salt, oil, alkali, organic matter and other deleterious substances: Tests for water for making concrete, all to the cost of the Contractor.

Cement mortar

Cement mortar shall consist of proportions by volume as specified or Portland cement, natural sand or crushed natural stone or a combination of both Building Sands from Natural Sources. The constituent materials shall be accurately gauged and mixed in an approved manner. Cement mortar shall be made in small quantities only as and when required, and any mortar which has begun to set or which has been mixed for a period of more than one hour shall be rejected.

Hydrated Lime

Building Limes and shall be of the semi – hydrated type.

Calcium chloride

Calcium chloride shall be good industrial grade, and shall be obtained from an approved source.

Lime mortar

Lime mortar shall consist of proportions by volume as specified by hydrated lime and natural sand or crushed natural stone or a combination of both. The constituent materials shall be accurately gauged and mixed in an approved manner in a proportion specified.

Cement – lime mortar

Cement – lime mortar shall consist of Portland Cement, hydrated lime and natural sand or crushed natural stone or a combination of both. The constituent materials shall be accurately gauged and mixed by volume in an approved manner in proportion specified.

Cement – lime mortar shall be made to set or which has been mixed for a period of more than two hours shall be rejected.

Cement grout

Cement grout shall consist of Portland Cement and water mixed in the proportion of one part by volume of cement and one and a half parts by volume of water. The grout shall be used within one hour of mixing.

Cast stone

Cast stone shall be manufactured by an approved manufacturer to the shapes and dimensions shown on the drawings. Cast Stone. It shall have dense and even surface of the texture and colour detailed on the drawings or required by the Engineer. Where indicated, exposed faces of the stone shall be formed of a specially graded mix. Metal bond ties of approved manufacturer shall be cast in with the stone as shown on the drawings. Samples of the completed stone shall be submitted for the Engineer's prior approval.

All stones shall be protected from damage during transport and erection by means of cement slurry coating or by other approved methods.

Reinforcement for concrete

Reinforcement which shall comply with the following Standard, covers plain and deformed bar reinforcement and steel fabric to be cast into concrete in any part of the works but does not include pre-stressing tendons or any other embedded steel.

All reinforcement shall be from an approved manufacturer and, if required by the Engineer, the Contractor shall submit a test certificate from the manufacturer.

All reinforcement for use in the works shall be tested for compliance with the appropriate Standard in a laboratory acceptable to the Engineer and two copies of each test certificate shall be supplied to the Engineer. The frequency of testing shall be as set out in the relevant Standard.

In addition to the testing requirement described above, the Specification shall be removed from site.

All reinforcement shall be delivered to site either in straight lengths or cut and bent. No reinforcement shall be acceptable in long lengths which have been transported bent over double.

Any reinforcement which is likely to remain in storage for a long period shall be protected from the weather so as to avoid corrosion and pitting. All reinforcement which has become corroded or pitted to an extent which in the opinion of the Engineer will affect its properties shall either be removed from site or may be tested for compliance with the appropriate Standard at the Contractor's expense.

Dowel bars

Dowel bars and tie bars shall consist of mild steel, or deformed bars of high yield steel and they shall be free from oil, paint other than bond – breaking compound, dirt, loose rust and scale.

Dowel bars and tie bars shall be of sizes as shown on the drawings and directed by the Engineer, and shall be straight, free from burred edges, or other irregularities and shall have their sliding ends sawn or , if approved, sheared.

Bond breaking compound for dowel bars shall consist of 66 per cent of 200 pen bitumen blended hot with 14 per cent light creosote oil and, when cold, brought to the consistency of paint by the addition of 20 per cent solvent naphtha or other approved compound meeting the following requirements.

- i. It shall not retard or in any other way affect the setting of concrete.
- ii. The average bond stress on bars coated with the compound with half their length cast into concrete specimens and subject to pull out tests at 7 days shall not exceed 0.14 Newtons per square millimeter and the total movement other dowel bar relative to the concrete shall not be less than millimeters in section and 0.45 metre long and made with the same mix proportions as used in the Works.

Structural steel for welded work

The use of Structural Steel in Building and for welded work, High Yield Stress and High Tensile Structural Steel, High Tensile (Fusion Welding Quantity) Structural Steel for Bridges, etc, and General Building Construction.

Waterproof underlay

Waterproof underlay shall consist of wither waterproof paper. Waterproof Building Paper, containing approved fibrous reinforcement, or 900 Gauge polythene sheeting as stated in the Bill of Quantities.

Preformed joint filler

Preformed joint filler shall be of the thickness shown on the drawing or as stated in the Bills of Quantities.

The material comprising joint filler shall be as stated on the drawings or approved by the Engineer.

UPVC pipes and fittings

Un-plasticized polyvinyl chloride pressure pipe shall have outside diameters complying with ISO 161-1 1978.

Concrete pipes

Reinforced concrete pipes and special fittings for drainage purposes shall have "Cornelius" or similar approved spigot and socket flexible joints and shall comply with BS 5911 "Concrete cylindrical pipes and fittings including manhole inspection chambers and street gullies".

Unreinforced concrete pipes with ogee joints shall comply with BS 5911 Part 3.

Concrete porous pipes

Concrete porous pipes shall comply with the requirements of Porous pipes for under-drainage.

Concrete drain invert blocks

Pre- cast concrete invert blocks shall be manufactured from concrete Class 20/10 as specified on drawing using maximum 12mm size aggregate. If required, cube test certificates shall be supplied by the manufacturer.

Concrete slabs for open drains

Pre- cast concrete slab for lining open drains shall be manufactured from concrete Class 20/10 as specified in Table 4.2 using maximum 12mm size aggregate. If required cube test certificates shall be supplied by the manufacturer.

Manhole covers and frames

Cast Manhole Covers, Road Gully Gratings and Frames for Drainage Purposes except that the manhole covers shall be constructed of mild steel, concrete filled, in accordance with the standard detail drawings.

Foul water sewer manhole shall have triangular Grade "A" heavy duty covers and frames.

Circular manhole covers and frames shall be used on surface water sewer manhole.

Gully grating and frames

Gully grating and frames shall be of nominal size 500mm x 350mm except that the gully grating shall be constructed of mild steel concrete filled in accordance with the standard detail drawings.

Where indicated as being kerb inlet type the gullies shall conform to the shape and dimensions given on the detail drawings supplied.

Pre- cast concrete manhole and inspection chambers

Concrete Cylindrical Pipes and Fitting including Manholes, Inspection Chambers and Street Gullies and they shall carry the relevant Standard Institution registered certification trade mark, or test certificates shall be furnished by the manufacturer.

Pre- cast concrete gullies

Pre- cast concrete gullies shall be un-reinforced Concrete Cylindrical Pipes and fittings including Manhole, Inspection Chambers and Street Gullies.

Valve Chamber and Manhole step iron

Steps irons of general –purpose type shall comply in all respects with malleable Step Irons.

Timber

Timber shall be sound, well seasoned and entirely free from worm, beetle, warps, shakes, splits and all forms of rot and deadwood. Where required, all timber shall be

treated with creosote. Coal Tar Creosote for the preservation of Timber or an alternative approved timber preservative.

Water bars

Water bars shall be “Dumbbell” type and be of natural or synthetic rubber or extruded PVC. They shall be flexible, tough, elastic and durable and of dimensions detailed. They should be unaffected on contact with dilute acids or alkalis. Joints and junctions shall, when possible, be prefabricated by the manufacturer’s instruction including recommended adhesive shall be followed and used. Samples shall be submitted for approval of the Engineer before use of any material.

Concrete blocks

All solid and hollow concrete blocks used in the walling must be capable of withstanding a crushing pressure of not less than 0.35 per square millimeter after 29 days. The blocks shall be cast in metric sizes.

Plumbing materials

Galvanized mild steel pipes

Galvanized mild steel pipes and fittings shall comply with BS 1387 Class B or “Medium Grade”. Threading for screwed and socketed joints shall be in accordance with the requirements of BS 21. Joints shall be made with an approved pipe-jointing compound in accordance with the manufacturer's instructions. Red lead compounds shall not be used. Joints in underground piping shall be coated with bitumen or other approved composition.

ix. Fittings for galvanized pipes

All fittings for galvanized steel water pipe work shall be galvanized heavy weight fittings in accordance with BS 1740. Fittings for waste pipe work shall be galvanized malleable iron complying with the requirements of BS 143. Brass or gunmetal fittings shall be subject to the approval of the Engineer.

CONCRETE WORKS

General

a) Code of practice

All workmanship, materials, tests and performances in connection with the reinforced concrete work are to be in conformity with the latest edition of the followings

- b) British Standard Code of Practice (C.P. 114 for “Structural Use of Concrete”)** where not inconsistent with these specifications.

British Standard Code of Practice B.S 5337 “ the design and construction of reinforced concrete structures for the storage of liquids

- c) Appropriate Ministry of Works Standards in any or in their absence appropriate British Standards Contractor’s plant**

Not less than 30 days prior to the installation of the Contractor’s plant and equipment for processing, handling, transporting, storing and proportioning ingredients, and for mixing, transporting and placing concrete, the Contractor shall submit drawings for approval by the Engineer, showing proposed general plant arrangements, together with a general description of the equipment he proposes to use.

After completion of installation, the operation of the plant and equipment shall be subject to the approval of the Engineer.

Materials

Cement

Cement, unless otherwise specified, shall be Portland cement of the Blue Triangle brand, or Bamburi Portland Cement brand. Any other brand must be approved by the Engineer and shall comply with the requirements of B.S. 12 with the exceptions that it may contain reactive volcanic ash (of not more than 10% of total weight) and the quantity of insoluble residue permitted in B.S. 12 may be exceeded. A manufacturer’s Certificate of Test in accordance with B.S. shall be supplied for each consignment delivered to site.

Should the Contractor require using cement of the rapid hardening variety, he shall obtain the approval of the Engineer and also obtain any instructions regarding the modifications to the preambles caused thereby. Any additional cost that may be caused by the use of the rapid hardening cement shall be at the Contractor's expense.

Cement may be delivered to site either in bags or in bulk. If delivered in bags, each bag shall be properly sealed and marked with the manufacturer's name and on the site is to be stored in a weather-proof shed of adequate dimensions with a raised floor. Each consignment shall be kept separate and marked so that it may be used in the sequence in which it was received. Any bag found to contain cement which has set or partly set shall be completely discarded and not used in the Works. Bags shall not be stored more than 1500 mm in height.

If delivered in bulk the cement shall be stored in a weather-proof silo either provided by the cement supplier or by the Contractor, but in either case the silo shall be to the approval of the Engineer.

1 Aggregates

The aggregates shall conform to the requirements of B.S. 882 and the sources and all types of all aggregates are to be approved in all respects by the Engineer before work commences.

The grading of aggregates shall be one within the limits set out in B.S. 882 and as later specified and the grading, once approved, shall be adhered to throughout the Works and not varied without the approval of the Engineer. Fine aggregate shall be clean, coarse, siliceous sand of good, sharp, hard quality and shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substances. It shall be graded within the limits set out in zone 1 or 2 of B.S. 882.

Coarse aggregate shall be good, hard, clean approved black trap or similar stone, free from dust, decomposed stone, clay, earthy matter, foreign substances or friable thin elongated or laminated pieces. It shall be graded within the limits of Table 1 of B.S. 882 for its respective nominal size.

If in the opinion of the Engineer the aggregate meets the above requirements, but is dirty or adulterated in any manner it shall be screened and/or washed with clean water if he so directs at the Contractor's expense.

Aggregates shall be delivered to the site in their prescribed sizes or grading and shall be stockpiled on paved areas or boarded platforms in separate units to avoid intermixing.

Fine aggregate

Fine aggregate shall be sand free from impurities and complying with British Standard No. 882.

Grading zone 2 of Table 2.

Coarse aggregate

Coarse aggregate shall be hard crushed rock free from impurities and complying with British Standard No. 882 "graded aggregate" 20 mm to 5 mm nominal size as Table 1.

Water for mixing concrete

Water for concrete shall be free from impurities, complying with BS 3148. Water for washing and curing shall be such that it will not impair neither the strength of the finished concrete nor its appearance.

Hardcore

Hardcore for filling under floors shall be good, hard stone ballast or quarry waste, to the approval of the Engineer, broken to pass through not greater than a 150 mm ring or to be 75% of the finished thickness of the layers being compacted, whichever is the lesser. Hardcore shall be free from all weeds, roots, vegetable soil, clay, black cotton soil or other unstable materials.

It shall be graded with smaller stones and fine materials to give a dense compact mass after consolidation. Sufficient fine material shall be added to each layer to give gradation of material as necessary to obtain a solid compact mass after rolling. Hardcore filling is to be laid in layers each of a consolidated thickness not exceeding 250 mm. Each layer shall be compacted by at least 8 passes of a 10-tonne smooth-wheeled roller or a 2-tonne vibrating roller until all movement ceases. Sufficient water is to be added to obtain maximum compaction to the Engineer's approval. To each layer a 25 mm thick layer of sand complying with the specification of fine aggregate for concrete shall be spread over the surface and forced into the hardcore by the use of a vibrating roller weighing not less than 2 tones. This operation should be carried out when the materials are dry and repeated whilst the sand is well watered. Should all the sand be absorbed the Engineer may require a further layer to be applied and the process repeated.

The top surface of the hardcore shall be leveled or graded to fall as required, and shall then be blinded with a layer of similar material broken to 25 mm gauge and finished

with a 10-tonne smooth-wheeled roller. The surface so obtained shall be to the Engineer's approval.

Compacted hardcore

The sub-grade shall be compacted by a smooth-wheeled roller of 8 to 10 tonnes weight or the vibrating roller of minimum 1300 Kg., or other approved plant. The number of coverage shall be at least 10 and there shall be a 50% overlap of successive coverage. If so instructed by the Engineer, water shall be added during compaction to obtain optimum water content. Filling shall be compacted as above but in maximum 200 mm deep layers.

Sand

The sand shall be as described for fine aggregate but that for plastering shall be light in colour and well graded to a suitable fineness in accordance with the nature of work in order to obtain the finish directed.

Finishes

lxix. General

The Contractor will be required from an early stage in the Contract to prepare samples, for the approval of the Engineer, of the various concrete finishes specified hereafter. Samples are to be prepared using the same materials and the same methods of construction, compaction, curing, etc. as the Contractor proposes to use for executing the full quantity of the work. A record of the mix, water content, method of compaction, any additives used, etc., is to be kept for each sample prepared. When the Engineer has approved a sample it will be kept on site in an approved location. The finishes in construction will be expected to be up to a standard equal to the approved sample. Consistency in cement colour, and the colour, grading and quality of aggregates must be maintained in all finished concrete work.

Mortars

Cement mortar shall consist of one part of Portland cement to three parts sand by volume. The cement/lime mortar shall consist of one part of Portland cement, one part of lime and six parts of sand by volume.

The ingredients of mortar shall be measured in proper gauge boxes on a boarded platform, the ingredients being thoroughly mixed dry, and again whilst adding water. In the case of cement/lime mortar, sand and lime shall be mixed first and then the cement added.

All mortar is to be thoroughly mixed to a uniform consistency with only sufficient water to obtain a plastic condition suitable for troweling. No mortar that has commenced to set is to be used or re-mixed for use.

Tamped finish

Areas so specified shall be finished at the time of casting with a tamped finish to the Engineer's approval produced by an edge board. Board marks are to be made to a true pattern and will generally be at right angles to the traffic flow. Haphazard or diagonal tamping will not be accepted.

Fair face

Fair face surfaces shall be clean, smooth, even, true to form, line and level, and free from all board marks, joint marks, and honeycombing, pitting, and other blemishes. Forms are to be provided with a smooth lining of plywood, steel, or other approved material which will achieve the required finish without any general rubbing down. Rubbing down will only be permitted to remove any projecting fins at corners or joints.

Fine face

Fine face surfaces shall be for Fair face above, but to a higher standard obtained from forms provided with an impervious sheet lining of metal or plastics faced plywood in large panels arranged in an approved pattern. Rubbing down shall only be permitted after an inspection by the Engineer. The finished surfaces shall be capable of receiving a painted finish.

lxxiv. Chisel-dressed finish

Chisel-dressed finish is to be carried out on any grade of concrete but not until it is at least 30 days old. The surfaces are to be fully chisel-dressed to remove a maximum of 12 mm (average 9 mm) of the surface by shearing and exposing the aggregate without excessive cracking of the surrounding matrix. Arises of columns, beams, etc., are pre-formed fair face with timber fillets set in the formwork and care must be taken in working up to these to preserve a clean line.

For vertical surfaces of walls and columns particular care must be taken to remove all sharp projections. For beam soffits this requirement is not necessary. All surfaces requiring this treatment are to have margins chisel-dressed by hand for a minimum width of 75 mm commencing from the fillet edge. Thereafter, mechanical chisel-dressing may be used, but the Contractor must ensure that a uniform texture and even plane surface is achieved. The use of sharply pointed steel tools for both hand and mechanical chisel-dressing is essential. Upon completion the surfaces are to be thoroughly wire brushed and washed down.

Protection of finishes

Wherever possible, in-situ exposed concrete finishes should be commenced at the highest level and worked progressively down the building. Precaution shall be taken to avoid staining or discoloration of previously finished concrete faces by leakage of grout from newly placed concrete. The Contractor shall, during all stages of construction, adequately protect all concrete finishes from Damage by leaking grout, knocking, paint stains, falling plaster, etc. In cases of balustrade walls to staircases and members where Damage is otherwise likely, concrete finishes shall be protected by cladding with timber, celotex, or other approved sheeting. All Sub-Contractors shall be informed accordingly on the precautions to be taken.

Blinding

All blinding concrete to be 1:3:6, or as otherwise instructed by the Engineer in writing.

Formwork

The method and system of formwork which the Contractor proposes to use shall be approved of by the Engineer before construction commences. Formwork shall be substantially and rigidly constructed of timber or steel or pre-cast concrete or other approved material.

All timber for formwork shall be good, sound, clean, sawn, well-seasoned timber, free from warps and loose knots and of scantings sufficiently strong for their purpose.

Construction of formwork

All formwork shall be of sufficient thickness and with joints close enough to prevent undue leakage of liquid from the concrete and fixed to proper alignment, level and plumb and supported on sufficiently strong bearers, shores, braces, plates e.t.c.

properly held together by bolts or other fastenings to prevent displacement, vibration or movement by the weight of materials, men and plant on same and so wedged and clamped as to permit easing and removal of the formwork without jarring the concrete. Where formwork is supported on previously constructed portions of the reinforced concrete structural frame, the Contractor shall by consultation with the Engineer ensure that the supporting concrete is capable of carrying the load and/or sufficiently propped from lower floors or portions of the frame to permit the load to be temporarily carried during construction.

Soffits shall be erected with an upward camber of 5 mm for each 5 meters of horizontal span or as directed by the Engineer.

Great care shall be taken to make and maintain all joints in the formwork as tight as possible, to prevent the leakage of grout during vibration. All faulty joints shall be caulked to the Engineer's approval before concreting. The formwork shall be sufficiently rigid to ensure that no distortion or bulging occurs under the effects of vibration. If at any time the formwork is insufficiently rigid or in any way defective the Contractor shall strengthen or improve such formwork as the Engineer may direct.

The Contractor's attention is drawn to the various surface textures and applied finishes required and the faces of formwork next to the concrete must be of such material and construction and be sufficiently true to provide a concrete surface which will in each particular case permit the specified surface treatment or applied finish.

All surfaces which will be in contact with concrete shall be oiled or greased to prevent adhesion of mortar. Oil or grease shall be of a non-staining mineral type applied as a thin film before the reinforcement is placed. Surplus moisture shall be removed from the forms prior to placing of the concrete.

Temporary openings shall be provided at the base of columns, wall and beam forms and at any other points where necessary to facilitate cleaning and inspection immediately before the pouring of concrete. Before the concrete is placed the shuttering shall be trued-up and any water accumulated therein shall be removed. All sawdust, nails, chips and other debris shall be washed out or otherwise removed from within the formwork. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete the formwork shall be well wetted and inspection openings shall be closed. The erection, easing, striking and removing of all formwork must be done under the personal supervision of a competent foreman, and any Damage occurring through faulty formwork or its incorrect removal shall be made good by the Contractor at his own expense.

After removal of formwork, all projections, fins etc., on the concrete surface shall be chipped off, and made good to the requirements of the Engineer. Any voids or honeycombing shall be treated as described in "Faulty Concrete".

lxxvi. Stripping formwork

All formwork shall be removed without undue vibration or shock and without Damage to the concrete. No formwork shall be removed without the prior consent of the Engineer and the minimum periods that shall elapse between the placing of the concrete and the striking of the formwork will be as follows:

Beam sides, wall and columns 2 days

Slab Soffits (props left under) 3 days

Beam Soffits 7 days

Removal of props (partly subject to 7 days concrete cube strength being satisfactory) to:

Slabs 10 days

Beams 14 days

Cantilevered Beams and Slabs 28 days

If the Contractor wishes to take advantage of the shorter stripping times permitted for beams and slab soffits when props are left in place, he must so design his formwork that sufficient props are agreed with the Engineer can remain in their original positions without being moved in any way until the expiry of the minimum time for removal of props. Stripping and re-propping will not be permitted.

The above times may be reduced in certain circumstances, at the discretion of the Engineer provided an approved method is adopted at the Contractor's expense to ensure that the required concrete strength is attained before the forms are stripped.

Solid strips in composite slabs shall be considered as beams. The tops of retaining walls shall be adequately supported with stout raking props at intervals required by the Engineer. These props are not to be removed until 7 days after casting of the floor slab is over.

lxxvii. Supporting props to wall and beam soffits

When directed by the Engineer, supporting props to wall and beam soffits are to be left in position until the completion of the whole of the reinforced concrete structure. The props are to be to the approval of the Engineer and the Contractor must submit the suggested method of propping to the Engineer prior to removal of formwork to the relevant surfaces.

Concrete mixes

| Class | Nominal mix | Trial strength in N/mm² | | where used in this contract |
|--------------|--------------------|---|----------------|------------------------------------|
| | | 7 days | 28 days | |
| 15 | 1:3:6 | 13 | 19.5 | surround to pipes |
| 25 | 1:2:4 | 25 | 32.5 | Structural concrete walls |

Concrete mixing and placing

The concrete shall be mixed only in approved power-driven mixers of a type and capacity suitable for the work, and in any event not smaller than 0.04/0.28 cu.m. capacity. The mixer shall be equipped with an accurate water measuring device. All materials shall be thoroughly mixed dry before water is added and the mixing of each batch shall continue for a period of not less than two minutes after the water has been added and until there is a uniform distribution of the materials and the mass is uniform in colour.

The entire contents of the mixed drum shall be discharged before recharging. The volume of mixed material shall not exceed the rated capacity of the mixer. Whenever the mixer is started, 10% extra cement shall be added to the first batch and no extra payment will be made on this account.

As a check on concrete consistency slump tests may be carried out and shall be in accordance with B.S. 1881. The Contractor shall provide the necessary apparatus and carry out such tests as are required. The slump of the concrete made with the specified water content, using dry materials, shall be determined and the water to be added under wet conditions shall be so reduced as to give approximately the same slump.

The concrete shall be mixed as near to the place where it is required as is practicable, and only as much as is required for a specified section of the work shall be mixed at one time, such sections being commenced and finished in one operation without delay. All concrete must be efficiently handled and used in the Works within twenty (20) minutes of mixing. It shall be discarded from the mixer direct either into receptacles or barrows and shall be distributed by approved means which do not cause separation or

otherwise impair the quality of the concrete. Approved mechanical means of handling will be encouraged, but the use of chutes for placing concrete is subject to prior approval of the Engineer.

Concrete shall be placed from a height not exceeding 1,500 mm directly into its permanent position and shall not be worked along the shutters to that position. Unless otherwise approved, concrete shall be placed in a single operation to the full thickness of slabs, beams, and similar members, and shall be placed in horizontal layers not exceeding 1,500 mm deep in the walls and similar members.

Concrete in columns may be placed to a height of 4 meters with careful placing and vibration and satisfactory results. Where the height of the column exceeds 4 meters suitable openings must be left in the shutters so that this maximum lift is not exceeded.

Concrete shall be placed continuously until completion of the part of the work between construction joints as specified hereinafter or of a part of the approved extent. At the completion of a specified or approved part a construction joint of the form and in the positions hereinafter specified shall be made. If stopping of concrete be unavoidable elsewhere, a construction joint shall be made where the work is stopped. A record of all such joints shall be made by the Contractor and a copy supplied to the Engineer.

Any accumulation of set concrete on the reinforcement shall be removed by wire brushing before further concrete is placed. The Contractor shall provide runways for concreting to the satisfaction of the Engineer. Under no circumstances will the runways be allowed to rest on the reinforcement. Care shall be taken that the concrete is not disturbed or subjected to vibrations and shocks during the setting period. Mixing machines, platforms and barrows shall be clean before commencing mixing and be cleaned on every cessation of work. Where concrete is laid on hardcore or other absorbent materials, the base shall be suitable and sufficiently wetted before the concrete is deposited.

Works cube tests

Work cubes are to be made at intervals as required by the Engineer in accordance with C.P. 114, and the Contractor shall provide a continuous record of the concrete work. The cubes shall be made in approved 150 mm moulds in strict accordance with the Code of Practice. Three cubes shall be made on each occasion. Each cube shall be marked with a distinguishing number (numbers) to run consecutively and the date, and a record shall be kept on site giving the following particulars:-

- a) Cube No.

- b) Date made
- c) Location in work
- d) 7-Day Test, Date, Strength
- e) 28-Day Test, Date, Strength

Cubes shall be forwarded, carriage paid, to an approved Testing Authority, in time to be tested two at 7 days and the remaining one at the discretion of the Engineer. No cube shall be dispatched within three days of casting. Copies of all Works Cube Tests shall be forwarded to the Engineer and one shall be retained on site. If the strengths required above are not attained and maintained during the carrying out of the Contract, the Contractor will be required to increase the proportion of cement and/or substitute better aggregates so as to give concrete which does comply with the requirements of the Contract. The Contractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength as ascertained by Works Cube Tests.

Compaction

At all times during which the concrete is being placed, the Contractor shall provide adequate trained and experienced labour to ensure that the concrete is compacted in the forms to the satisfaction of the Engineer. Concrete shall not be placed at a rate greater than will permit satisfactory compaction or to a depth greater than 400 mm before it is compacted.

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuous tamping, spading, slicing and vibration. Vibration is required for all concrete of classes 40, 35, 25, and 20. Care shall be taken to fill every part of the forms, to work the concrete under and around the reinforcement without displacing it to avoid disturbing recently placed concrete which has begun to set. Any water accumulating on the surface of newly placed concrete shall be removed and no further concrete shall be placed thereon until such water is removed.

Internal vibrators shall be of a frequency not less than 7000 cycles per minute and shall have a rotating eccentric weight of at least 0.05 Kg. with an eccentricity of not more than 12 mm. Such vibrators shall visibly affect the concrete within a radius of 250 mm from the vibrator. Internal vibrators shall not be inserted between layers of reinforcement less than one and one half times the diameter of the vibrators apart. Contact between the vibrators and reinforcement, and vibrators and formwork shall be avoided. Internal vibrators shall be inserted vertically into the concrete at not more than 500 mm centers and shall be moved constantly from place to place. No internal vibrator shall be permitted to remain in any one position for more than ten seconds and it shall be withdrawn very slowly from the concrete.

In consolidating each layer of concrete the vibrating head shall be allowed to penetrate and re-vibrate the concrete in the upper portion of the underlying layer. In the area where newly placed concrete in each layer joins previously placed concrete more than usual vibration shall be performed, the vibrator penetrating deeply at close intervals along these contacts. Layers of concrete shall not be placed until layers previously placed have been vibrated thoroughly as specified. Vibrators shall not be used to move concrete from place to place in the formwork.

At least one internal vibrator shall be of the high frequency, low amplitude type applied with the principal direction of vibration in the horizontal plane. They shall be attached directly to the forms at no more than 1200 mm centers. In addition to internal and external vibration the upper surface of suspended floor slabs shall be leveled by tamping or vibrating to receive finishes. Vibrating elements shall be of the low frequency high amplitude type operating at a speed of not less than 3000 r.p.m.

Curing and protection

Care must be taken that no concrete is allowed to become prematurely dry and the fresh concrete must be carefully protected, within two hours of placing, from rain, sun and wind by means of Hessian sacking, polythene sheeting, or other approved means. This protective layer and the concrete itself must be kept continuously wet for at least 7 days after the concrete has been placed. The Contractor will be required to provide complete coverage of all fresh concrete for a period of 7 days. Hessian or polythene sheeting shall be in the maximum widths obtainable and shall be secured against wind. The Contractor will not be permitted to use old cement bags, Hessian or other materials in small pieces.

Concrete in foundations and other underground work shall be protected from admixture with falling earth during and after placing. Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or Damage to the concrete members. Where directed by the Engineer props may be required to be left in position under slabs and other members for greater periods than those specified hereafter.

Faulty concrete

Any concrete which fails to comply with these specifications, or which shows signs of setting before it is placed shall be taken out and removed from site. Where concrete is found to be defective after it has set, the concrete shall be cut out and replaced in accordance with the Engineer's instructions. On no account shall any faulty,

honeycombed, or otherwise defective concrete be repaired or patched until the Engineer has made an inspection and issued instructions for the repair. The whole cost whatsoever, which might be occasioned by the need to remove faulty concrete, shall be borne by the Contractor.

Pre-cast units

Pre-cast reinforced concrete slabs to be made to sizes as shown in the Drawings. Slabs to be cast with Grade 25 concrete in approved formwork, suitably vibrated and cured for 28 days before use.

REINFORCEMENT

Steel

Reinforcement shall be;

- (a) High deformed steel bars conforming to B.S 4449
- (b) Fabric reinforcement conforming to B.S 4483

The contractor shall obtain from his suppliers certificate of the mechanical and physical properties and shall submit the to the Engineer for approval

General Reinforcement

The following clauses concerning joints give details of reinforcement required at such locations.

This clause deals with other reinforcement in external road and drainage slabs.

The top reinforcement layer shall have 50 mm cover unless otherwise permitted and shall terminate 40-80 mm from edges and joints. Mesh fabric shall have main bars longitudinal.

At transverse laps between sheets of mesh fabric the first transverse bar of one sheet shall lie within the last complete mesh of the previous sheet. No overlap will be required longitudinally between sheets.

Unless detailed otherwise, all corners of box-outs for manholes etc. shall be provided with 12 mm bars 1200 mm long across and bisecting the corner angle in the slab where that angle exceeds 40°. These bars may lie on any top reinforcement, which may be

depressed locally to maintain cover to these crack control bars. In unreinforced slabs such bars shall have 50 mm cover.

Similarly at corners of slabs having no load transfer bars to other slabs, 10 mm bars shall be positioned to prevent cracking across the corner. At a 90o corner one bar shall be L-shaped with equal 1500 mm legs with hooked ends. A similar V-shaped bar with an internal angle of 30° shall be placed to bisect the corner angle with its apex also in the corner.

Bending and placing reinforcement

Reinforcement shall be cleaned before placing and secured with space blocks in the correct position. It shall be bound with suitable wire and have such cover as shown on the drawings.

Strength of reinforcement

Characteristic strengths of reinforcement are as given in B.S. 4449, 4461, and 4483. lxxx.
Rod reinforcement

The steel reinforcement shall comply with the latest requirements of the following British Standards:-

Hot Rolled bars for the Reinforcement of concrete to B.S. 4449 (metric units)

Cold worked steel for the reinforcement of concrete to B.S. 4461 (metric units)

The Contractor will be required to submit a test certificate of the rolling. Reinforcement shall be stored on racks above ground level. All reinforcement shall be free from loose mill scale or rust, grease, paint or other substances likely to reduce the bond between the steel and the concrete.

BRC

The BRC should be electrically cross-welded steel wire mesh reinforcement to B.S. 4483: 1969, or as directed by the Engineer, and of the size and weight specified in the Drawings.

The fabric shall be free from scale, dust, rust, grease or other substance likely to reduce the bond between the steel and the concrete and shall be laid with a minimum 300 mm laps and bound with No. 18 S.W.G. annealed iron wire.

Fixing reinforcement

Reinforcement shall be accurately bent to the shapes and dimensions shown on the Drawings and in accordance with B.S. 4466 (1969). Reinforcement must be cut and bent cold and no welded joints will be permitted, unless so detailed. Reinforcement shall be accurately placed as shown on the Drawings, and before and during concreting, shall be secured against displacement by using No. 18 S.W.G. annealed binding wire or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers to ensure the correct position. No concreting shall be commenced until the Engineer has inspected the reinforcement in position and until his approval has been obtained and Contractor has given two clear days' notice of intention to concrete.

The Contractor is responsible for maintaining the reinforcement in its correct position, according to the drawings, before and during concreting. During concreting, a competent steel fixer must be in attendance to adjust and correct the position of any reinforcement which may be displaced. The vibrators are not to come into

Position and correctness of reinforcement

Irrespective of whether any inspection and/or approval of the fixing of the reinforcement has been carried out as in C above, it shall be the Contractor's sole responsibility to ensure that the reinforcement complies with the details on the Drawings and is fixed exactly in the positions shown therein and in the positions to give the prescribed cover. The Contractor will be held entirely responsible for any failure or defect in any portion of the reinforced concrete structure and including any consequent delay, claims, third party claims. etc., where it is shown that the reinforcement has been incorrectly positioned or is incorrect in size or quantity with respect to the detailed Drawings.

Concrete cover to reinforcement

Unless otherwise directed, the concrete cover to rod reinforcement over main bars in any face shall be:-

| | |
|------------------------------|-------|
| Foundations against blinding | 50 mm |
| Strip foundations | 40 mm |
| Columns/Floor slab | 40 mm |
| Beams | 25 mm |

Projecting reinforcement

Where reinforcement projects from a concreted section of the structure and this reinforcement is expected to remain exposed for some time, it is to be coated with a cement grout to prevent rust staining on the finished concrete. This grout is to be brushed off the reinforcement prior to the continuation of concreting.

Fixtures

No openings, chases, holes or other voids shall be formed in the concrete without the prior approval of the Engineer. Details of any fixtures to be permanently built into the concrete including the proposed position of all electrical conduits 25 mm and over in diameter shall be submitted to the Engineer for his approval before being placed.

Chases, holes, etc., in concrete

The Contractor shall be responsible for the co-ordination with the Electrical and other Sub-Contractors for incorporating electrical conduits, pipes, fixing blocks, chases and holes in concrete members as required and must ensure that adequate notice is given to such Sub-Contractors informing them when concrete members incorporating the above are to be poured. The Contractor shall submit full details of these items to the Engineer for approval before the work is put in hand. All fixing blocks, chases, holes, etc., to be left in the concrete shall be accurately set out and cast with the concrete. Unless otherwise instructed by the Engineer, all electrical conduit to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and columns and between the top and bottom steel layers in the slabs and similar members.

The proposed position of all electrical conduits 25 mm and over in diameter which are to be enclosed in the concrete shall be shown accurately on a plan to be submitted to the Engineer, whose approval shall be obtained before any such conduit is placed

PIPEWORK

U.P.V.C. pipes and fittings

U.P.V.C pipes and fittings shall comply with BS 3505.

U.P.V.C pipes up to 50-mm diameter shall be jointed with solvent cement joints in accordance with the manufacturer's instructions. Pipes having diameter larger 50 mm shall be jointed using approved flexible mechanical joints.

All tees, reducers, sockets flange etc. of any diameter are to be jointed to pipes with solvent cement joints.

All jointing and lying of U.P.V.C pipes and fittings shall be carried out strictly in accordance with the manufacturer's instructions.

Steel pipes

Steel pipes shall be to BS 3601

Sluice valves

Flanged sluice valves shall confirm to BS 1218 or B.S 5163 whichever is applicable

Sluice valves shall have heads for key operation unless otherwise stated.

Valves shall be securely fixed with the spindle in vertical position, unless otherwise stated. They shall be checked for ease of operation and water tightness. Valve glands shall be repacked if necessary.

Unless otherwise stated, sluice valves should be able to withstand the working pressure of the class of pipe adjoining the valve.

All sluice valves shall be double flanged, with flanges faced and drilled and to conform to the manufacturer's dimensions or those specified in B.S 4504.

All sluice valves shall be suitable for opening and closing by manual operation against the unbalanced heads stated in meters water column.

Air valves

Air valves shall be of cast iron conforming to BS 1452, grade 14. They shall be suitable for working pressures not less than the specified for the class of pipe specified. To which they are connected.

Air valve shall be of the single acting type for the automatic admission and discharge of either large quantities of air during emptying or filling or small quantities of air under pressure during normal working condition of the pipeline.

Each air valve shall be complete with an isolating valve and cork.

All double orifice air valves shall be flanged. Flanges shall be faced and drilled and shall conform to the dimensions specified in B.S 4504 table for NP 10 unless otherwise stated.

All double orifice air valves shall be supplied drilled with a 20. Dia. Hole tapped pipe. Thread suitable for fixing of pressure gauge hole shall be fitted with brass screwed plug and copper compression ring casket.

Manufacturer's instructions.

The Contractor shall be responsible for obtaining copies of any manufacturer's instructions for pipes jointing and shall familiarizes himself and his employees with these instructions.

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

Step Irons

Step irons shall be galvanized malleable iron and shall comply with B.S 1247.

Surface Boxes

Surface boxes shall confirm to B.S 1426.

Trench excavation.

Excavated material shall be placed tidily and compactly at the sides of the trench so as to occupy as little space as possible and to create as little nuisance as possible.

The bottom of the trench shall be absolutely smooth and completely free from stones and sharp objects so as to ensure that the pipes rest uniformly upon original ground throughout its length.

Backfilling with excavated material beneath the pipe at low spots will not be permitted.

Excavation below the bottom of the trench at pipe joints must be kept to a minimum.

If the bottom of the trench materials that is unsuitable for pipe laying, the Engineer may instruct the Contractor to excavate below formation level and backfill to formation with suitable approved material properly compacted.

No pipe laying is to take place until the bottom of the trench is carefully examined by the engineer's representative.

Minimum trench depth

The minimum depth for pipe trenches shall be that which provides a cover of 600 mm above the top of the pipe.

Backfilling in pipe trenches

Backfilling around the pipe and to a height of 300 mm above it is to be carried out by using material that is free from stones and carefully compacted in layers not exceeding 150 mm thick.

Backfill to trenches shall be properly compacted and subsequent subsidence shall be the Contractor's responsibility and shall make it good at his own expense.

All topsoil shall be kept aside during excavation and be replaced after backfilling.

All surplus material from the excavations shall be disposed.

Removal of timbering

All timbering materials shall be removed from trenches before or during backfilling unless, in the opinion of the Engineer, its removal will cause any subsidence in which case he may instruct the Contractor to backfill leaving the timbering in place.

Reinstatement

Immediately backfilling of trenches has been completed, temporary reinstatement of the ground surface shall take place.

When in the opinion of the Engineer's representative a suitable period as elapsed after the temporary reinstatement and expects no further settlement, he shall allow the Contractor to carry out the permanent reinstatement. This shall in any way relieve the Contractor of his responsibility for the reinstatement and, should any further unforeseen settlement take place, the Contractor will be required to make good the reinstatement at his own expense.

Permanent reinstatement means the ground surface shall be restored to its original form and condition.

Handling and storing pipes

Particular care shall be taken during loading, unloading, handling and transportation to avoid distortion, flattening, denting, scoring or any damage to external or internal coating, sheathing or lining of the pipes, fittings, etc.

Pipes shall be stacked clear of the ground on the timbers of adequate dimensions to prevent damage to the pipes and successive tiers shall be separated by timber of similar dimensions. Wooden wedges shall be fixed to these timbers to prevent the wedges from rolling.

Fittings etc. shall be stacked clear of the ground on timbers not more than 1 tier high.

All valves rubber joint rings, gaskets, nuts, bolts, washers and similar fittings shall be stored in approved locked premises and shall not be distributed to the trench until immediately prior to fixing. All rubber joint rings and gaskets must be stored in a cool place.

All UPVC pipes and fitting should be stored under cover and protected from the weather to the satisfaction of the Engineer.

Examination of pipes

Before laying each pipe must carefully be examined for damage. Any defects in the external coating or internal lining shall be made good. The pipes shall be carefully examined for cracks or chipped ends. Damaged ends shall be cut off beyond the damaged area and machined true.

All pipes shall be cleaned internally before laying.

Laying of pipes

All pipes shall be laid strictly to the lines, levels and gradients as shown on the drawings unless where otherwise directed by the Engineer.

Mains shall be boned to even gradients using site rails no dips or bumps permitted.

All pipes shall be solidly bedded on the trench bottom. Joint holes shall be as small as possible and filled in compactly before the refilling of the trench commences.

The Contractor shall make full allowance for all cuttings and jointing of pipes.

Surface water

No surface water or other extraneous matter shall be allowed to enter the pipes during or after laying. Should this happen, the Contractor shall arrange for the necessary cleaning of the pipe at his own expense.

Painting of exposed pipes, valves, fittings and metalwork

All pipes, valves, tubes, manhole covers and the like, that are left exposed to the air at river crossings, in manholes, chambers etc., except where galvanized, shall be thoroughly cleaned and painted with two coats of approved bituminous paint after erection.

Testing of pipes

All pipes and apparatus that are to contain water under pressure shall be tested to the working pressure plus 50 %. If the pipes are in the trench they shall be backfilled for the two thirds of the distance between joints, leaving joints exposed. The fill shall be a minimum of 450mm deep.

Testing shall take place in the presence of the Engineer's representative as the work proceeds, test lengths being approved by the Engineer. The maximum length of the pipe laid without pressure testing must not exceed 3 km.

Pipes shall be securely anchored and pipe ends shall be closed by means of caps or blank flanges. Sluice valves shall not be used at the end of a test length.

The Contractor shall give the Engineer's representative a minimum of 24 hours' notice of his intention to carry out a test.

All water, materials and apparatus for carrying out the tests are to be provided by the Contractor at no extra cost.

The procedure for testing is as follows.

- (a) The test length shall be filled with water and brought to the required test pressure by means of a pressure pump. When the required is obtained, indicated by an approved pressure gauge, the pump shall be disconnected, and the pressure of the water watched for a period of 60 minute, any drop in pressure being carefully monitored.
- (b) If there is a drop in pressure at the end of the 60 minutes period, the pump should be reconnected and the test pressure re-established. The pump should then be disconnected and the pressure lowered immediately by bleeding off the water from the mains through a tap into a container. When the pressure reaches the same pressure that was indicated at the end of, the 60 minutes test period, the tap is closed and the amount of water collected in the container is measured. This amount of water is the leakage and for the test to be successful must not be greater than the “allowable leakage” as calculated below.

$$\text{Allowable leakage (litres)} = \frac{d \times l \times p}{1,227,000}$$

Where d -diameter of pipe (mm)
l -length of pipe under test (m)
p-average pressure in pipe (m).

- (a) If the test fails, it is the Contractor’s responsibility to locate the leak and remedy it so that the pipeline passes the test.

Sterilization

Treated water mains should be washed out and sterilized before being put into service. Sterilization should consist of introducing water containing a quantity of chlorine such that there is a concentration of chlorine throughout the mains at not less than 30 parts per million. This solution is to remain in the pipeline for a period of 24 hours after which the main shall be thoroughly flushed out with water to be used for the supply.

The inside of water retaining structures shall, after being thoroughly cleaned, be filled to overflow level with water containing 20 parts per million of chlorine and left for at least 24 hours before flushing out.

After flushing, bacteriological samples of water shall be taken in accordance with the Engineers instructions. If any of the samples proves to be inferior to that of the supply water, the sterilization and flushing shall be repeated.

All costs of sterilization shall be the Contractor's responsibility. The cost of sampling and testing shall be the responsibility of the employer if successful but if not shall be borne by the Contractor.

Concrete surround for pipes

Bed the draw off pipe and surround it with Class 15 concrete as specified. The sequence of work will involve:

- (a) Lay the Concrete bed
- (b) Lay, and joint the pipes on the Concrete bed.
- (c) After the pipes have been tested complete the Concrete surround.

Penstock

All penstock shall be of the flat back type and shall be drop tight when tested to a minimum face pressure of 1.0 bar

Penstock frames and doors are to be of best quality cast iron complying with B.S 1452 with two annular gunmetal sealing faces on frame and door. The gunmetal shall comply with the requirement of B.S 1400

All screw penstocks shall be provided with mild steel spindle screwed from anti-clockwise opening and running in a gunmetal nut housed in a suitable head gear which shall have hand wheel for operation. The extended spindle shall be of cadmium plated mild steel with protection tubes; wherever there lengths so required steadying brackets shall be provided

All penstock shall be supplied complete with all necessary nuts, bolts or studs and washers for fixing in position.

All headstocks shall have forged steel rod and be complete with gunmetal index pointer working over polished and graduated gunmetal indicator plate fixed to the side

of the pillar. The distance from the base to the center of the operating hand shall not be less than 0.8m.

BUILDING'S WORKS

Damp proofing

Damp proof courses shall protrude beyond the outer face of the wall for a minimum of 25 mm, the last 10 mm of which shall be turned down on an approved profile to form an anti-rain lip. The material shall be laid on a cement screed troweled smooth. At all angles, intersections etc. the material must be lapped not less than 75 mm.

A damp proof membrane of 500 gauge polythene shall be laid under floor slabs where indicated on the Drawings or directed by the Engineer and shall have laps of not less than 200 mm at all joints.

Bonding to concrete

All doorframes shall be fixed with holdfasts screwed to the frames one end and built into blockwork or concrete at the other end. Alternatively, holdfasts may be formed as an integral part of metal doorframes. Doorframes shall have three holdfasts at each side.

The holdfasts shall be of 6 mm x 25 mm galvanized wrought iron 200 mm long, one end turned up, twice drilled and countersunk for screwing to frames with stout screws and the other end formed swallowtail for building into brickwork etc.

Bonding ties shall be of 6 mm x 15 mm galvanized wrought iron 150 mm long with both ends formed swallowtail for building into block work, etc.

Block work walling

Blocks for walling shall be properly bonded together and in such manner that no vertical joint in any one course shall be within 100 mm of a similar vertical joint in the courses immediately above or below.

Alternate courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining wall. All perpendics; reveals and other angles of walling shall be built strictly true and square.

The blocks shall be bedded and jointed in 1:3 cement/sand mortars with beds and joints not more than 20 mm or less than 12mm thick, all flushed up and grouted solid as the work proceeds. All walling shall be properly protected as the mortar is setting.

Ends of lintels, sills, joints, roof trusses, etc. shall be built in and bedded solid in mortar. They shall bear 300 mm on supports and shall be cast with a recessed throating under the front edge. Block walls shall be pinned up to the underside of concrete beams and slabs with cement.

Timber frames shall be built in with holdfasts and bedded solid and pointed both sides in cement mortar. Lugs of window frames shall be built in or cut and pinned to block work. Frames shall be bedded solid in mortar and pointed in approved mastic applied with a caulking gun externally.

All holes for pipes, electrical conduits, etc. mortises for bolts, dowels, etc. shall be cut or formed grouted up in cement and made good.

Horizontal reinforcement consisting of approved fabric shall be provided in every third course to span between the vertical block reinforcement. A proprietary wall reinforcement system may be used with the Engineer's approval.

At corners and junctions of walls, all horizontal reinforcement shall be lapped 300mm. The cavities of the blocks shall be filled with 1:3 cement/sand mortars around a mild steel reinforcing bar.

External faces of block work shall be rendered with 12 mm thick 1:5 cement/sand mortar to BS 5262 with a wood float finish.

Internal faces of block work shall be plastered to BS 5492 with an undercoat to suit the block work surface. The total thickness shall be 20 mm.

Openings through walls shall be formed to the net size required and rendered smooth in cement mortar. Where openings occur in cavity walls the wall shall be built solid all-round the opening.

Painting

Delivery and storage

All materials are to be delivered to the site in the manufacturers' original containers with seals unbroken and are to be clearly marked with the manufacturer's name or

trade mark and a description of the contents, colour or pattern, and, if applicable, the conditions for storage and the date by which they shall be used.

All materials are to be stored at Site in accordance with the manufacturer's directions and to the satisfaction of the Engineer.

Materials samples and tests

During the course of the work, the Engineer may take samples of any of the paints, varnishes, stains or sealers, either from the sealed or open containers, before or during use.

When requested by the Engineer to do so, the Contractor shall submit samples for testing in accordance with BS 3900. The costs of such test, including transport and incidental costs, shall be borne by the Contractor if the results show non-compliance with the Specification.

Any work executed with materials tested and found not to comply with the requirements of the Specification shall be burnt off or otherwise removed and re-executed as directed by the Engineer.

Workmanship

Before painting, varnishing, staining or sealing is commenced; every possible precaution shall be taken to keep down dust.

During the execution of painting and decorating work, the Contractor shall take all necessary precautions to protect the health and safety of the workmen, including provision of washing facilities. The Contractor shall comply with all statutory rules and regulations affecting the trades engaged on the work.

Only skilled workmen shall be employed. A properly qualified foreman shall be constantly in attendance on the work while it is proceeding.

All brushes tools and containers used in carrying out the work shall be clean and free from foreign matter and shall be thoroughly cleaned before being used for a different type of material.

An ample supply of dustsheets shall be provided to protect the work as it proceeds.

Unless the manufacturers instruct otherwise, all liquid materials shall be thoroughly stirred before use. Where necessary the liquids shall be strained to remove any skin before application.

All containers shall be kept securely covered with tight fitting lids when not in use.

No dilution of liquid materials will be allowed, except as recommended by the manufacturer or as otherwise permitted by the Engineer.

The Contractor shall arrange his work so that any treated surfaces to be subsequently covered up shall be treated before they become inaccessible.

The painting work shall be carried out in accordance with BS 6150 and all painting varnishing, staining or sealing shall be executed in dry conditions when relative humidity is less than 80%. No such finishes shall be applied to surfaces structurally or superficially damp and all surfaces must be ascertained to be free from condensation, dust, oil or any other foreign matter before application of each coat.

The tints of undercoats are to approximate to those of the finishing colour but in order to indicate the number of coats applied, a difference is to be made in the shade of each succeeding coat.

Primed or undercoated work shall not be left in an exposed or otherwise unsuitable situation for too long a period before completing process.

Rubbing down before application of the final coats shall be by means of the wet process with waterproof glass paper. Preliminary coats of paint shall be lightly rubbed down with fine sandpaper before the next coat is applied.

Finishing coats shall be applied evenly over the whole surface to give a solid film free from brush marks, sags, runs, orange peeling or other defects.

The Contractor shall clean down all paintwork on completion, remove all marks due to spill and leave all painted surfaces to the complete satisfaction of the Engineer.

Samples of workmanship and colour

The Contractor shall prepare samples of the different finishes on the appropriate backing material, with the correct priming and undercoats where applicable, for acceptance by the Engineer, including alternatives as directed. These samples shall be prepared at least twenty-eight days before commencement of the actual work.

Preparation of surfaces

General

All surfaces shall be thoroughly prepared and shall be clean, free from loose dirt or other impurity. No paint shall be applied until all surfaces are thoroughly dry.

Preparation of the different materials to receive decorative and protective finishes shall be as specified below.

Concrete and concrete block work

Surfaces shall be brushed down thoroughly to remove all dust and loose material. Mortar droppings and nibs shall be removed and defects made good.

Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. lxxxviii. Plaster and rendering

Surfaces shall be brushed down to remove loose material and dust. The surface shall be washed, where directed, with a minimum of warm water and detergent, and allowed to dry.

Minor defects, cracks and holes, after cutting out as necessary, shall be made good and rubbed down flush with the surrounding surface.

Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. lxxxix. Hardwood

All surfaces shall be rubbed down smooth with fine abrasive, and dusted off. No further preparation is required for wood to be stained or clear sealed.

Iron and steelwork

Bare iron and steelwork to be painted shall be thoroughly prepared by removing all grease, dirt, rust and loose mill scale.

All tools shall be operated in such a manner that no sharp ridges or burrs are left and no cuts made in the steel.

Dust and other loose material shall be removed after cleaning. Oil and grease shall be removed with white spirit.

The priming coats shall be applied before any contamination or rusting occurs.

If the surfaces have been exposed to salt spray laden winds or to atmosphere polluted with chemicals, they shall be thoroughly washed with fresh water and allowed to dry before priming.

Steelwork delivered primed is to be thoroughly washed down to remove all dirt and grease. All defective paint, damaged, blistered, crazed or not firmly adhering, etc. shall be removed by scrapping back to a firm edge or, if necessary, the surface shall be completely stripped. All such areas shall be patch-primed immediately upon delivery. Areas damaged during erection shall be similarly dealt with.

Galvanized iron and steel

Galvanized iron and steel surfaces shall be thoroughly cleaned to remove all grease, dirt, dust etc.

Priming

General

Before priming, painting, varnishing, staining or sealing is started; all possible precautions shall be taken to keep down dust.

All metal fittings and fastenings shall be removed before the preparatory processes are started. They shall be cleaned and re-fixed in position on final completion of the work.

Special priming

Unless the paint manufacturer recommends otherwise the following materials shall receive special priming:

Cement based surfaces, such as concrete, fair face block work and brickwork, render and plaster, and asbestos free boards containing cement which are to receive oil based paints, shall be treated with an alkali-resistant primer.

Galvanized iron and steelwork shall be treated with calcium plumbate or a two-pack etching primer.

Copper shall be treated with a suitable etching primer.

Hardwood shall be treated with aluminum primer.

The smooth face of hardboard shall be treated with specially formulated hardboard primer.

All uncoated iron and steelwork cleaned of rust, mill scale, etc., in preparation for painting shall be primed within twenty-four hours of preparation whether at the works or on Site.

Painting

Concrete surfaces are to receive one coat of undercoat and two coats of approved plastic emulsion.

Iron and steelwork are to receive one coat of red lead primer, two coats of undercoat and one coat of high gloss finish.

All wooden surfaces are to be primed with aluminum wood primer and are to receive two coats of exterior grade undercoat and one coat of exterior or interior, as appropriate, high gloss finish.

Plumbing

Galvanized malleable iron brackets shall be used for fixing galvanized steel pipes up to 50 mm diameter. Pipes larger than 50 mm diameter shall be fixed with galvanized iron or brass hinged holder bats. For fixing to timber, stout galvanized pipe clips screwed to the timber shall be used.

Drainage pipes shall be encased with 150 mm surround of Class C20 concrete beneath floor slabs.

Workmanship in timber

All joiner's work shall be wrought and finished with a clean even and smooth surface, arises straight and cleanly cut, and all to be properly framed together, single or double mortised, and tanned, housed, dovetailed or fitted with all proper and suitable joints

whether these are shown on the Drawings or not, and all joints shall be fitted without stopping, the whole being glued, feathered, tongued and fixed with screws, nails etc. all detailed on the Drawings or as approved by the Engineer and in accordance with the best class of workmanship.

Adhesives used for timberwork shall be synthetic resins of the phenol and amine plastic type BR in accordance with BS 1204 Parts 1 and 2.

Nails for joinery shall be oval lost head nails.

Screws shall be countersunk wood screws. Steel screws shall be used only in concealed positions, or where the work is to be painted, elsewhere brass shall be used. Steel screws in contact with aluminum shall be dipped in zinc chromate solution before fixing. Ironmongery is to be fixed with screws of the same metal, except for aluminum, which shall be fixed with chromium, plated brass screws.

All joinery shall be properly protected from injury or from weather by casing wherever required.

Wooden doors

General

The materials used in the construction of wooden doors shall be in accordance with BS 459. Doors shall be obtained from an approved manufacturer and the details and methods of construction shall be to the Engineer's approval.

. Flush doors

Flush doors shall be 45 mm thick overall, faced both sides with 4mm plywood and lipped on all edges with 10 mm thick hardwood. External doors shall be faced both sides with exterior quality plywood and assembled with waterproof adhesive to type MR of BS 1203. Suitable blocking pieces for door furniture shall be built in. Glazed vision panels shall be inserted as shown on the Drawings and shall be to the approval of the Engineer.

Cupboard doors shall be as above but 40mm thick overall.

Door and window furniture

Each door shall be provided complete with all hinges, handles, locks, three keys per lock, bolts, doorstops etc. and all necessary screws, bolts and other fixings. Double leaf doors shall be provided with barrel bolts top and bottom of the first closing leaf,

complete with flush mounted floor socket, and handle for the top bolt extended to 2.0 m above floor level.

Windows shall be provided with all necessary hinges, fasteners, locks, catches, stays, etc.

Glazing

Glazing shall be clear or obscured glass set in metallic putty and shall be subject to the approval of the Engineer. Clear glass shall be used for all windows except in toilets or as otherwise directed by the Engineer. Glazing shall be carried out in accordance with BSCP 152 "Glazing and fixing of glass in buildings", and the window manufacturer's instructions.

Proprietary sheet metal roofing

The fixing of all proprietary roof sheeting, etc. shall be in accordance with the manufacturer's details and as shown on the Drawings.

Bituminous felt roofing

Bituminous roofing felt shall be laid in accordance with BSCP 144 Part 3. Before laying roofing felt the underlying concrete surface shall have any cracks and expansion joints sealed with a bituminous patching compound. A slip membrane comprising one layer of one ply roofing felt shall be laid and adhered to the concrete at all edges.

Two under layers of two ply roofing felt shall be applied with 100 mm overlaps between strips, bonded with bitumastic compound at all edges. The overlap joints between successive layers shall be staggered to half the strip width.

A surface layer of grey mineralized surface felt of an approved colour shall be laid with 100 mm overlaps, fully bonded with hot applied bitumen compound.

Guttering

Gutters shall be laid to falls as directed. The general arrangement of the drainage system shall be to the Engineer's approval.

Fencing and gates

Wire and metal posts used in compound boundary fences and gates shall be of galvanized steel to the details shown on the Drawings.

Posts, stays and gates shall be primed with one coat of zinc chromate paint and finished with two coats of oil based aluminum paint.

The whole of the fencing shall be to a pattern approved by the Engineer.

Ladders

Unless otherwise indicated permanent ladders shall be of mild steel and shall be in accordance with BS 4211. Rungs shall be 20mm diameter solid round bar and shall be at 300 mm centres. Stringers shall be 65 mm x 10 mm strip set 300 mm apart shall extend 1.0 m above the top rung and shall be turned out at the bottom and drilled for 12 mm holding down bolts. Intermediate and top support stays shall be 100 mm x 100 mm strip, bolted to the stringers with 12 mm bolts and shall be of a length that will give a minimum clearance of 200 mm behind the rungs. Support stays shall have a maximum spacing of 2.5 m.

Ladders exceeding 4.0 m height shall be equipped with a safety cage consisting of hoops of 50 mm x 8 mm strip bent to a diameter of 0.76 m, fixed to the stringers at 0.55 m centres and joined by one additional stringer of 50 mm x 8 mm strip at the maximum distance from the rungs.

All components of ladders shall be galvanized after cutting, drilling and welding and all fixing bolts, nuts washers, etc, necessary to complete the installation shall be provided.

Ladders to insides of water retaining structures shall be galvanized mild steel.

Open mesh steel flooring

Open mesh flooring shall be to BS 4592 and shall be painted black in accordance with the Specification.

Kicker plates 100 mm high shall be provided round all openings.

Chequer plate flooring

Chequer plate flooring shall be of mild steel and manufactured with diamond chequering or other non-slip pattern. The plates shall be of sufficient thickness not to bend or spring in ordinary usage and shall be fitted evenly and truly into steel angle frames or curbing with suitable attachments for building into concrete flooring.

The plates and frames shall be painted an approved colour in accordance with the Specification.

Hand railing

Hand railing shall consist of 38 mm diameter galvanized steel sections of tubing BS 1387, screwed at each end. The sections shall be joined by 38 mm diameter galvanized steel equal crosses; equal tees or short radius 90o bends where appropriate, such that the top rail shall be 1 m and the lower rail 0.5 m above the concrete slab, and the spacing between standards shall be 2 m maximum. A 38 mm diameter galvanized steel flange shall be screwed to the base of each standard and drilled for four 20 mm diameter, 100 mm long mild steel rag bolts which shall be cast into the reinforced concrete slab.

All hand railing components shall be galvanized after cutting, screwing and drilling and shall be supplied complete with all bolts, nuts, washers and other fixings necessary to complete the installation.

Removal of anthills

Anthills that come within the area covered by the building and three metres clear all round shall be entirely removed and the queen eradicated. The cavity formed by the removal of the nest must be treated and filled in with approved materials in layers not exceeding 300 mm thick well rammed and consolidated.

Ant proofing

No ant treatment is to be carried out near potable water structures. Otherwise ant treatment is to mean the treatment of the whole of the surface under floors with a solution composed of 5 parts by weight of Pentachlorophenol to 95 parts by weight of furnace oil well mixed together.

The solution is to be applied by means of a watering can with a fishtail spout. It is to be accurately applied at the rate of five liters per square meter of surface.

Before and after the application the surface is to be cleaned free from foreign matter, particularly scrap timber and cellulose material.

Fencing

Details of the types of fencing and gates to be installed under the Contract are included with the Drawings. The Contractor shall, when required provide details of any alternative type of fencing. The Contractor should note that the Engineer is not obliged to accept the Contractor's alternative proposals, but will not unreasonably withhold consent, provided the Contractor's alternative design is fit for the purpose intended, is demonstrably durable and meets all other requirements of the relevant British Standard.

- Fencing shall be strained wire mesh fencing also to BS 1722 except as indicated.
- All bolts to fencing shall be burned over.
- All posts to be founded in Class E concrete.
- All steelwork to fencing shall be galvanized and painted in accordance with the relevant painting specification.

Hand railing

General details of the type of hand railing to be installed under the Contract are included in the Tender Drawings. The Contractor shall, when required, submit for consideration alternative type of hand railing proposed. The Contractor should note that the Engineer is not obliged to accept the Contractor's alternative proposals, but will not unreasonably withhold consent, provided the Contractor's alternative design is fit for the purpose intended and is demonstrably durable.

Landscaping and miscellaneous works

Stone Pitching

Stone pitching shall be either set in mortar or set dry. Stones shall be sound, tough and durable. No stone shall be less than 200 mm minimum dimension, except that smaller pieces may be used for filling spaces between the larger stones.

Mortar shall be composed of 1 part cement to 4 parts of sand of approved quality.

All pitching shall be set on a backing of free-draining material. No pitching shall be placed until the underlying material has been compacted sufficiently to avoid future settlement. Unless otherwise specified, pitching on embankments shall be supported on a toe wall of stone masonry, approximately 1,000 mm deep x 350 thick unless otherwise instructed.

Commencing at the toe wall, if any, the stone pitching shall be firmly bedded into the underlying material and against the adjoining stones. The stones shall be set by hand with the longest dimension at right angles to the slope, with their surfaces in close contact, and in courses so as to break joint. The spaces between the larger stones shall be filled with spalls securely rammed into place. The finished surface of the pitching shall present an even, tight surface.

Where pitching set in mortar is specified, suitable weep holes shall be formed. Remaining spaces between the stones shall be filled with mortar in such a way as to completely fill the voids. The joints shall be neatly pointed. Pitching set in mortar shall be cured for a minimum period of 4 days by continuous spraying, or by covering with water-retaining material and keeping wet.

Precast paving

Precast paving slabs shall be in Grade 25/10 concrete with a wood float finish and shall be 50 mm thick unless otherwise shown on the Drawings.

Where slabs are to be laid on original ground, topsoil shall be removed and the subsoil shall be scarified to a depth of 150 mm and compacted to 93% of modified AASHTO density. The Contractor shall remove to a level agreed with the Engineer any locally soft areas where the above compaction cannot be achieved. The excavated material shall be replaced with approved backfill compacted to the above density.

Where slabs are to be laid on sand, the area to be paved shall be trimmed to falls, compacted and overlain with 50 mm of sand which shall be watered and raked to a true surface. The paving slabs shall then be laid and bedded down using a light vibrating-plate compacter. Concrete edge strips shall be provided on the perimeters of such paved areas to prevent loss of sand.

Where slabs are to be laid on concrete bedding, the area to be paved shall be trimmed to falls, compacted and overlain with 75 mm of Class E dry mix concrete. The dry mix concrete shall be spread out dry and raked to a true surface. The paving slabs shall

then be laid and bedded down using a light vibrating-plate compacter. Joints between slabs shall be filled and pointed with 1:4 cement: sand mortar.

Topsoil and grassing

The Contractor will be required to complete all surface drainage works and other remedial works indicated by the Engineer ahead of top soiling and grassing.

Topsoil stockpiled from the Works shall be spread to a minimum depth of 100 mm over the areas to be grassed.

All surfaces to be grassed shall immediately before planting of grass be reduced to a fine tilt free from stones larger than 50 mm.

An approved indigenous star type grass (e.g. *Cynodon dactylon*, *Cynodon niemfuensis* (Star grass) and *Chloris gayana* (Rhodes grass) shall be used for all planting except where the Engineer indicates otherwise. All grass shall be won from areas designated for such use by the Contractor. The Contractor shall ensure that such areas are not made barren by the excessive transplanting of grass runners from such areas. In general the cover of areas used for winning grass runners shall not be reduced by more than 50%. Where, in the opinion of the Engineer, the removal of grass is considered excessive, he will instruct the Contractor accordingly.

Splits (clumps) of the transplanted star grass shall be planted at a grid not exceeding 300 mm in all areas where such grass is required. Where instructed by the Engineer, the Contractor will be required to apply an approved fertilizer to the grassed areas.

Planting shall preferably be carried out at the beginning of a rainy season and the Contractor will be required to adjust his works program accordingly. In exceptional circumstances, grassing works will be allowed during the Defects Liability Period for the Works, but the Contractor should expect consequent extended Defects Liability Periods for these areas of the Works.

The Contractor shall care for and water the grass at his own expense until it is firmly established both during the construction and Defects Liability Periods for the Works. Allowance for the following operations considered necessary for the establishment of grassed areas should be made in tender pricing:-

Planting

The Contractor shall obtain and plant suitable shrubs and trees as directed and shall provide the same maintenance input during the construction and Defects Liability Period as that provided for grassed areas.

In the case of ground cover plants, the lateral shoots shall be spread out well around the plant as far as shape permits to encourage outward growth.

Climbing plants shall be positioned with the root ball touching the wall/fence, and shoots angled towards the structure to be climbed. Where appropriate, climbing stems shall be lightly trained to climbing frames. All containers, labels, canes and ties shall be removed unless otherwise instructed.

Failure of shrubs and trees due to drought will be the sole responsibility of the Contractor

Access Roads

Where the Contractor proposes to use a private road as an access road to the Works or to a quarry or a borrow pit, it shall be entirely his responsibility to comply with any conditions laid down by the owner, and the Employer will be in no way responsible for any claim arising from such arrangements.

| ITEM No | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSH |
|----------|---|--------|-----|-----------|------------|
| A | BILL No. 1: PRELIMINARIES AND GENERAL | | | | |
| 1.1 | <p>Project standard medium size Sign Board</p> <p>Allow for providing, erecting, and maintaining throughout course of the contract and afterwards clearing away project sign boards as designed, specified and approved by the project engineer.</p> | No | 2 | | |
| 1.2 | <p>Temporary Buildings and storage of materials</p> <p>The Contractor shall provide where directed on the site weatherproof lock-up sheds for storage of all goods and materials liable to suffer damage from exposure to sunlight or inclement weather. The contractor shall also provide offices, and all the buildings required by the contractor for his own use. Upon completion all temporary buildings are to be removed and cleared away. The contractor will be required and make good damaged or disturbed surfaces upon completion to the satisfaction of the project engineer.</p> | Item | 1 | | |
| 1.3 | <p>Security of Works ETC.</p> <p>The Contractor shall be entirely responsible for the security of all the works stores, materials, plant, personnel, etc., and must provide all necessary watching, lighting and other precautions as necessary to ensure security against theft, loss or damage and the protection of the public.</p> <p>No claim will be entertained from the Contractor for not maintaining adequate security for both the works</p> | Months | 9 | | |

| | | | | | |
|-----|---|--------|----|--|--|
| | stores, materials, plant, and personnel | | | | |
| 1.4 | <p>Office for the Project Engineer</p> <p>The Contractor shall provide, erect and maintain where directed on site a Site office of the type noted in the Particular Preliminaries, complete with Furniture and equipment. He shall also provide a strong metal trunk complete with strong hasp and staple fastening and two keys. He shall provide, erect and maintain a lock-up type water closet for the sole use of the project engineer and other staff to the standard requirement of Medical Officer of Health and shall provide services of cleaner and pay all conservancy charges and keep both office and closet in a clean and sanitary condition from commencement to the completion of the works. The office and closet shall be completed before the Contractor is permitted to commence the works.</p> <p>The Contractor shall make available on the Site as and when required by the "Project engineer" a modern and accurate level together with leveling staff, ranging rods and 50 metres metallic or linen tape.</p> | M2 | 40 | | |
| 1.5 | <p>Water Supply for the Works</p> <p>The Contractor shall provide all necessary water required for use in the works. The Contractor shall pay all fees and obtain all permits in connection therewith. The Contractor must make his own arrangements and provide water, temporary tanks as required at his own cost and clear away when no longer required and make good on completion to the entire satisfaction of the project engineer.</p> | Months | 9 | | |

| | | | | | |
|------|--|----------|-----------|-----------|--------------|
| 1.6 | <p>Lighting and power</p> <p>The contractor shall provide all temporary artificial lighting and power for use on the works and include all temporary connections, wiring, fittings etc. and clearing away on completion. The Contractor shall pay all fees and obtain all permits in connection therewith.</p> | Months | 9 | | |
| 1.7 | <p>Sanitation for the Works</p> <p>The Contractor shall provide and maintain proper sanitation of the works to the satisfaction of the local Authorities, Labor Department and the project engineer</p> | Months | 9 | | |
| 1.8 | <p>Technical Supervision and Administration of the works</p> <p>Provide a provisional sum of Ksh. (2,500,000/=) for Technical supervision and administration of the works.</p> | Lump sum | 1 | 2,500,000 | 2,500,000.00 |
| 1.9 | <p>Contractor's overhead</p> <p>Extra over Item '1.8' for Profits and Overheads %</p> | % | 2,500,000 | | |
| 1.10 | <p>Management Site Meetings</p> <p>Allow for a PC Sum of KSH. 450,000 to cover the cost of Management Site Meetings.</p> <p>The Contractor shall be expected to take care of all site meetings by making all the necessary arrangements. A table of sufficient size for meetings and ten chairs for the joint use of the contractor and the project implementers shall be provided.</p> <p>The contractor shall allow for the cost of providing light refreshment</p> | PC Sum | 1 | 450,000 | 450,000.00 |

| | | | | | |
|------|--|----------|----------------|---------|------------|
| | for the participants at site meetings, materials, food and refreshments for the entire duration of the site meetings. | | | | |
| 1.11 | Mobilization of plant and equipment Allow for mobilization/demobilization of plant, equipment for the contractor | Lump sum | 1 | | |
| 1.12 | Community sensitization on O&M Allow for community sensitization on operation & maintenance of the water infrastructure system (intake, pipelines and water storage structures) | Lump sum | 1 | | |
| 1.13 | Environment management according to EMP Provide a provisional sum of Ksh770,000 for Environmental Management and monitoring as required by EMP and EIA license conditions | Lump sum | 1 | 770,000 | 770,000.00 |
| 1.14 | Performance Bond Allow for Performance Bond in form of unconditional bank guarantee equivalent to five per cent (5%) of the Contract price | % | Contract Price | 5% | |
| 1.15 | Insurance Allow for third party insurance for the works to cover risks including personal injuries, loss of or damage to the works, materials, plant and loss or damage to property. | | | | |
| | TOTAL - BILL No. 1: PRELIMINARIES AND GENERAL | | | | |

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| B | BILL NO 2: REHABILITATION OF INTAKE WORKS | | | | |
| 2.01 | River diversion Allow for Supplying all the necessary tools and equipment and diverting the river to create a workable dry area to facilitate for rehabilitation of the cross weir | Item | 1 | | |
| 2.02 | Excavation works Excavate over site soil material to reduced levels not exceeding 300mm deep and cart away | M2 | 6 | | |
| 2.03 | Excavation for raft foundation not exceeding 1.0 metres deep starting from reduced levels. | M3 | 3 | | |
| 2.04 | Hardcore Fill Provide, place and compact hardcore fill 300mm thick | M2 | 6 | | |
| | Formwork <i>Provide and fix shuttering including all propping, strutting and striking as necessary when required</i> | | | | |
| 2.05 | Formwork to the sides of concrete surround of off-take pipe under sides of inlet and chambers | M2 | 4 | | |
| 2.06 | Formwork to walling sides of valve chamber | M2 | 29 | | |
| 2.07 | Formwork to walling sides of inlet and off-take chambers | M2 | 26 | | |
| 2.08 | Formwork to soffit and sides of roof slab of valve chamber, inlet and off- | M2 | 8 | | |

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| | take chambers | | | | |
| | <p>Reinforcement <i>Provide, cut, bend, place in position and fix the following steel reinforcement, including spacers and all binding wire</i></p> <p><i>(Drawing plus bar bending schedule provided)</i></p> | | | | |
| 2.09 | D12mm diameter steel bars at 150mm c/c both ways to floor slab and roof slab of inlet and off-take chambers | Kg | 186 | | |
| 2.10 | D12mm diameter steel bars at 150mm c/c both ways to the walling of inlet and off take chambers | Kg | 97 | | |
| 2.11 | D12mm diameter steel bars at 150mm c/c both ways to floor slab and roof slab of valve chamber | Kg | 95 | | |
| 2.12 | D12mm diameter steel bars at 150mm c/c both ways to the walling of valve chamber | Kg | 116 | | |
| | <p>Concrete Works <i>Provide all materials, mix, place and compact concrete as directed by the Engineer</i></p> | | | | |
| 2.13 | Plain Concrete blinding class 15(1:4:8)50mm thick under base slab | M2 | 6 | | |
| 2.14 | Plain Concrete class 20 (1:3:6) surround to off-take pipe under inlet and off-take chambers | M3 | 3 | | |
| 2.15 | Vibrated Reinforced Concrete class 20 (1:2:4) to intake, off-take and valve chamber floor slabs, walling and roof slab | M3 | 3 | | |
| | Weir Crest and Outlet sump Finishes | | | | |

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| 2.16 | Provide, install and securely fix 150 mm high angle steel line over the weir crest | M | 9 | | |
| 2.17 | 2 Layers of 25mm thick steel trowelled plaster to sides of inlet, off-take and valve chamber floor slabs and walling internally using (1:3) cement/sand ratio. Include for water proofing | M2 | 55 | | |
| 2.18 | 2 Layers of 25mm thick steel trowelled plaster to sides of inlet, off-take and valve chamber walling externally using (1:3) cement/sand ratio. Include for water proofing | M2 | 12 | | |
| 2.19 | Fabricate and install a 1.2mx0.9mm lockable 40mm square hollow framed steel plate (16 g) cover. Include for welding and concreting to cover | No | 3 | | |
| 2.20 | Provide for installation of 100mmØ scour. Cost to include for material and fixing. | Item | 1 | | |
| | Pipe fittings <i>Supply, and securely fix, the following pipes and pipe fittings consisting of 12" Ø GI pipe, and 3" Ø GI pipe, at the intake works as shown in the drawings. (Allow for pipe anchorage/support).</i> | | | | |
| 2.21 | 12" Ø GI flanged bell mouth | No | 1 | | |
| 2.22 | 12" Ø GI flanged bend | No | 1 | | |
| 2.23 | 12" Ø GI flanged pipe piece 1m long | No | 1 | | |
| 2.24 | 12" Ø flanged sluice valve | No | 1 | | |
| 2.25 | 12" Ø flanged GI pipe | No | 2 | | |
| 2.26 | 3" Ø GI flanged bell mouth | No | 1 | | |
| 2.27 | 3" Ø GI flanged bend | No | 1 | | |
| 2.28 | 3" Ø GI flanged pipe piece 1m long | No | 1 | | |
| 2.29 | 3" Ø flanged sluice valve | No | 1 | | |
| 2.30 | 3" Ø flanged GI pipe | No | 2 | | |
| 2.31 | Coarse Screen | Item | 1 | | |

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| | Supply materials and fabricate and fix coarse galvanized screens as directed by the supervising engineer | | | | |
| 2.32 | Fine Screen Supply materials and fabricate and fix fine galvanized screens as directed by the supervising engineer | Item | 1 | | |
| | TOTAL - BILL No. 2: REHABILITATION OF THE INTAKE WORKS | | | | |
| C | BILL NO 3: PIPES AND PIPE FITTINGS | | | | |
| | Supply, and deliver the following pipes and pipe fittings | | | | |
| | Main Gravity line (3,500m long) | | | | |
| 3.01 | 300mm Ø medium gauge flanged G.I. pipes | No | 5 | | |
| 3.02 | 300mm Ø UPVC class 'C' pipes | No | 585 | | |
| 3.03 | 300mm Ø GI bend | No | 6 | | |
| 3.04 | 300mm Ø UPVC long radius bend | No | 2 | | |
| | Air Valve fittings (3No) | | | | |
| 3.05 | 300mm Ø PVC/GI Flexible VJ coupling adaptors | No | 6 | | |
| 3.06 | 300mm Ø 1m long Flanged GI pipe piece | No | 6 | | |
| 3.07 | 300x80 mm Ø Flanged Tee | No | 3 | | |
| 3.08 | 80x25mm Ø GI reducer (bigger end flanged & smaller end threaded) | No | 3 | | |
| 3.09 | 25mm Ø gate valve (Pelgler or similar) | No | 3 | | |
| 3.10 | 25mm Ø GI Nipple | No | 3 | | |
| 3.11 | 25mm Air valve | No | 3 | | |
| | Washout fittings (5No) | | | | |
| 3.12 | 300mm Ø PVC/GI Flexible VJ coupling adaptors | No | 10 | | |
| 3.13 | 300mm Ø 1m long Flanged GI pipe piece | No | 10 | | |
| 3.14 | 300x80 mm Ø Flanged Tee | No | 5 | | |
| 3.15 | 80mm Ø Flanged sluice valve | No | 5 | | |
| 3.16 | 80mm Ø 2m long Flanged GI pipe piece | No | 5 | | |

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| | Control Valve fittings at the Pan 1 (2No) | | | | |
| 3.17 | 300mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| 3.18 | 300mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.19 | 300x250 mm GI Ø Flanged Tee | No | 1 | | |
| 3.20 | 12" (300mm) Ø flanged sluice valve | No | 1 | | |
| 3.21 | 300mm Ø 3m long Flanged GI pipe piece | No | 1 | | |
| 3.22 | 8" (250mm) Ø flanged sluice valve | No | 2 | | |
| 3.23 | 8" (250mm) Ø non return valve | No | 2 | | |
| 3.24 | 250mm Ø Flanged GI pipe | No | 3 | | |
| 3.25 | 250mm Ø PVC/GI Flexible VJ coupling adaptor | No | 3 | | |
| 3.26 | 250x100 mm Ø Flanged Tee | No | 1 | | |
| 3.27 | 100mm Ø Flanged sluice valve | No | 1 | | |
| 3.28 | 100mm Ø Flanged GI bend | No | 2 | | |
| 3.29 | 100mm Ø Flanged GI pipe | No | 2 | | |
| 3.30 | 100mm Ø PVC/GI Flexible VJ coupling adaptor | No | 1 | | |
| | Sub Main Gravity line (3,500m long) | | | | |
| 3.31 | 80mm Ø medium gauge flanged G.I. pipes | No | 5 | | |
| 3.32 | 80mm Ø UPVC class 'C' pipes | No | 585 | | |
| 3.33 | 80mm Ø GI bend | No | 6 | | |
| 3.34 | 80mm Ø UPVC long radius bend | No | 2 | | |
| 3.35 | 80mm Ø GI plug | No | 1 | | |
| | Sub Main Air Valve fittings (3No) | | | | |
| 3.36 | 80mm Ø PVC/GI Flexible VJ coupling adaptors | No | 6 | | |
| 3.37 | 80mm Ø 1m long Flanged GI pipe piece | No | 6 | | |
| 3.38 | 80x80 mm Ø Flanged Tee | No | 3 | | |
| 3.39 | 80x25mm Ø GI reducer (bigger end flanged & smaller end threaded) | No | 3 | | |
| 3.40 | 25mm Ø gate valve (Pelgler or similar) | No | 3 | | |
| 3.41 | 25mm Ø GI Nipple | No | 3 | | |
| 3.42 | 25mm Air valve | No | 3 | | |
| | Sub Main Washout fittings (5No) | | | | |
| 3.43 | 80mm Ø PVC/GI Flexible VJ coupling adaptors | No | 10 | | |
| 3.44 | 80mm Ø 1m long Flanged GI pipe piece | No | 10 | | |
| 3.45 | 80x80 mm Ø Flanged Tee | No | 5 | | |

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| 3.46 | 80mm Ø sluice valve | No | 5 | | |
| 3.47 | 80mm Ø 2m long Flanged GI pipe piece | No | 5 | | |
| | Main Distribution Line (800m long) From Pan1 – Pan2 | | | | |
| 3.48 | 250mm Ø medium gauge Flanged G.I. pipes | No | 3 | | |
| 3.49 | 250mm Ø UPVC class 'C'. pipes | No | 131 | | |
| 3.50 | 250mm Ø VJ couplings | No | 6 | | |
| 3.51 | 250mm Ø UPVC bend | No | 2 | | |
| | Control Valve fittings at Pan 2 (1No) | | | | |
| 3.52 | 250mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| 3.53 | 250mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.54 | 250mm Ø GI Equal Tee | No | 2 | | |
| 3.55 | 250mm Ø sluice valve | No | 2 | | |
| 3.56 | 250mm Ø non return valve | No | 1 | | |
| 3.57 | 250x200mm Ø GI Flanged reducer | No | 1 | | |
| 3.58 | 200mm Ø sluice valve | No | 2 | | |
| 3.59 | 200mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.60 | 200mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| | Distribution line A (Up to 2500m long) | | | | |
| 3.61 | 200mm Ø UPVC class 'C'. pipes | No | 260 | | |
| 3.62 | 200mm Ø medium gauge G.I. pipes | No | 20 | | |
| 3.63 | 200mm Ø PVC/GI Flexible VJ coupling adaptors | No | 20 | | |
| 3.64 | 150mm Ø UPVC class 'C'. pipes | No | 122 | | |
| 3.65 | 150mm Ø medium gauge G.I. pipes | No | 15 | | |
| 3.66 | 150mm Ø PVC/GI Flexible VJ coupling adaptors | No | 15 | | |
| 3.67 | 200x150mm Ø reducer | No | 1 | | |
| 3.68 | 150mm Ø UPVC bend | No | 1 | | |
| | Washout fittings (1No) | | | | |
| 3.69 | 200mm Ø PVC/GI Flexible VJ coupling adaptors | No | 2 | | |
| 3.70 | 200mm Ø 1m long Flanged GI pipe piece | No | 2 | | |
| 3.71 | 200x80 mm Ø Flanged Tee | No | 1 | | |
| 3.72 | 80mm Ø sluice valve | No | 1 | | |
| 3.73 | 80mm Ø 2m long Flanged GI pipe | No | 1 | | |

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| | piece | | | | |
| | Distribution line B (Up to 1000m long) | | | | |
| 3.74 | 110mm Ø UPVC class 'D'. pipes | No | 167 | | |
| | Control Valve fittings at Wakinuthia's Junction (1No) | | | | |
| 3.75 | 150mm Ø PVC/GI Flexible VJ coupling adaptors | No | 2 | | |
| 3.76 | 150mm Ø 1m long Flanged GI pipe piece | No | 2 | | |
| 3.77 | 150mm x 100mm Ø GI Tee | No | 1 | | |
| 3.78 | 150mm Ø sluice valve | No | 1 | | |
| 3.79 | 100mm Ø sluice valve | No | 2 | | |
| 3.80 | 100mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.81 | 100mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| | Distribution line C (Up to 1100m long) | | | | |
| 3.82 | 110mm Ø UPVC class 'D'. pipes | No | 184 | | |
| | Control Valve fittings at CP42 Junction (1No) | | | | |
| 3.83 | 200mm Ø PVC/GI Flexible VJ coupling adaptors | No | 2 | | |
| 3.84 | 200mm Ø 1m long Flanged GI pipe piece | No | 2 | | |
| 3.85 | 200mm x 100mm Ø GI Tee | No | 1 | | |
| 3.86 | 200mm Ø sluice valve | No | 1 | | |
| 3.87 | 100mm Ø sluice valve | No | 2 | | |
| 3.88 | 100mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.89 | 100mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| | Distribution line D (Up to 1400m long) | | | | |
| | | | | | |
| 3.90 | 110mm Ø UPVC class 'D'. pipes | No | 234 | | |
| | Control Valve fittings at Junction 2 (1No) | | | | |
| 3.91 | 110mm Ø PVC/GI Flexible VJ coupling adaptors | No | 2 | | |
| 3.92 | 110mm Ø 1m long Flanged GI pipe piece | No | 2 | | |
| 3.93 | 100mm Ø equal GI Tee | No | 1 | | |
| 3.94 | 100mm Ø sluice valve | No | 2 | | |
| 3.95 | 100mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.96 | 100mm Ø PVC/GI Flexible VJ | No | 1 | | |

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| | coupling adaptors | | | | |
| | Distribution line E (Up to 1600m long) | | | | |
| 3.97 | 110mm Ø UPVC class 'D'. pipes | No | 267 | | |
| 3.98 | 100mm Ø UPVC bend | No | 10 | | |
| | Control Valve fittings at Junction 1 (1No) | | | | |
| 3.99 | 110mm Ø PVC/GI Flexible VJ coupling adaptors | No | 2 | | |
| 3.100 | 110mm Ø 1m long Flanged GI pipe piece | No | 2 | | |
| 3.101 | 100mm Ø equal GI Tee | No | 1 | | |
| 3.102 | 100mm Ø sluice valve | No | 2 | | |
| 3.103 | 100mm Ø 1m long Flanged GI pipe piece | No | 1 | | |
| 3.104 | 100mm Ø PVC/GI Flexible VJ coupling adaptors | No | 1 | | |
| | Trenching and Pipe Laying | | | | |
| 3.105 | <p>Allow for pipeline trenching to minimum depth of 1m for pipes ranging between 80mm diameter to 300mm diameter. Include backfilling and compacting after pipe laying as directed by the supervising engineer</p> <p><i>3,500m trench to accommodate 2 parallel pipelines (300mm Ø & 80mm Ø) Gravity main Gravity Sub main respectively</i></p> | M | 11,900 | | |
| 3.106 | <p>Allow for handling, cutting, fixing and laying various sizes of pipes ranging between 80-300mm diameters in trench complete with fittings. Including jointing materials, (bolts nuts, washers, gaskets, packing) Cutting and Threading including Anchor/Thrust blocks where necessary as specified (rate to include testing and commissioning)</p> <p><i>Including the 80mm Ø) Gravity main Gravity Sub main in the same trench with the 300mm Ø Gravity main</i></p> | M | 15,400 | | |
| | Valve Chambers | | | | |

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| 3.107 | Provide all materials and construct air valve chambers of internal dimensions measuring 1.5x1.5x1.m deep in masonry work with lockable manhole cover. Rate to include for excavation, all shuttering and provision of locks and keys | No | 11 | | |
| 3.108 | Provide all materials and construct air valve chambers of internal dimensions measuring 1.2x1.2x1.m deep of masonry work with lockable manhole cover. Rate to include for excavation, all shuttering and provision of locks and keys | No | 5 | | |
| | TOTAL - BILL No. 3: PIPES AND PIPE FITTINGS | | | | |
| D | BILL NO 4: MASONRY TANKS (225m3) | | | | |
| | Site Clearance and Excavation | | | | |
| 4.01 | Site clearance to remove all vegetation i.e. grass, trees, stumps, roots etc. and stripping off vegetable topsoil 300mm from the ground level over area of the tank and dispose of as directed. | M2 | 71 | | |
| 4.02 | Excavate tank pit from strip level to formation level, average depth 1.5m and set aside for reuse as fill materials where required and cart away surplus to tips | M3 | 106 | | |
| 4.03 | Extra over for excavation in rock (Provisional) | M3 | 7 | | |
| 4.04 | Allow to keep excavation free from general water during the work progress | Item | 1 | | |
| 4.05 | Backfill around tanks with selected excavated materials as required. | M3 | 49 | | |
| | Hardcore | | | | |

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| 4.06 | Provide, place and compact hardcore fill 300mm thick | M2 | 103 | | |
| 4.07 | Treat hardcore surface with ant termite killer as shall be directed. | M2 | 103 | | |
| | Concrete <i>Provide all materials, mix and place concrete as specified:</i> | | | | |
| 4.08 | Mass Concrete blinding class 15 mix (1:3:6)50mm thick to base slab. | M3 | 5 | | |
| 4.09 | Vibrated Reinforced concrete: Concrete class 20, to 125mm thick to base slab, 300x300mm beams, 300mm dia. roof support column and 150mm thick roof slab. Allow for thickening column at roof and the base | M3 | 26 | | |
| | Screed <i>Provide all materials, mix and place concrete screed as specified:</i> | | | | |
| 4.10 | 25mm thick Cement Screed, 1:2 Cement Sand ratio, include Water Proof Cement at a rate of 2Kg Water Proof Cement to 50Kg Building Cement to base slab and roof slab. Allow for sloping and smooth trowel finish. | M2 | 140 | | |
| | Walling | | | | |
| 4.11 | Set out tank walling over floor slab with cement/sand screed mix 1:2 | M2 | 10 | | |
| | <i>Provide all Materials and construct masonry walls curved in plan and as specified</i> | | | | |
| 4.12 | 350 x 225mm thick dressed quarry stones | M2 | 30 | | |
| 4.13 | 300 x 225mm thick dressed quarry stones | M2 | 30 | | |
| 4.14 | 225 x 225mm thick dressed quarry stones | M2 | 55 | | |

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| 4.15 | Provide all materials and apply 20 mm thick cement sand plaster of 1:2 Cement Sand ratio with water proof additive at the rate of 2Kg Water Proof Cement to 50Kg ordinary port land Cement to the walling internally. | M2 | 110 | | |
| 4.16 | Provide all materials and apply 20 mm thick cement rendering of 1:2 Cement Sand ratio with water proof additive at the rate of 2Kg Water Proof Cement to 50Kg ordinary port land Cement to the walling externally | M2 | 115 | | |
| 4.17 | Apply external wall surfaces up to the ground level with 3 coats of bituminous paint and backfill | M2 | 45 | | |
| | Shuttering | | | | |
| 4.18 | Provide and fix shuttering including propping, strutting and striking to the edge of base slab 150mm wide | M | 30 | | |
| 4.19 | Provide and fix wrought strip shuttering including propping, strutting and striking to the edge of roof slab 150mm wide, and sides of beams | M | 50 | | |
| 4.20 | Shuttering to the soffit of roof slab and soffits of beams Provide and fix wrought shuttering including propping, strutting and striking to the soffit of roof slab and all – deemed – to be included items | M2 | 95 | | |
| 4.21 | Provide and fix polythene sheeting on top of formwork to soffit of roof slab, sides and soffit of beams | M2 | 95 | | |
| | Reinforcement <i>Provide, cut, bend, place in position and fix the following steel reinforcement, including spacers</i> | | | | |

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| | and all binding wire; | | | | |
| 4.22 | Y10mm dia. bars in foundation slab at 150mm c/c both ways. | Kg | 334 | | |
| 4.23 | Y 8mm dia. bars to walling, circular in plan | Kg | 143 | | |
| 4.24 | Y 10mm dia. bars to walling, circular in plan | Kg | 646 | | |
| 4.25 | R 6mm dia. Mild steel bars in roof slab | Kg | 5 | | |
| 4.26 | Y 8mm dia. bars in roof slab and column roof support | Kg | 271 | | |
| 4.27 | Y 10mm dia. bars in roof slab and column roof support | Kg | 316 | | |
| 4.28 | Y 12mm dia. bars in roof slab and column roof support | Kg | 109 | | |
| 4.29 | Y 16mm dia. bars in roof slab and column roof support | Kg | 298 | | |
| | Treatment between masonry and concrete | | | | |
| 4.30 | Provide and Smooth trowel to bottom and top of wall and provide and apply 3 coats of bituminous paint or similar approved (e.g. mullseal) paint | M | 30 | | |
| 4.31 | Provide and apply one layer of Lime 300mm wide by 6mm thick on top of bituminous layer applied at the bottom and top of wall | M | 30 | | |
| 4.32 | Chisel wall/floor joint to form a 50mm X 25mm groove along the edge at the bottom of masonry wall internally and then provide and apply bondex in the groove as shall be directed by the supervising engineer | M | 30 | | |
| | Miscellaneous finishes | | | | |

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| 4.33 | Allow for construction of scour sump as detailed on drawings | No | 1 | | |
| 4.34 | Allow for construction of 25 X 25mm Drip all around roof edge | No | 1 | | |
| | Roof Ventilators | | | | |
| 4.35 | Provide and install roof ventilator of 100mm dia. GS pipe complete with all bends and anti-mosquito wire mesh fixed between flanges | No | 4 | | |
| | Manhole Cover | | | | |
| 4.36 | Allow for construction of 750mmX750mm access manhole, include for supply and fixing of lockable mild steel cover and frame. | No | 1 | | |
| | Access Ladders | | | | |
| 4.37 | Provide all materials, fabricate and fix mild steel galvanized cat ladder to outside of reservoir (Stringers - 50mm X 10mm, rungs - 20mm dia. at 300 centers) length 5.5m. | No | 1 | | |
| 4.38 | Provide all materials and fix mild steel galvanized cat ladder to inside of reservoir (Stringers - 50mm X 10mm, rungs - 20mm dia. at 300 centers) length 4.5m | No | 1 | | |
| | Testing and Sterilization | | | | |
| 4.39 | Allow for water tightness test as specified and directed | Item | 1 | | |
| 4.40 | Allow for sterilization of the tank with tropical chloride of lime | Item | 1 | | |
| | Pipe Work and Fittings: Supply, lay and fit all pipes and fittings including jointing materials, (bolts nuts, washers, gaskets, packing) Cutting and | | | | |

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| | Threading including Anchor/Thrust blocks where necessary as specified | | | | |
| | Scour pipe | | | | |
| 4.41 | 150x100 mm Ø flanged reducing socket | No. | 1 | | |
| 4.42 | 100mm Ø 900 flanged GI bend | No. | 1 | | |
| 4.43 | 100mm Ø GI pipe piece Flanged 4m long | No. | 1 | | |
| 4.44 | 100mm Ø sluice valve | No. | 1 | | |
| | | | | | |
| | Overflow pipe | | | | |
| 4.45 | 75mm Ø 900 Bend | No. | 1 | | |
| 4.46 | 75mm Ø G.S socket | No. | 1 | | |
| 4.47 | 75 mm G.S threaded Pipe 4m long | No. | 1 | | |
| 4.48 | 75mm Ø. G.S Flange | No. | 1 | | |
| 4.49 | 75 x 100mm Ø Reducing socket | No. | 1 | | |
| | | | | | |
| | Inlet pipe | | | | |
| 4.50 | 100mm Ø G.I class 'B' pipe with puddle flange 500mm long | No. | 1 | | |
| 4.51 | 100mm Ø G.I flanged pipe piece 4 .m long | No. | 1 | | |
| 4.52 | 100mm Ø G.I flanged bend | No. | 2 | | |
| 4.53 | 100mm Ø Sluice Valve c/w hand wheel | No. | 1 | | |
| 4.54 | 100mm Ø ball valve | No. | 1 | | |
| | Outlet | | | | |
| 4.55 | 200X150mm reducing socket with puddle flange | No. | 1 | | |
| 4.56 | 150mm G.I bend with puddle flange | No. | 1 | | |
| 4.57 | 150mm G.I pipe Piece 3m long Flanged | No. | 1 | | |
| 4.58 | 150mm Ø. Flanged sluice valve c/w hand wheel | No. | 1 | | |
| | | | | | |
| | Valve Chambers | | | | |

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| 4.59 | Provide all materials and construct air valve chambers of internal dimensions measuring 1.5x1.5x1.m deep in masonry work with lockable manhole cover. Rate to include for excavation, all shuttering and provision of locks and keys | No | 3 | | |
| | Fencing | | | | |
| 4.60 | 2.4 high, 14 gauge chain link fence completed with 12 ½ gauge x 6mm strand galvanized barbed wire lines and 2.4 m high 100x125 cranked precast concrete posts at 3m centres mortised in mass concrete surround (1:4:8 mix) | M | 196 | | |
| 4.61 | Extra over item 5.12 for 100x100 precast concrete struts 2600mm long | No | 11 | | |
| 4.62 | Provide and install lockable steel gate overall 4 m wide by 2m high made from SHS and wire mesh. Rate to include for concrete columns | No | 1 | | |
| | Total for 1 No. Masonry Water tank (225m3) | | | | |
| | TOTAL - BILL No. 4: MASONRY TANKS (225m3) 3 No. | | | | |
| E | BILL NO 5: MAIN PAN (115m X 87m X 2.5m deep) | | | | |
| | Setting Out and Site Clearance | | | | |
| 5.01 | Allow for setting out of the pan | Item | 1 | | |
| 5.02 | Clear site of all trees/bushes/shrubs/including stumps removal from the reservoir area and cart away as directed by the Supervising Engineer | SM | 13965 | | |
| | Earth Works - Reservoir Excavation | | | | |
| 5.03 | Excavate over site average 300mm | M3 | 3506 | | |

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|------|--|------|-------|--|--|
| | deep to remove vegetable soil; Load, wheel and cart away, but stockpile selected vegetable soil for reuse as directed by the supervising Engineer | | | | |
| 5.04 | Excavate in normal soils (other than top soil or rock) in the reservoir area from reduced level to an average depth of 1.5m deep and cart away or stock pile for reuse as shall be directed by the supervising Engineer. Include grading sides of excavation to the required slopes. | CM | 16268 | | |
| 5.05 | Excavate in normal soils (other than top soil or rock) in the reservoir area from 1.5m deep to 2.5m deep and cart away or stock pile for reuse as shall be directed by the supervising Engineer. Include grading sides of excavation to the required slopes. | CM | 9561 | | |
| 5.06 | Provide a provisional sum for Extra Over (EO) excavation in rock for items 5.04 & 5.05 | CM | 250 | | |
| 5.07 | Provide a level finish of the dam bottom as directed by the supervising engineer | M2 | 9116 | | |
| 5.08 | Allow for sealing bottom with imported clay seal | M2 | 9116 | | |
| | Auxiliary Structures | | | | |
| 5.09 | Allow for inlet concrete embedment to caution erosion | Item | 1 | | |
| 5.10 | Allow for installation of overflow pipe including necessary concrete collar construction. | Item | 1 | | |
| | Draw off system | | | | |
| 5.11 | Allow for construction of a standard draw off tower system as per | Item | 1 | | |

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|------|--|------|----|--|--|
| | specifications comprising of intake tower using 3m high perforated 4” GI pipes with wire mesh screens embedded in reinforced concrete mix of ration 1:2:4 (cement. sand and ballast). Provide a dead storage of 0.5m on the pipe as described in the working drawings. | | | | |
| 5.12 | Excavate, provide, lay, joint, and backfill 100 mm diameter draw off GI Pipe class “C” in trench average depth not exceeding 2.5 m and 1.2 m wide from draw off tower to distribution valve chamber. (rate to include testing, commissioning) as directed by the Super vising Engineer) | M | 12 | | |
| 5.13 | Provide all materials and construct valve chambers average size 2.0x2.0x2.m deep of masonry work with lockable manhole cover. Rate to include for excavation and provision of locks and keys | 1tem | 1 | | |
| | Filling and Compaction | | | | |
| 5.14 | General filling and compaction using suitable imported rock material rip rap to overflow spill | 1tem | 1 | | |
| | Grassing | | | | |
| 5.15 | Allow for establishing grass cover around the pan minimum 5m wide along the perimeter of the pan. Include digging area to receive grass seedlings and remove debris and large stones to bring to fine tilth; place selected soil free from weeds stones, roots, rubbish and spread and level to receive grass seedlings; Plant approved grass seedlings at 150mm centres both ways, water, nurture and until established | 1tem | 1 | | |
| | Fencing | | | | |

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|------|--|----|-----|--|--|
| 5.16 | 2.4 high, 14 gauge chain link fence completed with 12 ½ gauge x 6mm strand galvanized barbed wire lines and 2.4 m high 100x125 cranked precast concrete posts at 3m centres mortised in mass concrete surround (1:4:8 mix) | M | 440 | | |
| 5.17 | Extra over item 5.12 for 100x100 precast concrete struts 2600mm long | No | 37 | | |
| 5.18 | Lockable steel gate overall 4 m X 2m high in SHS and wire mesh Provide and install lockable steel gate overall 4 m wide by 2m high made from SHS and wire mesh. Rate to include for concrete columns+ | No | 1 | | |
| | TOTAL - BILL No. 5: MAIN PAN (115m x 87m x 2.5m deep) | | | | |
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| | SUMMARY SHEET | | | | |
| (A) | BILL NO1 :PRELIMINARIES AND GENERAL | | | | |
| (B) | BILL NO2; REHABILITATION OF THE INTAKE WORKS | | | | |
| (C) | BILL NO3; PIPES AND FITTINGS | | | | |
| (D) | BILL NO4; 3 NO 225M3 MASONRY STORAGE TANKS | | | | |
| (E) | BILL NO5; MAIN PAN(115X87X2.5)M | | | | |
| | TOTAL | | | | |
| | CONTIGENCY TO COVER UNFORESEEN (2% OF CONTRACT PRICE) | | | | |
| | GRAND TOTAL (KSHS) | | | | |