THE UNITED REPUBLIC OF TANZANIA

PRESSIDENT OFFICE
REGIONAL ADMINSTRATION AND LOCAL GOVERNMENT

MKALAMA DISTRICT COUNCIL

CONTRACT AGREEMENT FOR CONSTRUCTION OF STAFF HOUSE
TENDER NO LGA/147/2021/2022/W/IMF/7

CLIENT
DISTRICT EXECUTIVE DIRECTOR,
P.O BOX 1007,
MKALAMA.

CONTRACTOR
KISULULU GENERAL SUPPLIES,
P.O BOX 63,
KIOMBOI - IRAMBA.

PROJECT MANAGER,
DISTRICT ENGINEER,
P.O BOX 1007,
MKALAMA

MARCH 2022

TABLE OF CONTENT

SECTION I : FORM OF CONTRACT AGREEMENT

2. Form of Bid

[date] 7/12/2021

To: THE SECRETARY, COUNCIL TENDER BOARD, P.O.BOX 1007, MWANZA - SIMIYU
[name and address of Employer]

We offer to execute the CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL TENDER NO:- LGA/149/2021/2022/W/IMF/07
[name and identification number of contract] in accordance with the Conditions of Contract accompanying this bid for the Contract Price of [amount in numbers], [amount in words] [name of currency]. ONE HUNDRED FOURTEEN MILLION TWO HUNDRED TWENTY ONE THOUSAND SIX HUNDRED FORTY SEVEN ONLY. (114,221,647)

The Contract shall be paid in the following currencies:

Currency	Percentage payable in currency	Rate of exchange: one foreign equals [*insert local*]	Inputs for which foreign currency is required
(a)	—	—	—
(b)			

The advance payment required is:-

	Amount	Currency
(a)	34,246,492/=	TSHS
(b)		

We accept the appointment of NATIONAL CONSTRUCTION COUNCIL [name proposed in Bid Data Sheet] as the adjudicator.

[Or]

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

We are not participating, as bids, in more than one bid in this bidding process other than alternative bids in accordance with the bidding documents.

Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the contract has not been declared ineligible by the Government of the United Republic of Tanzania under Tanzania's laws or official regulations or by an act of compliance with a decision of the United Nations Security Council.

The following commissions or gratuities of fees have been paid or are to be paid by us to agents relating to this bid, and to contract execution if we are awarded the contract:-

Name and address of agent or recipient	Amount and currency	Purpose of commission or gratuity
NONE /	NONE /	NONE /

(if none has been paid or is to be paid, state "none")

This bid and your written acceptance of it shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any bid you receive.

We hereby confirm that this bid complies with the bid validity and bid security required by the bidding documents and specified in the Bid Data Sheet.

Authorized Signature: _____

Name and Title of Signatory: VIKASIM HUSEIN KINGU - MANAGING DIRECTOR

Name of Bidder: KISUMU GENERAL SUPPLIES AND GENERAL WORKS

Address: P. O BOX 63 KISUMU

SECTION IV : GENERAL CONDITION OF CONTRACT

Form of Contract Agreement

This Agreement, made the 28.....day of March 2022 . between Mkalama District Council , P .o Box 1007 Mkalama (hereinafter called "the Employer") and Kisululu General Supplies , P .o Box 63, Kiomboi - Iramba (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute Construction of Staff House (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such works and the remedying of any defects therein in the sum of ***Eighty Nine Million Ninety Hundred Ninety Nine Thousand Nine Hundred Eighty Six Shillings and Fourteen Percentage Only (89,999,986.14/=)***(hereinafter called "Contract Price").

Now this Agreement witnessed 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, and they shall be deemed to form and be read and construed as part of this Agreement.

2. 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.

3. the Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects wherein 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 JAMES JOHN MKWEGA

Was hereunto affixed in the presence of: CHAIRMAN

MK ALAMA DISTRICT COUNCI

Signed, Sealed, and Delivered by the said KISULULU GENERAL SUPPLIES

In the presence of:

Binding Signature of Employer

Binding Signature of Contractor

DISTRICT EXECUTIVE DIRECTOR

MKALAMA DISTRICT COUNCIL

KISULULU GENERAL SUPPLIES

P. O. Box 63

SECTION II : LETTER OF ACCEPTANCE

THE UNITED REPUBLIC OF TANZANIA

PRESSIDENT OFFICE
REGIONA ADMINSTRATION AND LOCAL GOVERNMENT

MKALAMA DISTRICT COUNCIL

Ref NO :MDC/PMU/A.10/147

14 February 2022

M/S KISULULU GENERAL SUPPLY ,
P.O Box 63,
Kiomboi - Iramba.

REF : LETTER OF ACCEPTANCE

Reference is made to the above subject matter and notice of intention to award the contract with Ref MDC/PMU/A.10/144,dated 04 February 2022.

This is to notify that ypur bid dated 14 January 2022 for execution of Construction of Staff House at Mkalama District Hospital.

Tender No : LGA/147/2021/2022/W/IMF/07 For the bid price of Tanzanian Shillings,Eighty Nine Million Nine Hundred Ninety Nine Thousand Nine Hundred Eighty Six Shilings and Forty One percent Only (89,999,986.14/=) VAT Inclusive for duration of Four (4) calender months as corrected and modified in accordance with the instruction to bidder is here by accepted by us.

Your are hereby instructed to proceed with the execution of the said works in accordance with the contract documents and you are required to furnish the Performance bond to the client before signing the contract.

Authorized Signature .....
Name and Title of Signatory ..... DED - ASIA JUMA MEHOS
Name of Agency ..MKALAMA DISTRICT COUNCIL.....

DISTRICT EXECUTIVE DIRECTOR
MKALAMA DISTRICT COUNCIL

SECTION III : SUBMISION BID FORM

GENERAL CONDITIONS OF CONTRAC

A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in Clauses 26 and 27 hereunder.

Bill of Quantities –means the priced and completed Bill of Quantities forming part of the Bid.

Compensation Events are those defined in Clause 46 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with sub-Clause 57.1.

The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed bid document submitted by the Contractor to the Employer.

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

Corrupt practice means the offering, giving receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution and includes inter alia, bribery and extortion or coercion which involves threats of injury to person, property or reputation, and

Fraudulent practice means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among

Bidders (prior to or after bid submission) designed to establish bid prices at artificial non – competitive levels and to deprive the Employer of the benefits of free and open competition.

Days are calendar days; months are calendar months.

Day works are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.

The **Defects Liability Period** is the period named in the **Special Conditions of Contract** and calculated from the Completion Date.

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

The **Employer** is the party who employs the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date is** the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the **Special Conditions of Contract**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

The **Intended Commencement Date is** the date on which it is intended that the Contractor shall start the Works. The Intended Commencement date is specified in the **Special Conditions of Contract**. The Intended commencement Date may be revised

only by the Project Manager by issuing an extension of time.

Materials are all supplies, including consumables, used by the Contractor for incorporation in the Works.

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

The **Project Manager** is the person named in the **Special Conditions of Contract** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

The **Site** is the area defined as such in the **Special Conditions of Contract**.

Site Investigation Reports are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

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

The **Start Date** is given in the Special Conditions of Contract. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

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

A **Variation** is an instruction given by the Project Manager which varies the Works.

"Force Majeure" means an event which is beyond the reasonable control of a Party and which makes a

Party's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the **Special Conditions of Contract**.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.

2.2 If sectional completion is specified in the Special Conditions of Contract, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement,

(2) Letter of Acceptance,

(3) Contractor's Bid,

(4) Special Conditions of Contract,

(5) Conditions of Contract,

(6) Specifications,

(7) Bill of Quantities, and

(8) Any other document listed in the Special Conditions of Contract as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the **Special Conditions of Contract**.

4. Project Manager's Decisions

4.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters

between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Project Manager may delegate any of his duties and responsibilities to other people except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the **Special Conditions of Contract**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the **Special Conditions of Contract**, to carry out the functions stated in the Schedule or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employers and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor

carries the risks which this Contract states are Contractor's risks

11. Employers Risks

11.1 From the Start Date until the Defects Correction Certificate has been issued, the following are Employer's risks:

(a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to:

(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or

- Negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

(b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

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

(a) a Defect which existed on the Completion Date,

(b) an event occurring before the Completion Date, which was not itself an Employer's risk, or

(c) the activities of the Contractor on the Site after the Completion Date.

12. Contractor's Risks

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

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the

Special Conditions of Contract for the following events which are due to the Contractor's risks:

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

(b) loss of or damage to Equipment;

(c) loss of or damage to property (except the Works, plant, Materials, and Equipment) in connection with the Contract; and

(d) Personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports

14.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the **Special Conditions of Contract**, supplemented by any information available to the Bidder.

15. Queries about the Special Conditions of Contract

15.1 The Project Manager will clarify queries on the **Special Conditions of Contract**.

16. Contractor to Construct the Works

16.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

17. Commencement and Completion of Works

17.1 The Contractor may commence execution of the Works by the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the

Project Manager, and complete them by the Intended Completion Date.

18. Approval by the Project Manager

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.

19. Protection of the environment

19.1 The Contractor shall take all reasonable steps to protect the environment and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

19.2 The Contractor shall ensure that emissions, surface discharges and effluent from his activities shall not exceed values prescribed in relevant environmental laws.

20. Labour Laws

20.1 The Contractor shall comply with all the relevant labour laws applicable in the Country, including laws relating to workers employment, working hours, health, safety, welfare, immigration and shall allow them all their legal rights.

20.2 The Contractor shall require his employees to obey all applicable laws, including those concerning safety at work.

21. Health and Safety

21.1 The Contractor shall at all times take all reasonable precautions to maintain the health and safety of his personnel.

21.2 The Contractor shall ensure that first aid facilities are available at all times at the site and that suitable arrangements are made for all necessary welfare and

hygiene requirements and for the prevention of epidemics

21.3 The Contractor shall notify the Employer details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to the property, as the Employer may reasonably require.

21.4 The Contractor shall conduct an HIV-Aids awareness programme, and shall take other such measures as specified in the **SCC** to reduce the risk of transfer of HIV virus between and among Contractor's personnel, the Employers Staff and the surrounding community.

22. Discoveries

22.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.

23. Possession of the Site

23.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the **Special Conditions of Contract**, the Employer will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event

24. Access to the Site

24.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

25. Instructions, inspections and audits

25.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

25.2 The Contractor shall permit the Government, of the United Republic of Tanzania to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Government of the United Republic of Tanzania if so required by the Government of the United Republic of Tanzania.

26. Disputes

26.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority

given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.

27. Procedure for Disputes

27.1 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

27.2 The Adjudicator shall be paid by the hour at the rate specified in the Bid Data Sheet and Special Conditions of Contract, together with reimbursable expenses of the types specified in the **Special Conditions of Contract**, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.

27.3 The arbitration shall be conducted in accordance with the arbitration procedure published by the institution named and in the place shown in the **Special Conditions of Contract**.

28. Replacement of Adjudicator

28.1 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract; a new Adjudicator will be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the **Special Conditions of Contract** at the request of either party, within 14 days of receipt of such request.

B. Time Control

29. Program

29.1 Within the time stated in the **Special Conditions of Contract**, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

29.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of

the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

29.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period stated in the **Special Conditions of Contract**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the **Special Conditions of Contract** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

29.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

30. Extension of the Intended Completion Date

30.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

30.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

31. Acceleration

31.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Employer and the Contractor.

31.2 If the Contractor's priced proposals for acceleration are accepted by the Employer, they shall be incorporated in the Contract Price and treated as a Variation.

32. Delays Ordered by the Project Manager

32.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

33. Management Meetings

33.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

33.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

34. Early Warning

34.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work increase the Contract Price or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall provided by the Contractor as soon as reasonably possible.

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

C. Quality Control

35. Identifying Defects

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

36. Tests

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

37. Correction of Defects

37.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the **Special Conditions of Contract**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

37.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

38. Uncorrected Defects

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

D. Cost Control

39. Bill of Quantities

39.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

39.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor shall be paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

40. Changes in the Quantities

40.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.

40.2 The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.

40.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

41. Variations

41.1 All Variations shall be included in updated Programs produced by the Contractor.

42. Payments for Variations

42.1 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

42.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in sub-Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.

42.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

42.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

42.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

43. Cash Flow Forecasts

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

44. Payment Certificates

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

44.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within twenty eight (28) days from the receipt of certificate.

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

44.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

44.5 The value of work executed shall include the valuation of Variations, Compensation Events and Variation of Price.

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

44.7 The Project Manager shall not bound to certify any payment, if the net amount, after all retentions and deductions would be less than minimum amount of Interim Payment Certificate stated in the **Special Condition of Contract.**

45. Payments

45.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

45.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

45.3 Unless otherwise stated, all payments and deductions will be paid or charged in the proportions of currencies comprising the Contract Price.

45.4 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

46. Compensation Events

46.1 The following shall be Compensation Events:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Special Conditions of Contract.

(b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.

(c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.

(d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

(e) The Project Manager unreasonably does not approve a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effects on the Contractor of any of the Employer's Risks.

(k) The Project Manager unreasonably delays issuing a Certificate of Completion.

(l) Other Compensation Events described in the Contract or determined by the Project Manager shall apply.

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

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

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

47. Taxes

47.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of Clause 49.

48. Currencies

48.1 Where payments are made in currencies other than the Tanzania Shillings, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.

49. Price Adjustment

49.1 The amounts payable to the Contractor, in various currencies pursuant to sub-Clause 44.1, shall be adjusted in respect of the rise or fall in the cost of labour, Contractor's Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause.

49.2 To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

49.3 The adjustment to be applied to amount payable to the Contractor as certified in Payment Certificates shall be determined formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be as follows;

$$Pn = a + b\frac{Ln - Lo}{Lo} + c\frac{Mn - Mo}{Mo} + d\frac{En - Eo}{Eo} + etc.$$

where;

Pn is a price adjustment factor to be applied to the amount in each specific currency for the payment of the work carried out in the subject month, where such variations and daywork are not otherwise subject to adjustment;

a is a constant, specified in the **Appendix to Bid**, representing the nonadjustable portion in contractual payments;

b, c, d, etc., are weightings or coefficients representing the estimated proportion of each cost element (labour, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, as specified in the **Appendix to Bid**; the sum of a, b, c, d, etc., shall be one;

Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements in the specific currency of origin for month "**n,**" determined pursuant to Sub-Clause 49.5, applicable to each cost element; and

Lo, Mo, Eo, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 49.5

The value of net work done, certified by the Project Manager, in any monthly Interim or Final Certificate as payable by the Employer to the Contractor before deduction of any retention money shall be increased or decreased by an amount of '**F**'.

$$F = PnxPc$$

where;

The effective value **Pc** of work done which is to be subjected to increase or decrease shall be the difference between:

(i) the amount which, in the opinion of the Project Manager, is due to the Contractor under Clause 44 (before deduction of retention money and before deducting sums previously paid on account) less:

- any amount for payment or repayment of any advance payment;
- any amount for materials on site (if any);
- any amounts for nominated sub-contractors (if any)
- any amounts for any other items based on actual cost or current prices; or
- any sums for increase or decreases in the Contract Price paid under this Sub-Clause

and

(ii) the amount calculated in accordance with (i) above of this Sub-clause and included in the last preceding statement.

49.4 The sources of indices shall be those listed in the **Appendix to Bid**, as approved by the Engineer. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract Price and expected foreign currency requirements shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightings and Source of Indices in the **Appendix to Bid**, which shall be subject to approval by the Engineer.

49.5 The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available

49.6 If the Contractor fails to complete the Works within the time for completion prescribed under Clause 57 adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favourable to the Employer, provided that if an extension of time is granted pursuant to

Clause 28, the above provision shall apply only to adjustments made after the expiry of such extension of time.

49.7 The weightings for each of the factors of cost given in the **Appendix to Bid** shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work already executed or instructed under Clause 42 or for any other reason.

50. Retention

50.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the **Special Conditions of Contract** until Completion of the whole of the Works.

50.2 On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the other half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected.

50.3 On completion of the whole Works, the Contractor may substitute retention money with an "on demand" Bank guarantee.

51. Liquidated Damages

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

51.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in Sub- Clause 43.1.

52. Bonus

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

53. Advance Payment

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

53.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

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

54. Performance Securities

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

55. Dayworks

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

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

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

56. Cost of Repairs	56.1	Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

57. Completion Certificate	57.1	The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager will do so upon deciding that the work is completed.
58. Taking Over	58.1	The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.
59. Final Account	59.1	The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.
60. Operating and Maintenance Manuals	60.1	If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the **Special Conditions of Contract**.
	60.2	If the Contractor does not supply the Drawings and/or manuals by the dates stated in the **Special Conditions of Contract**, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the **Special Conditions of Contract** from payments due to the Contractor.

61. Termination

61.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

61.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;

c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager's certificate;

e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

f) the Contractor does not maintain a Security, which is required; and

g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the **Special Conditions of Contract**.

h) If the Contractor, in the judgment of the Employer, has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

61.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under sub-Clause 61.2 above, the Project Manager shall decide whether the breach is fundamental or not.

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

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

62. Payment upon Termination of Contract

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

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

63. Property

63.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.

64. Release from Performance

64.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

65. Suspension of Financing

65.1 In the event that the source of financing is suspended to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the financing agency's suspension notice.

(b) If the Contractor has not received sums due it within the 28 days for payment provided for in Sub-Clause 45.1, the Contractor may immediately issue a 14-day termination notice.

SECTION V : SPECIAL CONDITION OF CONTRACT

Special Conditions of Contract

Instructions for completing the Special Conditions of Contract

SCC Clause	GCC Clause	Description
1.	1.1	The Employer is : **District Executive Director,** **Mkalama District Council,** **P.O. Box 1007** **Mkalama,** **TANZANIA** Authorized representative: **DE MKALAMA DC** The Project Manager is DE **MKALAMA DC** The name and identification number of the Contract is **.LGA/147/2021/2022/WIMF/07** *Constraction of Staff House* The Start Date shall be **within 10 days after official possession of site** The Intended Completion Date for the whole of the Works shall be **Two Months** The following documents also form part of the Contract: Agreement, Letter of Acceptance, Contractor's Bid, Special Conditions of Contract, General Conditions of Contract, Specifications, Drawings, Bill of Quantities, and The sites are located at District Hospital
2.	2.2	Indicate whether there is section completion is specified: **not specified.**
3.	2.3(9)	List other documents that form part of the contract if any: **Not Applicable**
4.	3.1	The language of the Contract documents is **English** The law that applies to the Contract is the Tanzanian Law.

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>5.</td><td>8.1</td><td>Include the Schedule of Other Contractors, if any.
Not Applicable</td></tr>
<tr><td>6.</td><td>9.1</td><td>Include the Schedule of Key Personnel.
<table>
<tr><th>Position</th><th>Total experience (years)</th><th>In similar works (years)</th></tr>
<tr><td>Project Manager</td><td>5</td><td>5</td></tr>
<tr><td>Site Agent</td><td>5</td><td>3</td></tr>
<tr><td>Site Engineer</td><td>5</td><td>3</td></tr>
<tr><td>Civil Engineering Technician</td><td>5</td><td>3</td></tr>
<tr><td>Land Surveyor</td><td>5</td><td>3</td></tr>
<tr><td>Electro-Mechanical Engineer</td><td>5</td><td>3</td></tr>
</table></td></tr>
<tr><td>7.</td><td>14.1</td><td>The minimum insurance covers shall be:

The minimum insurance covers shall be:

(a) loss of or damage to the Works, Plant, and Materials Tshs. 90,000,000 million

(b) loss of or damage to Equipment Tshs 90,000,000 million

(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract Tshs 20 million; and

(d) personal injury or death Tshs 10 million</td></tr>
<tr><td>8.</td><td>15.1</td><td>Site Investigation Reports available to the Bidder are: Not Applicable</td></tr>
<tr><td>9.</td><td>22.4</td><td>The other measures include:
a. Minimising the number of migrant workers employed on the project and household in the site camp

b. Providing access to voluntary counselling and testing (VCT)

c. Providing psychological support and health care including prevention and treatment of opportunistic infections for workers infected and affected, as well as their families
d. Providing condoms (male and female) to workers</td></tr>
<tr><td>10.</td><td>24.1 & 47.1</td><td>The Site Possession Date shall be within 14 days after signing of contract.</td></tr>
</table>

11.	28.2	Hourly rate of Fees payable to the Adjudicator is: **TShs. 100,000/-** Types of reimbursable expenses to be paid to the Adjudicator include:

		a) **Transport** b) **Subsistence allowances**
12.	28.3	Arbitration will take place at **Dar es Salaam** in accordance with rules and regulations published by **National Construction Council**
13.	29.1	Appointing Authority for the Adjudicator: **Mkalama District Council.**
A. Time Control		
14.	30.1	The Contractor shall Submit a Programme for the Works within **seven (7) days** of delivery of the Letter of Acceptance.
15.	30.3	The period between Programme updates is **fourteen (14) days.**
16.	30.3	The amount to be withheld by the Project Manager in the case the contractor does not submit an updated programme is: **Tanzania Shillings One Million (1,000,000).**
B. Quality Control		
17.	38.1	The Defects Liability Period is **360 days**.
C. Cost Control		
18	46.1	The interest rate shall be the prevailing borrowing rates of the Bank of Tanzania at the date of payment.
19.	47.1	The currency is: **Tanzanian Shillings**
20.	47.1(a)	The Site Possession Date shall be within **14 days** after signing of contract
21.	50	The contract **is not** subject to price adjustment in accordance with Clause 50 of the General Conditions of Contract.
22.	51.1	The amount of retention is **ten (10) percent** of value of works of Interim Payment Certificate'.
		Limit of retention will be **five (5) percent** of contract price.
23.	52.1	The amount of liquidated damages is **0.1% of the contract sum per day to a maximum of 10% of the Contract sum.**
	52.1	The maximum amount of liquidated damages must be equivalent to the amount of the performance security; **10% of the Contract sum**
24.	53.1	The bonus for early completion is **Not Applicable**
25.	54.1	The amount of advance payment shall be 10% for bank Guarantee and **30%** for performance bond of the contract sum payable within 28 days of submission of acceptable advance payment guarantee. (Perfomance bond or Bank Guarantee)

		Monthly Recovery of Advance Payment: Repayment through percentage deductions with every interim payment with equal proportions provided it exceeds 20% of works done per certificate.
26.	**55.1**	The Performance Security shall be an amount equivalent to percent of the contract price as follows: • Performance Bank guarantee – **10% of contact price OR** • Performance bond - **30% of the contract price. (From Bank)**
		D. Finishing the Contract
27.	**61.1**	As built drawings shall be supplied by the contractor no later than one month after completion of works Operating manual shall be supplied by the contractor by no later than one month after completion of works
28.	**61.2**	The amount to be withheld by the Project Manager in the case the contractor does not submit as built drawings is: **Tanzania Shillings Five Million (5,000,000)** The amount to be withheld by the Project Manager in the case the contractor does not submit operating manual is: **Tanzania Shillings Five Million (5,000,000)**
29.	**62.2 (g)**	Number of days for which the maximum amount of liquidated damages can be paid is **100 days**
30.	**63.1**	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is **forty (40) percent**

SECTION VI : BILL OF QUANTITY

PRESIDENT'S OFFICE

REGIONAL ADMNISTRATION AND LOCAL GOVERNMENT

BILL OF QUANTITIES FOR THE PROPOSED CONSTRUCTION OF THREE IN ONE SEMI DETACHED STAFF HOUSE RURAL TYPE

November, 2021

GENERAL SUMMARY

GENERAL DESCRIPTIONS	AMOUNT
BILL No 01 - PRELIMINARIES	631,217.30
BILL No 02 - SPECIFICATIONS	—
BILL No 03 - MEASURED WORKS {STAFF HOUSE -RURAL TYPE	74,592,500.00
BILL No 04 - PRIME COSTS AND PROVISIONAL SUMS	200,000.00
SUB-TOTAL	75,423,717.30
INSURANCE CLAUSES:	
. Clause 13 - Contractor to maintain in joint names of the Employer and Contractor, Insurance Against Loss and Damages to the works by fire, earthquakes, etc.	500,000.00
. Clause 54 - Performance Security	500,000.00
SUB-TOTAL ---------- (1)	75,423,717.30
ADD: 18% Value Added Tax (VAT) ------	13,576,269.11
SUB-TOTAL ---------- (2)	13,576,269.11
AMOUNT CARRIED TO FORM OF TENDER TShs.	89,999,986.41

Signed by ..... For and on behalf of KISULULU GENERAL SUPPLIES AND GENERAL WORKS

In the capacity of MANAGING DIRECTOR made this 04 day of 02 2022

KISULULU GENERAL SUPPLIES
AND GENERAL WORKS
P. O. BOX 53
KIVUBADHAMBA-SINGIDA

ITEM	DESCRIPTIONS OF WORKS	TSHS.
	DESCRIPTION OF SITE:	
A.	The site is located District/Councils WITHIN TANZANIA COUNTRY	
B.	The Contractor shall provide and maintain any necessary temporary roads; sleeper tracks; and temporary cross over during the execution of the works; clear away the same at completion and reinstate and make good any work disturbed to the satisfaction of the Local Authority and the Employer.	
C.	The Contractor shall be deemed to have visited the site and satisfied himself as to:- i) The nature of the site ii) The amount of bush; rubbish or debris to be cleared away before commencement. iii) The nature of proximity and size of adjoining building and property. iv) The nature of existing communications by roads or otherwise. v) The means of access to the site. vi) The availability of land for the erection and positioning of all temporary structures; plant and materials necessary for the execution of the works. vii) The source of adequate supplies of labour, plant and materials for the completion of the works.	
D.	If the Contractor wishes to execute trial holes before submitting his tender, he may do so in positions to be agreed with the Employer and at his sole expenses, including the reinstatement of the ground if so required by the Employer.	
E.	The whole of the site will be available to the Contractor immediately upon the issue of the order to commence.	
F.	Any sand; aggregate to or other building materials shall be the property of the Employer and shall not be used in the construction of the works without the written consent of the Employer.	
G.	The Contractor is to satisfy himself as to any difficulties that the site may present and to make all necessary enquiries to any point which in his opinion requires further elucidation as no claim for lack of information on any of the above will be entertained.	
	TO COLLECTION TSHS.	

ITEM	DESCRIPTIONS OF WORKS	TSHS.
A	**DESCRIPTION OF WORKS:** The work within this contract comprises of: ***Substructure, Frames ,Walls,ramp,Stairs, Roof, Doors, Windows, Service Engineering, Finishings, Decorations and External Works on Construction of Two Bedroom Staff house three in one Rural type***	
B	**SINGULAR AND PLURAL** Word importing the singular only also includes the plural.	
C	**LAW GOVERNING CONTRACT** The contract shall be in all respect to be constructed and operated in accordance with the law of Tanzania.	
	METHOD OF MEASUREMENT:	
D	These Bills of Quantities have been prepared in accordance with the standard method of measurement of Building Works for East Africa first edition (metric) published by the architectural association of Kenya chapter of Quantity Surveyor Act; 1970; and applied equally to the measurement of proposed works and of variations by Quantity Surveyors.	
E	Variation of 'Builder's Work' will be subject to the same amended rates of percentage of adjustment.	
	DEFINITIONS OF ABBREVIATIONS:	
F	The Contractor should take due notice of the under mentioned abbreviations:- mm - millimetres cm - centimetres M^3 - cubic meters M^2 - square metres M - linear metres No - Number Kg - Kilograms P.C - Prime cost	
G	The Contractor shall allow for keeping all records appertaining to the work and shall keep on the site a daily diary recording weather conditions; temperature, visitors to the site, etc.	20,000/=
H	The Contractor is to supply to the Employer such information as he may be required in connection with the work; including statement showing the number of men employed in all trades daily; and delivery notes (stating the name of the project) for all materials delivered to the site.	
	TO COLLECTION TSHS.	20,000/=

ITEM	DESCRIPTIONS OF WORKS	TSHS.
	EMPLOYER'S INSPECTION:	
A.	No work shall be covered up until it is inspected and approved by the Employer.	
B.	The Employer may at any time before the end of defects liability period or during any extended time where any defect are being made good, instruct the Contractor to open up; pull down; test or expose any part of the works in order to satisfy himself as to the quality of materials or workmanship used. If in the opinion of the Employer such parts are not in strict accordance with the contract documents he may order the Contractor to remove all defective work, replace with approved materials and reinstate any such part of the works and any other disturbed at his own expenses and to the entire satisfaction of the Employer. If any such parts of the works are found to be in accordance with the contract documents the Contractor will be reimbursed with the General conditions of contract.	
	DISTURBANCE OR NUISANCE:	
C.	The Contractor shall allow for taking all necessary precautions in the order and execution of the work so as to avoid causing disturbance or nuisance to the occupants of existing buildings and those adjacent to the works and for complying with the Employer's instructions in this respect. The Contractor shall be in tort for such nuisance and shednets.	
	TRESPASS, DAMAGE AND CARE OF WORKS:	
D.	The Contractor shall prevent any trespass on the opinion adjoining property and he shall take all reasonable precautions during the progress of the contract to prevent any damage to the adjoining property or plant or private roadways and to prevent material; plant; rubbish and debris; etc. collecting on the adjoining property or roadways.	
E.	Should the Contractor wish to erect scaffolding or to make use of adjoining property; he shall obtain prior permission from the Employer and clear away at a completion of his work or when directed and make good any damage to his satisfaction. Except as provided for in the General conditions of contract; the Contractor; shall be held responsible for the care of works generally until their completion; including all works executed and materials deposited on the site by himself or his Sub-Contractors or supplier together with all risks arising from weather; carelessness of operatives; damages and he shall make good all such damage or loss at his own expense	
F.	The Contractor shall be responsible for the protection of any adjacent building; boundary walls; fences; services either overhead or underground and for the making gocd of or paying for all damage thereto; should such be caused in the course of building operations.	
G.	The Contractor shall allow for making good all damage to the road; kerbs; surface water channels; etc. occasioned by heavy traffic; delivery of materials and building operations generally to the entire satisfaction of the Employer and shall be responsible for observing any by law of Local Authority regarding keeping the road free from mud; filth dirt; etc, out of the execution of the works.	-
	TO COLLECTION TSHS.	-

ITEM	DESCRIPTIONS OF WORKS	TSHS.
A.	**PROTECTION FROM THE WEATHER:** The Contractor shall allow for covering up and protecting all new work from injury by weather or any other cause. Any damage; loss or expense caused by non-compliance with the clause shall be at sole risk of the contract.	
B.	**TOOLS, PLANT AND SCAFFOLDING:** Provide all necessary cranes, hoists, concrete mixer and other plant including ladder, staging, access gangways tackle, tarpaulins, tools, moulds templates and other requisites necessary for proper executing, adapting from time to time as may be necessary and maintain all plant and equipment during the course of the contract.	
C.	The Contractor shall allow for providing adapting from time to time as may be necessary and maintaining all scaffolding scaffold boards and temporary staging, etc, necessary for the execution of the works.	
D.	The Contractor is to provide everything necessary for the proper execution of the works according to the true intent and meaning of the drawings; etc. whether the same may or may not be particularly shown on the drawings; specifications provided that the same is reasonably to be inferred there from.	
E.	**SITE ACCOMODATION:** The Contractor shall provide and maintain any necessary temporary office accommodation required by himself and his Sub-Contractors suitably equipped with desks; chairs; drawing boards; and electric lighting and telephone.	200,000/=
F.	The Contractor shall provide and maintain for his workers latrine facilities washing and drinking water, first aid equipment's and shelters equipped with tables; benches and checking facilities all to the reasonable satisfaction of the workers and approved by the Employer and Health Authorities.	
G	The Contractor shall provide and maintain any temporary storage, shed or buildings which in his opinion are necessary for himself and his Sub-Contractors for the execution of the works.	111,217.30
H	**WATER FOR THE WORKS** The Contractor shall allow for all necessary clean fresh water for the works, including that required by Sub-Contractors and for any temporary plumbing metres and storage facilities and pay all charges in connection therewith and clear away on completion and make good works disturbed.	100,000/=
J	The Contractor shall allow for providing and maintaining a temporary electricity supply for the works including that required by Sub-Contractor and for any meters and fittings to give artificial lighting and power necessary for the execution of the works and pay all charges, in connection and make good all works disturbed.	100,000/=
	TO COLLECTION TSHS.	511,217.30

ITEM	DESCRIPTIONS OF WORKS	TSHS.
	WATCHING AND LIGHTING:	
A.	The Contractor shall allow for providing and maintaining any barriesrs; hoalding; watching; lighting which must comply with the By-laws of requirements of the Local Authority and polycy regulations and the Contractor must give all requiste policies to those authorities and provide everything necessary to protect the general public workmen; plant; materials and the whole of the works	
B.	No advertisement will be permitted without the written authority of the Employer.	
	SIGN BOARD:	
C.	The Contractor shall provide and erect a large sized sign board on the site showing the title of the contract, the name and address of the Employer; consultant, nominated suppliers and Sub-Contractor and such information as may be required by the Employer who shall provide the sign layout and colours of the Board. The board shall be repainted when necessary and removed when no longer required.	100,000/=
	PROTECTION:	
D.	The Contractor is required to protect works section until completion.	
	TESTING:	
E.	Allow for testing all materials as will be identified by Project Manager like concrete cube test,reinforcements etc, submit sample and allow for installations required to be tested and provide everything necessary for this purpose and leave the whole in perfect working order to the satisfaction of the Employer and Local Authority.	
	REMOVING RUBBISH AND CLEANING:	
F.	The Contractor shall make good all defects and injuries to the works, clean down external faces wash off stains to face work, clean off marks mortar and cement, clean windows inside and out, scrub floors, flush drains run and leave all parts of the works clean, free from rubbish and waste materials and perfect on completion.	
G.	The Contractor shall clean and cart away all rubbish as it accumulate and keep the works in orderly condition to the satisfaction of the Employer	
	TO COLLECTION	100,000/=
	COLLECTION	
	Page No. 8/1/1	
	Page No. 8/1/2	
	Page No. 8/1/3	20,000/=
	Page No. 8/1/4	51,217.30
	Page No. 8/1/5	100,000/=
	BILL No. 01- PRELIMINARIES CARRIED TO GENERAL SUMMARY	63,217.30

TEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 1: SUBSTRUCTURE				
	EXCAVATION AND EARTHWORK				
A	Site clearance of small trees, shrubs and the like including grubbing up roots	250	m²	300/=	75,000/=
	Excavating				
B	Surfaces to reduce levels average 150mm deep vegetable soil and remove from site	250	m²	300/=	75,000/=
	Trenches in natural ground; to receive foundations; starting from reduced level				
C.	Not exceeding 1.50 meters deep	88	m³	1000/=	88,000/=
	Pits; to receive foundations; starting from stripped level				
D.	Not exceeding 1.50 meters deep	1	m³	1000/=	1000/=
E.	Extra over all kinds of excavations irrespective of depth for breaking up rock	1	m³	10,000/=	10,000/=
F.	Backfilling; depositing and compacting in layers maximum 150mm thick impoted material around foundations	41	m³	1000/=	41,000/=
G.	Remove away from the site surplus excavated materials.	48	m³		—
	Disposal of water				
H.	Keeping all excavation free from all water by pumping, bailing or other means including spring or running water		Item	5000/=	5000/=
	Plunking and Strutting				
J.	Allow for provision and subsequent removal for planking and strutting to uphold and maintain all faces of excavations		Item	5000/=	5000/=
	To Collection				300,000/=

TEN	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Filling				
A	Selected materials/ Sand filling in making up levels; average 150 mm thick	35	m³	10,000/=	350,000/=
	Hardcore and the like				
B	150mm thick stone hardcore bed; leveled compacted and sand blinded to receive damp proof ;membrane; measured separately.	160	m²	5000/=	800,000/=
	Soil Sterilization				
C	Chemical anti termite treatment around the building plinth	67	m	1000/=	67,000/=
D	Aldrin' solution applied at a rate of 7 litres per square metre	160	m²	1000/=	160,000/=
	Concrete works				
	Plain in-situ concrete; grade 15N/sq.mm nominal mix (1:3:6)				
E	100mm Bed	160	m²	2500/=	400,000/=
F	Ditto to ramp	1	m²	5000/=	5000/=
G	Foundation footing	22	m³	150,000/=	3,300,000/=
	Vibrated Reinforced in-situ concrete; grade 25 nominal mix (1:11/2:3)				
H	Plinth beam	11	m³	200,000/=	2,200,000/=
	Reinforcement; bars; BS 4449:1969 hot rolled round high yield steel straight or bent				
J	12mm Diameter bars	496	kg	2500/=	1,240,000/=
K	8mm Diameter bars	251	kg	2500/=	627,500/=
	To Collection				9,149,500/=

TEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Formwork (Marine plywood)				
A	Sawn to vertical sides of beams	100	m²	5000/=	500,000/=
B	Edges of slab over 75mm not exceeding 150mm	67	m	2000/=	134,000/=
	Walling				
	Concrete block B.S 2028 type A; 5N per square millimetre; solid in cement sand mortar (1:4)				
C	230mm Thick wall	100	m²	20,000/=	2,000,000/=
	Damp-proof Courses (DPC)				
D	230mm Wide	168	m	1000/=	165,000/=
	Damp-proof Membrane (DPM)				
E.	500Gauge polythene sheet laying on blinded hardcore with 150mm sides and end laps	160	m²	1000/=	160,000/=
	Sundries				
F.	12mm Cement and sand (1:3) external rendering to concrete block wall	26	m²	5000/=	130,000/=
G.	Prepare and apply two coats of black bituminous paint on rendered or concrete surfaces, externally	26	m²	5000/=	130,000/=
	To Collection				3,222,000/=
	COLLECTION				
	Page 2/1/1				300,000/=
	Page 2/1/2				9,149,500/=
	Page 2/1/3				3,222,000/=
	ELEMENT NO. 1 - SUBSTRUCTURE CARRIED TO SUMMARY				12,671,500/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 2 - FRAME				
	Concrete work				
	Vibrated Reinforced in-situ concrete; grade 25 nominal mix (1:11/2:3)				
A	Beams; horizontal or sloping not exceeding 15 degrees from horizontal	7	m^3	200,000/=	1,400,000/=
	Reinforcement; bars; BS 4449:1969 hot rolled round high yield steel straight or bent				
B	12mm Diameter bars	596	kg	2500/=	1,490,000/=
C	8mm Diameter bars	220	kg	2500/=	550,000/=
	Sawn formwork(Marine plywood) to.				
D	Horizontal sides and soffites of beams	85	m^2	10,000/=	850,000/=
	ELEMENT NO. 2 - FRAME CARRIED TO SUMMARY				4,290,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO4: WALLS				
	Block Work				
	Internal wall				
	Solid Concrete block B.S 2028 type A; 5MPa bedded and jointed in cement/sand mortar (1:4)				
A	150mm Wall	238	m²	20,000/=	4,760,000/=
B	150mm Wall, fence wall	16	m²	20,000/=	320,000/=
	External wall				
	Solid Concrete block B.S 2028 type A; 5MPa bedded and jointed in cement/sand mortar (1:4)				
C	150mm Wall	122	m²	20000/=	2,440,000/=
D	150mm Wall, fence wall	10	m²	20,000/=	200,000/=
	Vibrated reinforced concrete grade 25 nominal mix (1:11/2:3)				
E	230x150mm Coping with wire mesh 2.5mm and all formwork	15	m	5000/=	75000/=
F	250x100mm window Cill ditto	24	m	5000/=	120,000/=
	ELEMENT NO4: WALLS CARRIED TO SUMMARY				7915,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO 5: DOORS				
	Hardwood Mninga or equal and approved				
A	50x150mm Frame with one labour	125	m	10,000/=	1,250,000/=
B	50x150mm Transome or Mulion	17	m	10,000/=	170,000/=
C	25 x 25mm Glazing beads	47	m	3,000/=	141,000/=
	Hardwood Mninga or equal and approved				
D	45mm thick panelled door hardwood size 1200 x2100mm double door; comprising of 45x100mm rebated stiles; all panel filled in with and including 25mm thick hardwood boards; {DI}	3	Nr.	350,000/=	1,050,000/=
E	Ditto Size 900 x 2100m single door {D2}	12	Nr.	250,000/=	3,000,000/=
F	Size 800 x 2100m single door {D3}	6	Nr.	250,000/=	1,500,000/=
	Ironmongery; supply and fix the following as manufactured by Union ltd."or other equal and approved to hardwood with matching screws"				
G	150mm Brass butt hinges.	36	Pairs	5000/=	180,000/=
H	3 Lever Mortice lock	15	Nr.	50,000/=	750,000/=
J	Two Lever Mortice lock with indicator bolt	6	Nr.	50,000/=	300,000/=
	Clear glass				
	6mm thick clear glass sheet; glazed with hardwood beads:				
K	Glass panes over $0.1m^2$ not exceeding $0.5m^2$	7	m^2	30,000/=	210,000/=
	ELEMENT NO 5: DOORS CARRIED TO SUMMARY				8,551,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO 6: WINDOWS				
	Aluminium glazing approved by the Architect; single glazed combination frame and windows, 45 x 50mm Aluminium section framing, all mullions and transomes; epoxy power coat RAL 9006 finish, 6.14mm laminated glass pre assembled with stainless steel plates and screws window ironmongery, glazed beads, fiber mosquito net, rubber gaskets and backer rods and fixing to mansory or concrete grounds, sealing all around with non-hardening EPDM silicone sealant; screws bolts and fasterners				
A	Size 1500 x 1500mm high	13	Nos	300,000/=	3900,000/=
B	Ditto, Size 900 x 600mm high	9	Nos	120,000/=	1,080,000/=
	Composite items				
	Mild steel; welded together with welding fillets; protected from rust by applying three coats of zinc chromate primer and two full coat of gloss painting; including fixing in position				
C	Supply and fix in position "WINDOW GRILLES"; comprising of 25x25x3mm SHS pipes framing; filled in with 40x6mm flat; bars cut and bent to patterns spaced at not more than 150mm centres complete to the aproval of Architect for window Size 1500 x 1500mm high	13	Nos	120,000/=	1560,000/=
D	Ditto, for window size 900 x 600mm high	9	Nos	80,000/=	720,000/=
E	Ditto for door vent size 1200 x 400mm high	3	Nr.	60,000/=	180,000/=
F	Ditto for door vent size 900 x 400m high	9	Nr.	50,000/=	450,000/=
	ELEMENT NO6:WINDOWS CARRIED TO SUMMARY				7890,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO.7: ROOFING				
	Sawn soft wood; Impregnated with Preservatives				
A	50X150mm Beam	130	m	6000/=	780,000/=
B	50X150mm Rafters	196	m	6000/=	1,176,000/=
C	50X100mm Struts	148	m	4000/=	592,000/=
D	50X100mm Wall Plate	86	m	4000/=	344,000/=
E	50X50mm Purlins	256	m	2000/=	512,000/=
	Selected Hardwood				
F	Fascial/Barge board; 25 x 250mm; with semi-circular decorative mouldings along the bottom edges	99	m	6000/=	594,000/=
	Roofing; 28gauge Resin Colour Coated IT5 aluminium sheets; single length; supplied by Aluminium Africa Ltd. or equal and approved; fixed to timber purlins with 150mm end laps fixed with roofing nails				
G	Roof covering;sloping not exceeding 45 degrees from horizontal	292	m^2	22,500/=	6,570,000/=
H	Ridge capping	39	m	7,000/=	273,000/=
J	Valley capping	21	m	7,000/=	147,000/=
	Metal Works and Plates				
K	16mm Diameter Anchor Bolts, 850mm long, one end fish-tailed and cast into concrete	88	No	3000/=	264,000/=
L	10mm thick steel plate	44	No	3000/=	132,000/=
	ELEMENT NO. 07 - ROOFING CARRIED TO SUMMARY				11,384,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 08: FINISHINGS				
	Insitu finishings				
	Plaster; 12mm first coat cement and sand (1:6); 3mm second coat of cement and lime (1:5) steel trowelled to smooth surfaces; internally:				
A	15mm To walls	460	m²	5000/=	2,300,000/=
B	15mm to sides of beams	85	m²	5000/=	425,000/=
	External cement sand (1:4); rendering with approved plasticizer trowelled smooth:				
C	22mm To walls	174	m²	5000/=	870,000/=
	TILES, SLAB OR BLOCK FINISHINGS				
	Glazed ceramic wall tiles with cushion edges to BS 1281 fixed to backings with cement sand mortar and pointing with white cement				
D	400 x 250 x 6mm Tiling to walls	53	m²	20,000/=	1,060,000/=
	Graniti GN 572 Mid Grey porcelain tiles "high quality" bedding in premixed thin set cement mortar and grouting with coloured sandless tile grout including edge strips Aluminium strips				
E	600x600x8mm; 4mm diagonally joints ways; to floors to level; to cement and sand base	147	m²	20,000/=	2,940,000/=
F	400 x400 x 8mm; 4mm diagonally joints ways to floor level of toilets, cement and sand base	14	m²	20,000/=	280,000/=
G	150mm Thick skirting	240	m	2000/=	480,000/=
	Floor edge strips				
H	GENESIS ESA 10(10mm high) or similar and approved, aluminium straight edge trim; junctions of flooring finishes	45	m	2000/=	90,000/=
	To Collection				8,445,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Weather Bars				
A	6 x 25mm Brass weather bar strip at external door thresholds; in prepared groove	10	m	2000/=	20,000/=
	Beds and Backings				
	Cement and sand (1:4) wood floated surface finish				
B	32mm Bed to receive floor tiles	161	m²	2000/=	322,000/=
C	12mm Backing to receive wall tiles	53	m²	2000/=	106,000/=
	Gypsum plasterboard BS 1230 Pt. 2 1970 tapered wallboard self tapping galvanized drive screws				
D	9mm Thick ceiling; horizontal; internal	161	m2	10,000/=	1,610,000/=
E	Cornice	269	m	3000/=	807,000/=
F	Extra ceiling access panel	3	Nr.	20,000/=	60,000/=
	Sawn softwood pressure impregnated with preservatives				
G	50x50mm brandering fixed at 600mm centre to centre	408	m	2000/=	816,000/=
	Brickwork at COARTYARD or other material to be approved by Council Enginner)				
	Engineering bricks as manufactured by Coastal steel Industries or any other equal and approved and jointed in cement and sand mortar (1:2)				
H	65mm thick interlocking bricks laid to basket pattern on and including 50mm thick bed of well compacted sand	62	m²	12000/=	744,000/=
	To Collection				4,485,000/=
	COLLECTION				
	Page 2/8/1				8,445,000/=
	Page 2/8/2				4,485,000/=
	ELEMENT NO 08: FINISHINGS CARRIED TO SUMMARY				12,930,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 09: PAINTING AND DECORATIONS				
	Internal works				
	Prepare and apply one thinned coat and two full coats of wash 'n' ware paint				
A	Plastered walls	545	m²	3000/=	1,635,000/=
B	Gyspum ceiling	161	m²	3000/=	483,000/=
	External works				
	Prepare and apply one thinned coat and two full coats of weather guard paint to				
C	Rendered surfaces	174	m²	3000/=	522,000/=
	Varnishing; internal work; prepare and apply three coats of clear polyurethane clear varnish; wood surfaces.				
D	General surfaces	62	m²	3000/=	186,000/=
E	Frames, linings and associated mouldings 200-300mm girth	142	m	2000/=	284,000/=
	ELEMENT NO. 09 : PAINTING AND DECORATIONS CARRIED TO SUMMARY				3,110,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	ELEMENT NO. 10: SANITARY WARE INSTALLATIONS				
	WC				
A	Eastern type low level W.C suite vitrious complete with trap, 9litres flushing tank with single push button complete with all necessary accessories. "Casterware "	3	No	75,000/-	225,000/=
B	P-Trap and other associated accessories	3	No	5000/=	15,000/=
C	80mm Diameter high quality plastic floor drain (ALBETONY) trap built in concrete bed.	3	No	40,000/=	120,000/=
	UPVC pipes;Class 'E', including fittings in running length complete with all accessories, elbows, plug				
D	Allow sum for supply and connection of various size (100mm, 50mm diameter, etc) for waste water to discharged point		Item		50,000/=
	GULLY TRAP				
E	Construct a standard gully trap 300 × 300mm deep;in thick concrete block walls complete with benching and all fittings and gully trap cover	3	No	30,000/=	90,000/=
	FOUL WATER DRAINAGE				
F	Excavate trench to receive pipes; commencing at ground level; not exceeding 1.5m. deep; average 1000mm. deep; including grading bottom; backfilling and compacting and removal of surplus excavated material.	13	m	2,000/=	26,000/=
	To Collection				526,000/=

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	SEPTIC TANK:				
A	Construct septic tank overall internal dimensions; size 3000 x 1500x 2000mm. deep in 230mm. thick solid concrete blocks walls; 230mm. thick plain in-situ concrete grade '15' bed; 100mm. thick reinforced in-situ concrete grade '20' suspended slab reinforced with 10mm diameter x 100 x 100mm BRC square mesh; 80mm. thick baffle wall; complete with necessary pipe fittings; 4No. cast iron manholes covers and frames; vent pipe; finished to wall sides and top of slab with 15mm thick, water proof cement and sand render; including excavation back filling and removal of surplus material; all as per and shown in the drawings.	1	No	1,400,000/=	1,400,000/=
	SOAK PIT (S.P)				
B	Construct Soak pit overall size 2000mm diameter x 2000mm from invert level average depth; in 230mm. solid concrete block walls with weep holes at a height shown in the drawings; 230 x 450mm. plain insitu concrete grade '15' foundation at the bottom; 100mm. Thick suspended slab in reinforced insitu concrete grade '20' reinforced with 10mm diameter x 100 x 100mm BRC square mesh; 1No. Cast iron manhole cover and frames; vent pipe; top of slab finished with cement and sand (1:3) screed; including excavations; backfilling and removal of surplus material; all as per and shown in the drawing.	1	No	1,000,000/=	1,000,000/=
	To Collection				
	COLLECTION				2,400,000/=
	Page 2/10/1				526,000/=
	Page 2/10/2				2,400,000/=
	ELEMENT NO. 10 SANITARY WARE AND INSTALLATIONS CARRIED TO SUMMARY				2926,000/=

S/No	DESCRIPTION OF MATERIALS	UNIT	QTY	RATE	AMOUNTS
	ELEMENT NR. 11: ELECTRICAL INSTALLATIONS				
	DISTRIBUTION SYSTEM				
A	4Ways TPN distribution board (DB 3) with 100A/300mmA RCCB incomer and outgoing MCBs as shown in Schematic diagram as ABB or approved equal	No	3	150,000/=	450,000/=
	POWER POINTS				
B	2 x 13A Double switch socket as ABB or HAGER or LEGRAND make	No	12	10,000/=	120,000/=
C	20A DP control switch with neon indicator c/w steel box for Air Conditioners, Security lights and Hand driers as ABB or HAGER or LEGRAND make	No	0		—
D	45A DP Cooker Control Unit with neon indicator c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
E	2.4KW Hand dryer c/w sensing unit automatically controlled as GET Ex UK	No	0		—
	LIGHT FITTINGS, FANS AND SWITCHES				
F	Single fluorescent fitting complete LED philips or other equal approved	No	6	10,000/=	60,000/=
G	LED: Fluorescent fitting 60mm cassette type	No	0		—
H	Ceiling light complete with energy saver 18W	No	15	10,000/=	150,000/=
J	80W 56" Sweep ceiling fan c/w regulator, ceiling rose and hooks as Panasonic or National or KDK of Japan	No	0		—
K	52W 16" Sweep ceiling fan c/w regulator, ceiling rose and hooks as Panasonic or National or KDK of Japan	No	0		—
L	10A 1 gang 1 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	5	10,000/=	50,000/=
M	10A 2 gang 1 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	10	10,000/=	100,000/=
N	10A 1 gang 2 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
P	10A 2 gang 2 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
Q	10A 3 gang 1 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
R	Twin switch socket ABB or other equal approved	No	3	15,000/=	45,000/=
S	10A 3 gang 2 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
T	10A 4 gang 1 way flush light switch c/w steel box as ABB or HAGER or LEGRAND make	No	0		—
	LIGHTNING PROTECTION SYSTEM				
V	Soil treatment and interconnection to general earthing of building to meet the requirement of IEE regulations	Item	1	50,000/=	50000/=
	To collection				1,025,000/=

S/No	DESCRIPTION OF MATERIALS	UNIT	QTY	RATE	AMOUNT
	CABLES NB: Cables for 1.5sqmm 2.5sqmm and 4sqmm should be EURO or other equal approved				
A	1C x 1.5mm² PVC copper cable				
	(i) Red	Roll	3	50000/=	150,000/=
	(ii) Black	Roll	3	50,000/=	150,000/=
	(iii) Green	Roll	3	50,000/=	150,000/=
B	1C x 2.5mm² PVC copper cable				
	(i) Red	Roll	2	70,000/=	140,000/=
	(ii) Black	Roll	2	70,000/=	140,000/=
	(iii) Green	Roll	2	70,000/=	140,000/=
C	1C x 4.0mm² PVC copper cable				
	(i) Red	M	30	5000/=	150,000/=
	(ii) Black	M	30	5000/=	150,000/=
	(iii) Green	M	30	5000/=	150,000/=
	FIXED ENCLOSURES FOR CABLE RUNS				
D	20mm Dia heavy gauge PVC conduit to all lighting, fans c/w all accessories as MCL make	Pcs	150	1500/=	225,000/=
E	75mm Dia heavy gauge PVC conduit for supply from the Main Panel Distribution Board to all necessary accessories as MCL/ PLASCO make	Pcs	9	5000/=	45,000/=
F	Accessories (Single PVC Rectangular/Square Boxes, Twin PVC Rectangular/Square Boxes, Round PVC Boxes, Cover plates) and Binding wires	Item	1	100,000/=	100,000/=
	EARTHING SYSTEM.				
G	Soil treatment and interconnection to general earthing of building to meet the requirement of IEE regulations. Two earth pits with adequate number of earth rods linked together with the earthing cables from the main distribution panel board, filled with wet charcoal/salt or bentonite powder.				
H	Earth rod approved copper 16mm not less than 1200mm	No.	3	20,000/=	60,000/=
J	Charcoal	Item	1	5000/=	5000/=
K	Salt	Item	1	5000/=	5000/=
L	Eath wire 4sqmm	Mts	30	3000/=	90,000/=
	"AS BUILT/INSTALLED" DRAWINGS				
M	Prepare "As Built/Installed" drawings clearly indicating all conduit routes, installed fittings and submit in hard and soft copies.	Sets	1	50000/=	50000/=
	To collection				1900,000/=
	COLLECTION				
	Page 1				1025,000/=
	Page 2				1900,000/=
	Total Cost for Electrical Carried to Summary Page				2925,000/=

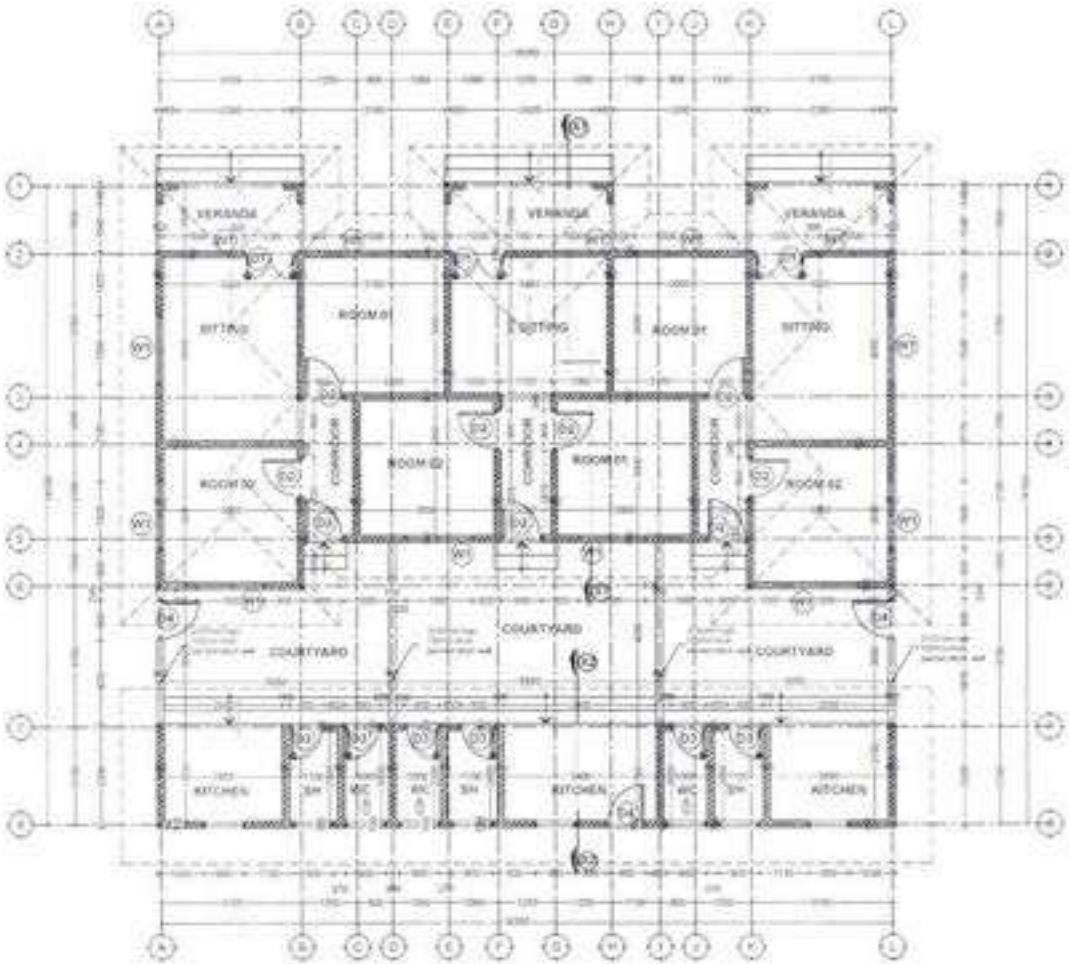
ITEM	DESCRIPTION	PAGE	AMOUNT
	BILL NR.3: MEASURED WORKS SUMMARY		
	ELEMENT NO. 01 - SUBSTRUCTURE	3/1/3	12,671,500/=
	ELEMENT NO. 02 - FRAME	3/2/1.	4,290,000/=
	ELEMENT NO. 03 - STAIRS	NA	NA
	ELEMENT NO. 04 - WALLS	3/4/1.	7,915,000/=
	ELEMENT NO. 05 - DOORS	3/5/1	8,551,000/=
	ELEMENT NO. 06 - WINDOWS	3/6/1	7,890,000/=
	ELEMENT NO. 07 - ROOF	3/7/1.	11,384,000/=
	ELEMENT NO. 08 - FINISHINGS	3/8/2.	12,930,000/=
	ELEMENT NO. 09 - PAINTING AND DECORATIONS	3/9/1.	3,110,000/=
	ELEMENT NO. 10: SANITARY WARE	3/10/2.	2,926,000/=
	ELEMENT NO. 11: ELECTRICAL INSTALLATION	3/11/2.	2,925,000/=
	BILL NO.3 - MEASURED WORKS CARRIED GENERAL SUMMARY	**T.Shs**	74,592,500/=

BILL NO: 04 - PRIME COST AND PROVISIONAL SUMS

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	BILL NR.4: PRIME COST AND PROVISIONAL SUM				
	Prime Cost (PC) Sums for works to be carried out by Nominated subcontractors or Nominated suppliers				
A	Electrical Connection and meter		Sum	200,000/=	200,000/=
	BILL NR.4- PC AND PROVISIONAL SUMS WORK CARRIED TO GENERAL SUMMARY				200,000/=

SECTION VII : DRAWINGS

DOOR & WINDOW SCHEDULE			
NO.	WIDTH	HEIGHT	TOTAL
D1	1200mm	2500mm	3
D2	900mm	2100mm	9
D2	800mm	2100mm	6
D4	900mm	2100mm	3
W1	1200mm	1500mm	13
W2	900mm	600mm	9



GROUND PLAN

SCALE: 1:100

TOTAL AREA = 165sqm

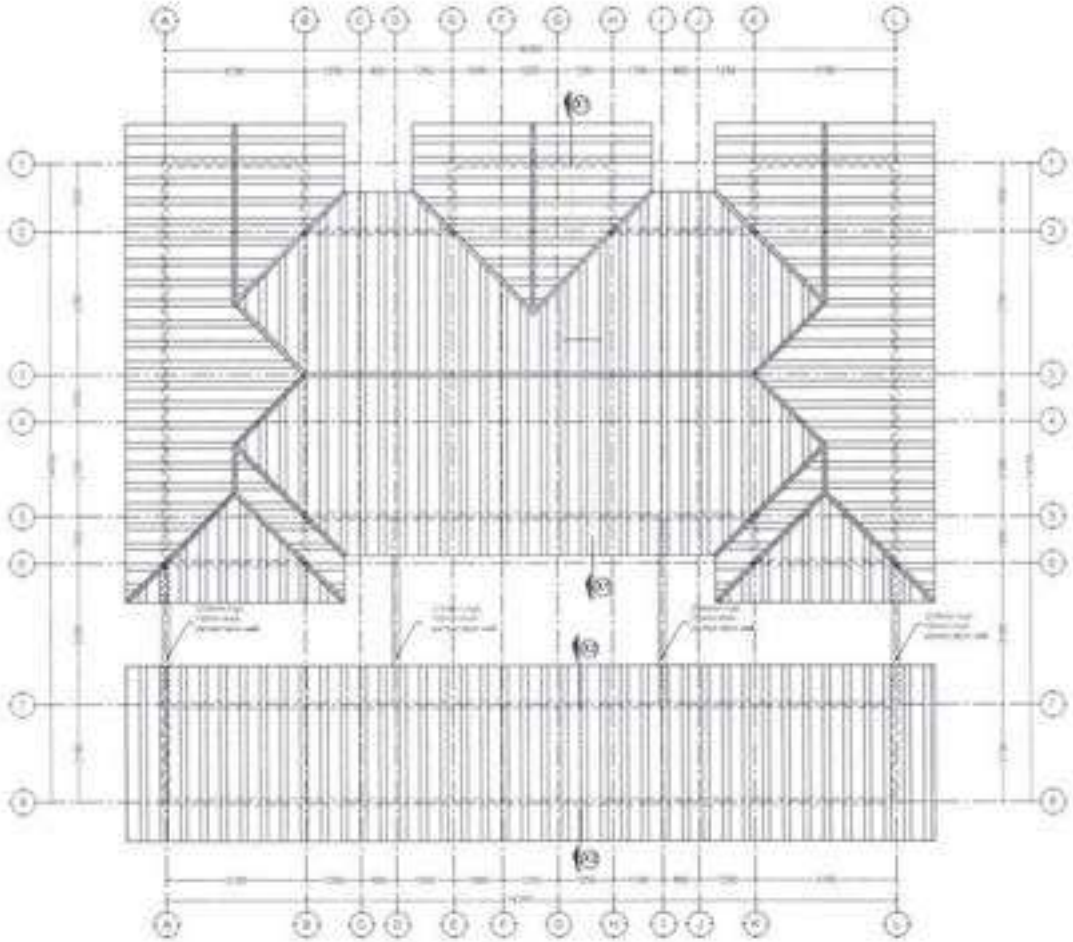
President's Office, Regional Administration and Local Governments,
Government City,
TAMBOMI STREET
P.O. Box 1923,
41155 Dodoma

Client
PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS.

Project
PROPOSED 2 BEDROOM SEMIDETACHED STAFF HOUSE

Drawing title
2 BEDROOM, 3in ONE STAFF HOUSE RURAL TYPE
Ground Floor plan

OCTOBER 2021 | SH A/101
Drawn by: JOP
Checked by: HG
Scale: 1:100



ROOF PLAN
SCALE: 1:100

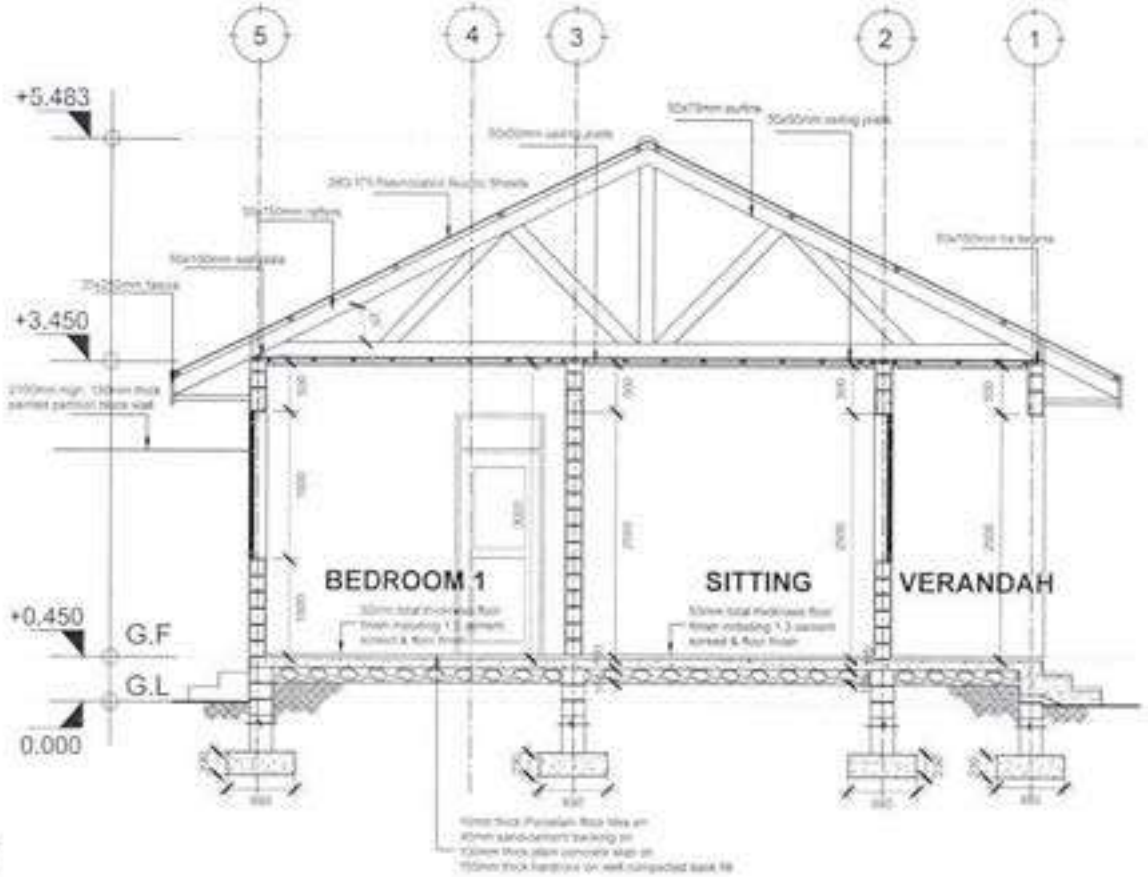
President's Office, Regional Administration
and Local Governments
Government City,
TAMISEMI STREET
P.O. Box 1923,
41105 Dodoma

Client
PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS.

Project
PROPOSED 2 BEDROOM SEMIDETACHED STAFF HOUSE

Drawing Title
2 BEDROOM, 3inONE STAFF HOUSE
RURAL TYPE
Roof Plan

OCTOBER 2021	SH A/102
JOA	
RM	



SECTION X1:X1
SCALE: 1:50

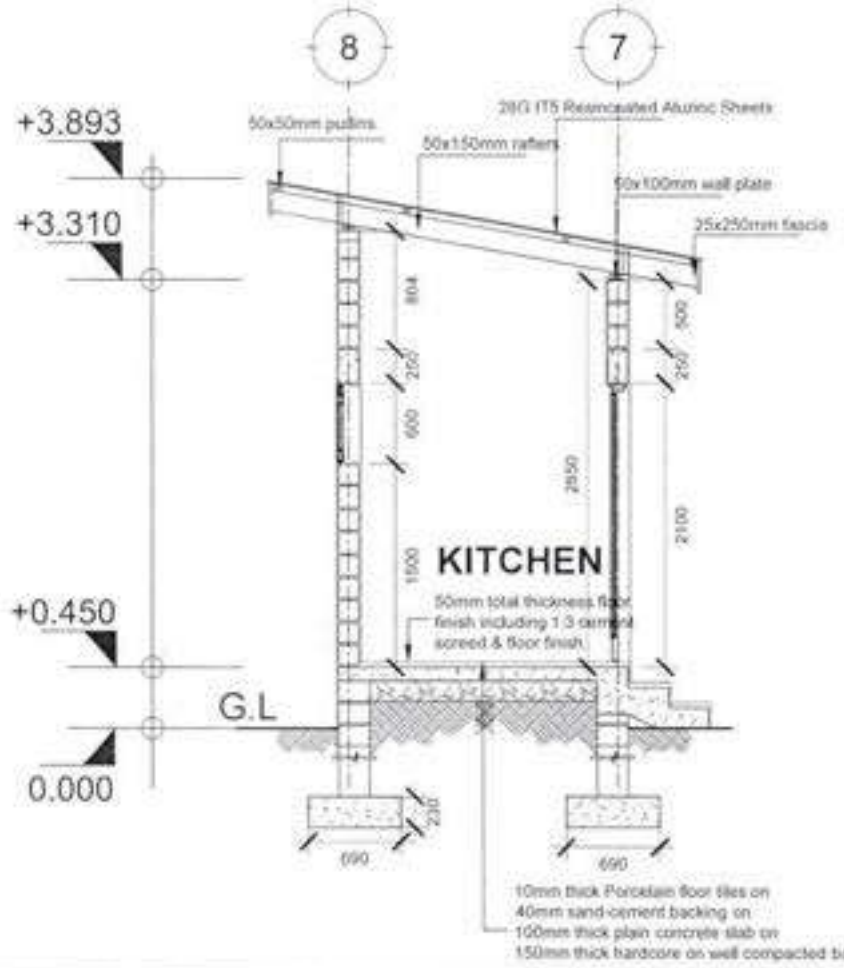
President's Office, Regional Administration and Local Governments
Government City,
TAMISEMI STREET,
P.O. Box 1923,
41189 Dodoma

Client
PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS.

Project
PROPOSED 2 BEDROOM SEMIDETACHED STAFF HOUSE

Drawing title
2 BEDROOM, 3inONE STAFF HOUSE RURAL TYPE
Section

OCTOBER 2021	SH A/103
JKR	
WS	



SECTION X2:X2

SCALE: 1:50

President's Office, Regional Administration and Local Government,
Government City,
TANGEMI STREET,
P.O. Box 1923,
41185 Dodoma

Client
PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS.

Project
PROPOSED 2 BEDROOM SEMIDETACHED STAFF HOUSE

Drawing title
2 BEDROOM, 3nONE STAFF HOUSE RURAL TYPE
Section

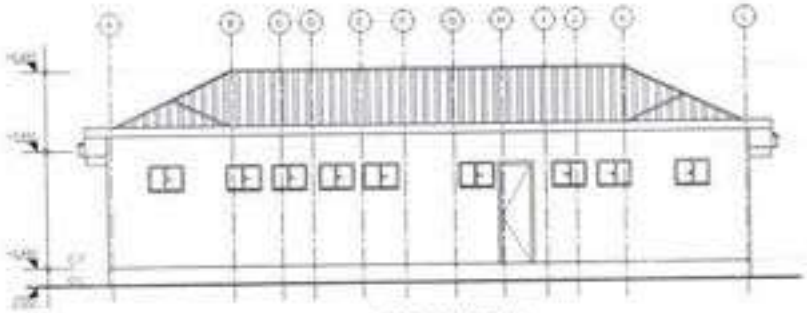
Project number
OCTOBER 2021
SH A/104

Drawn by JCK
Checked by IAB

Scale 1:50

FRONT ELEVATION

RIGHT SIDE ELEVATION



REAR ELEVATION

LEFT SIDE ELEVATION

ELEVATIONS

SCALE: 1:100

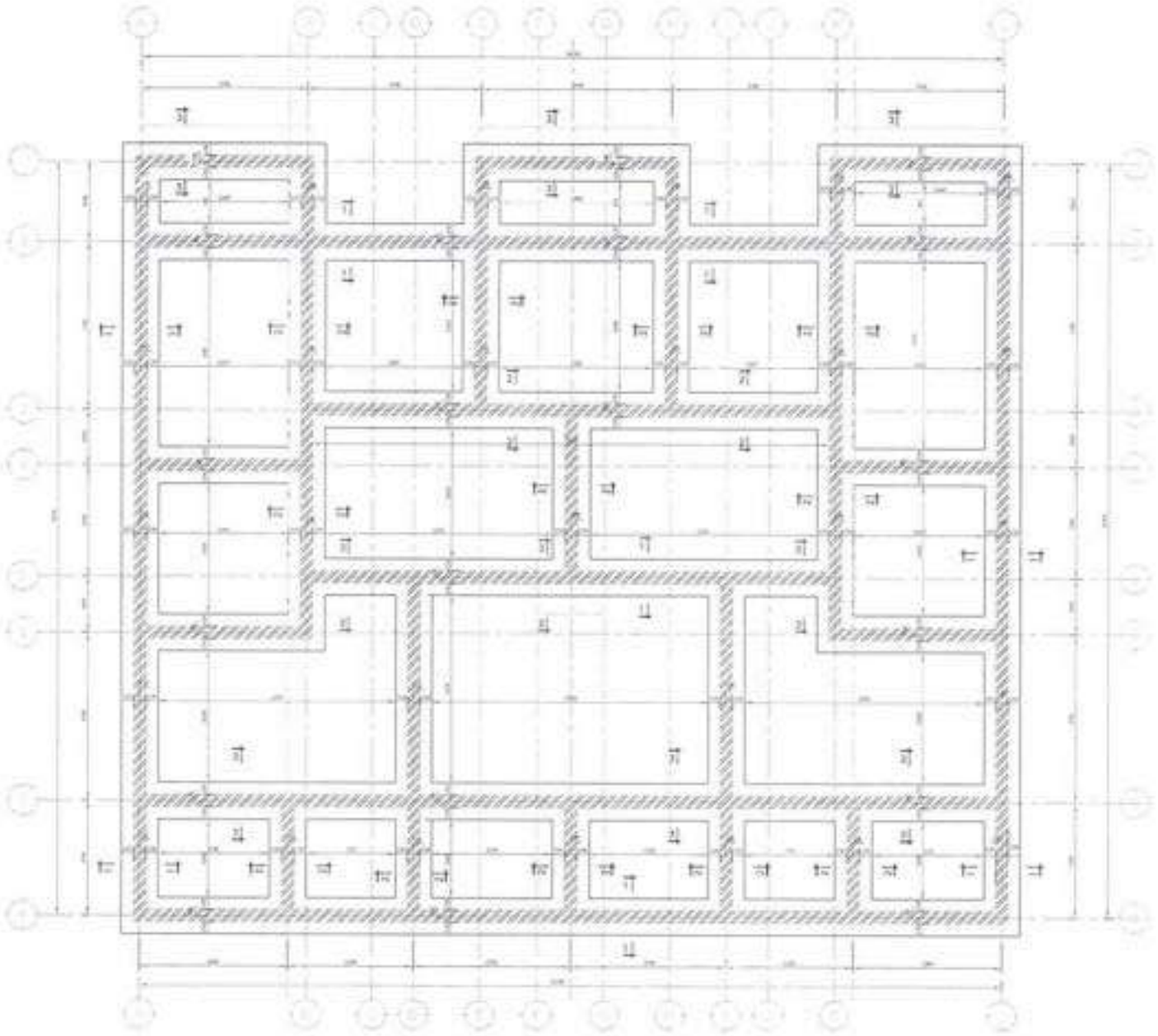
President's Office, Regional Administration
and Local Governments,
Government City,
TAMISEMI STREET
P.O. Box 1923,
41185 Dodoma

Client
PRESIDENTS OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS.

Project
PROPOSED 2 BEDROOM SEMIDETACHED STAFF HOUSE

Drawing title
2 BEDROOM, 3mONE STAFF HOUSE RURAL TYPE
Elevations

Project number	
OCTOBER 2021	SH A/105
Drawn by: JEN	
Checked by: MM	Scale: 1:100



Foundation Layout Plan

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements:
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

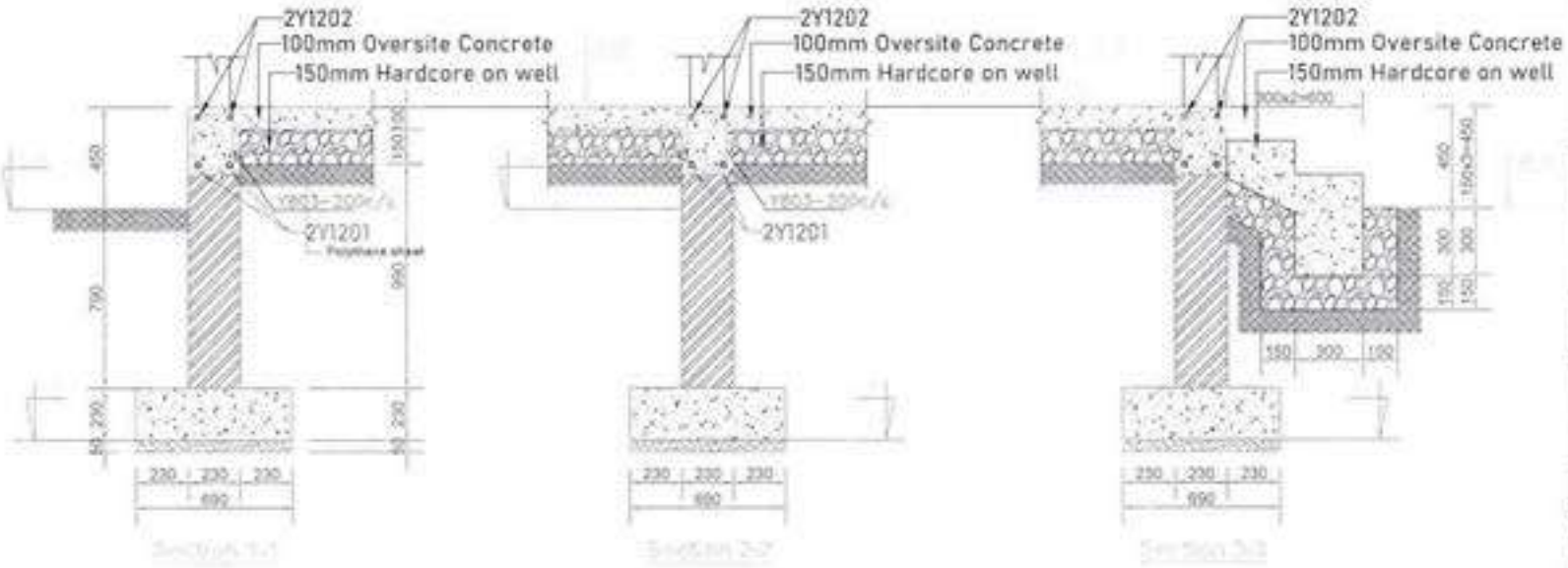
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:
2 BEDROOM, 3inONE STAFF HOUSE RURAL TYPE
Foundation Plan

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: **2021**	Scale:
Drawing No. **SH/S.101**	Sheet: **01**



NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENTS OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

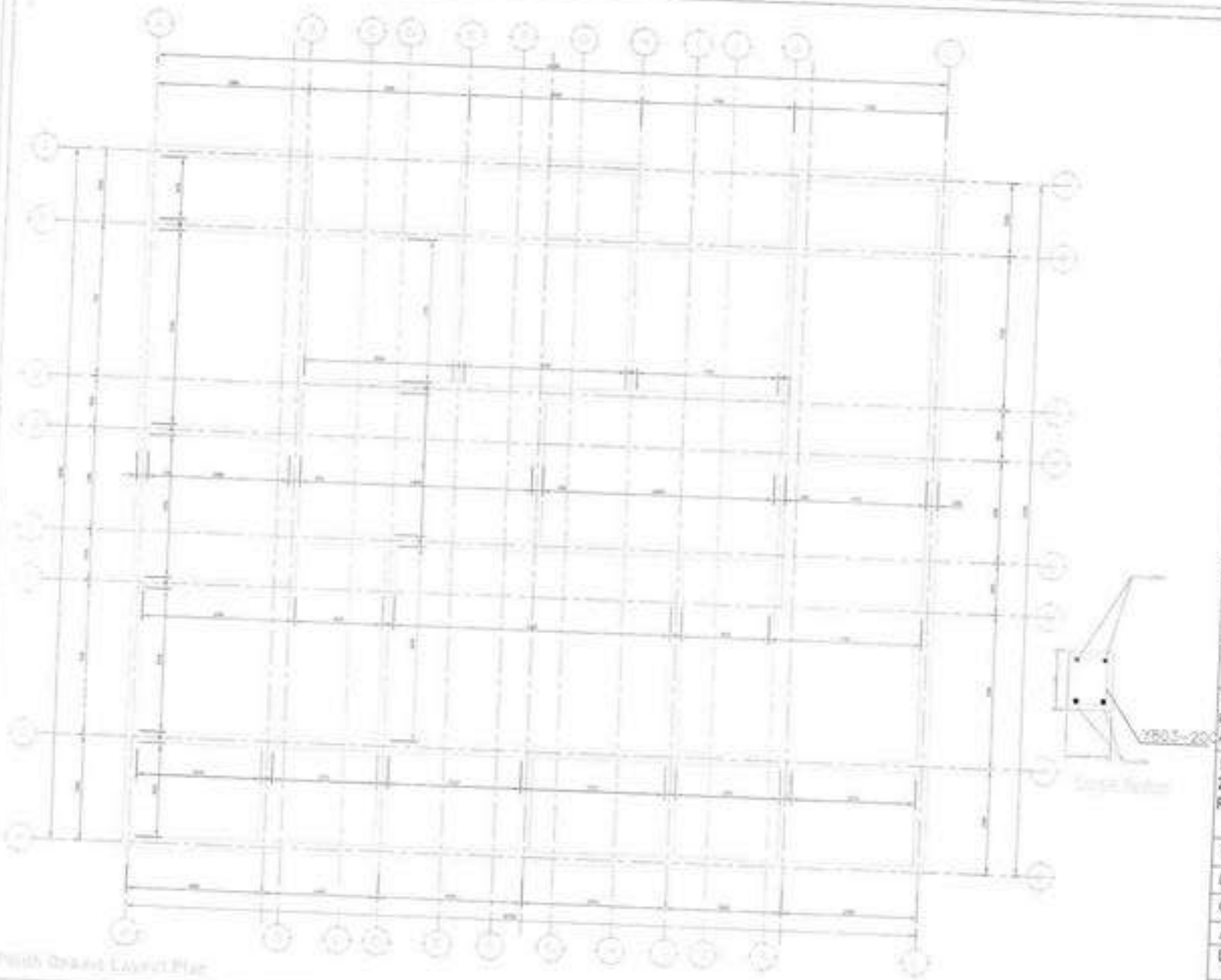
PROJECT:
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:
2 BEDROOM, 3inONE STAFF HOUSE
RURAL TYPE
Foundation Details

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. SH/S.102	Sheet: 01

Foundation Details



Plinth Drawing Layout Plan

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements:
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

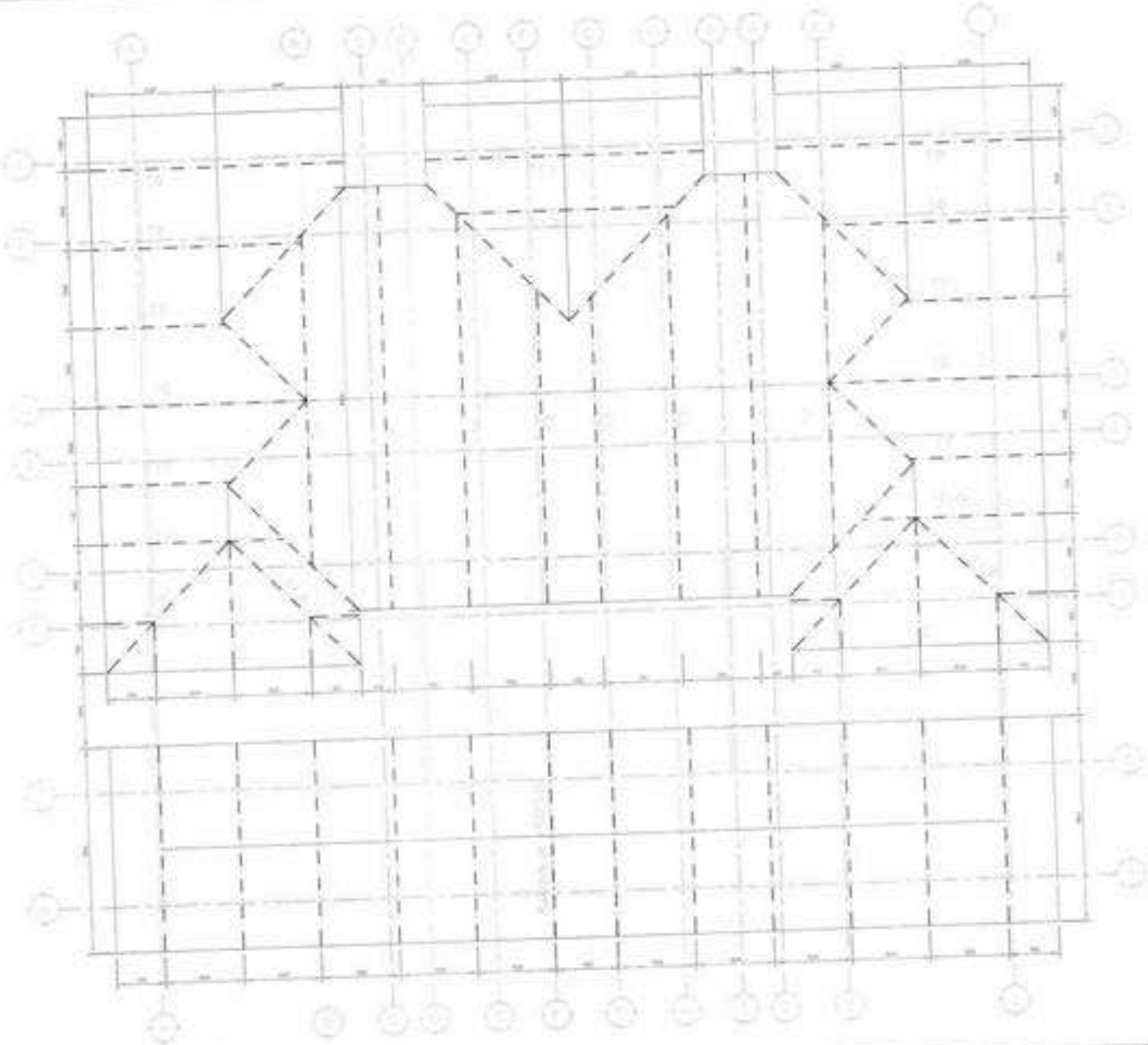
PROJECT:
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:
2 BEDROOM, 3inONE STAFF HOUSE RURAL TYPE

Floor Beams Layout Plan

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. SH/S.103	Sheet: 01



Roof Truss Layout Plan

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements:
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

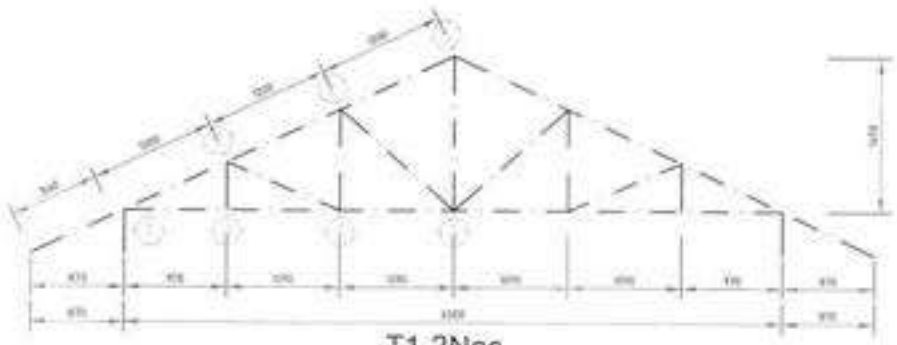
PROJECT:
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

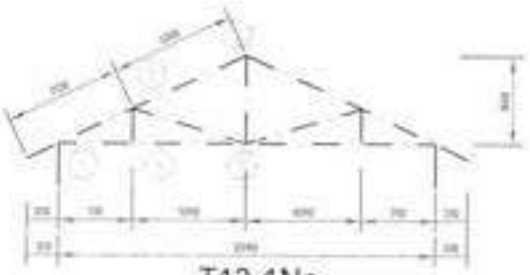
DRAWING TITLE:
2 BEDROOM, 3in1ONE STAFF HOUSE RURAL TYPE

Roof Truss Layout Plan

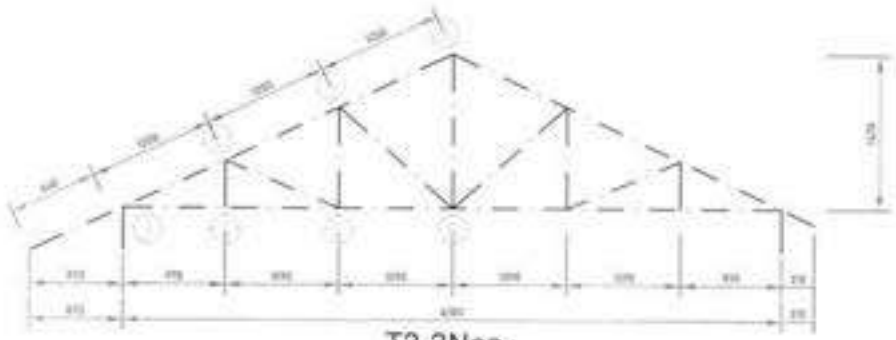
Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. SH/S.105	Sheet: 01



T1-2Nos

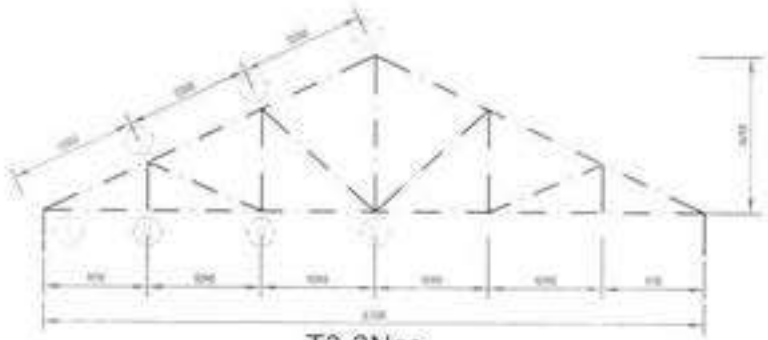


T12-1No

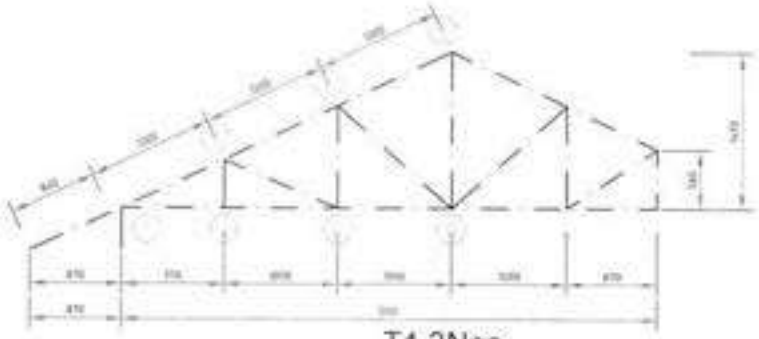


T2-2Nos

T11-1No



T3-2Nos



T4-2Nos

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:

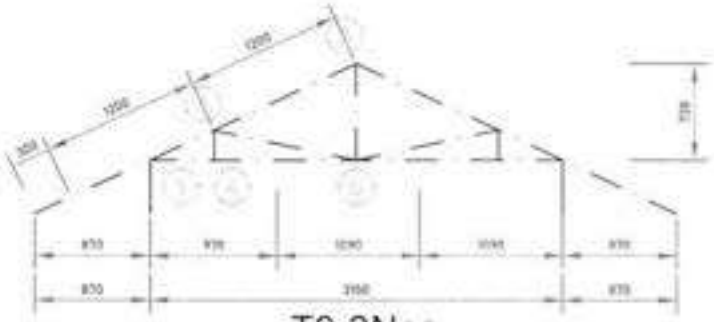
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:

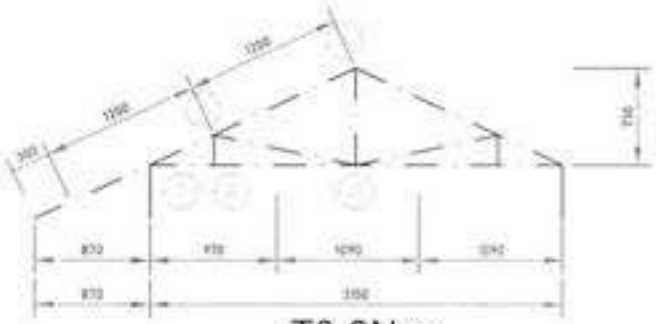
2 BEDROOM, 3in1ONE STAFF HOUSE
RURAL TYPE

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: **2021**	Scale:
Drawing No: **SH/S.106**	Sheet: **01**



T9-2Nos

T10-1Nos



T8-2Nos

T6-2Nos

T7-6Nos

T13-4Nos

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:

PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

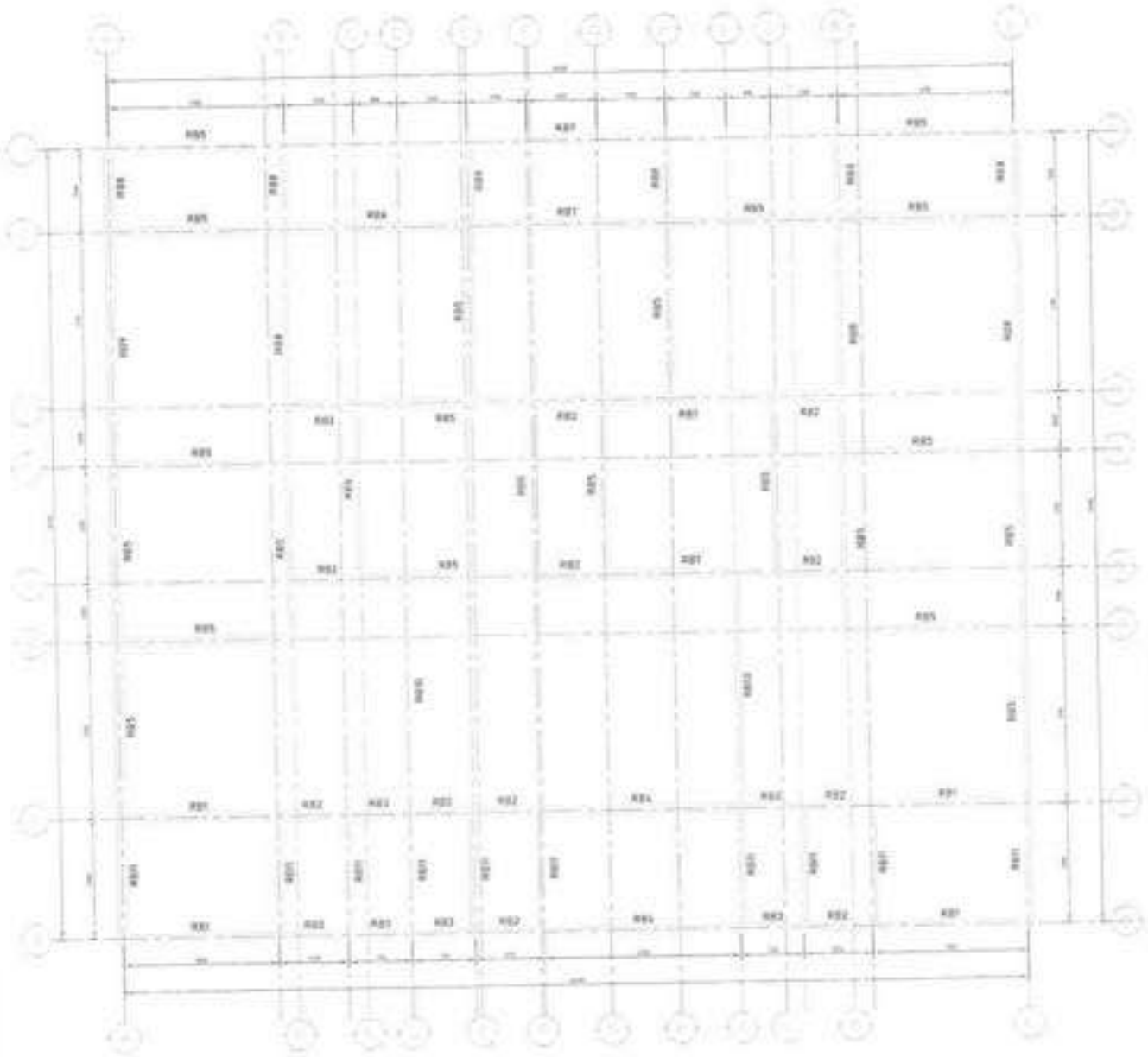
CLIENT:

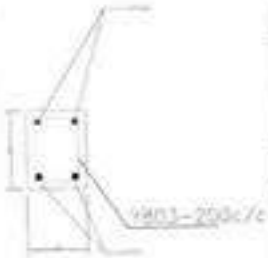
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:

2 BEDROOM, 3in1ONE STAFF HOUSE RURAL TYPE

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: **2021**	Scale:
Drawing No. **SH/S.107**	Sheet: **02**





NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
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   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:
2 BEDROOM, 3inONE STAFF HOUSE RURAL TYPE

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. SH/S.104	Sheet: 01

Typical detail for fixing purlin to truss.

100mm long nails 6 Nos
GUSSETS-2NOS -25 mm. marine plywood bothways.

1x50x100mm, or 1x50x150mm

Lengthening joint in both chords

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements
   a) Foundation 50mm
   b) Column 25mm
   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:

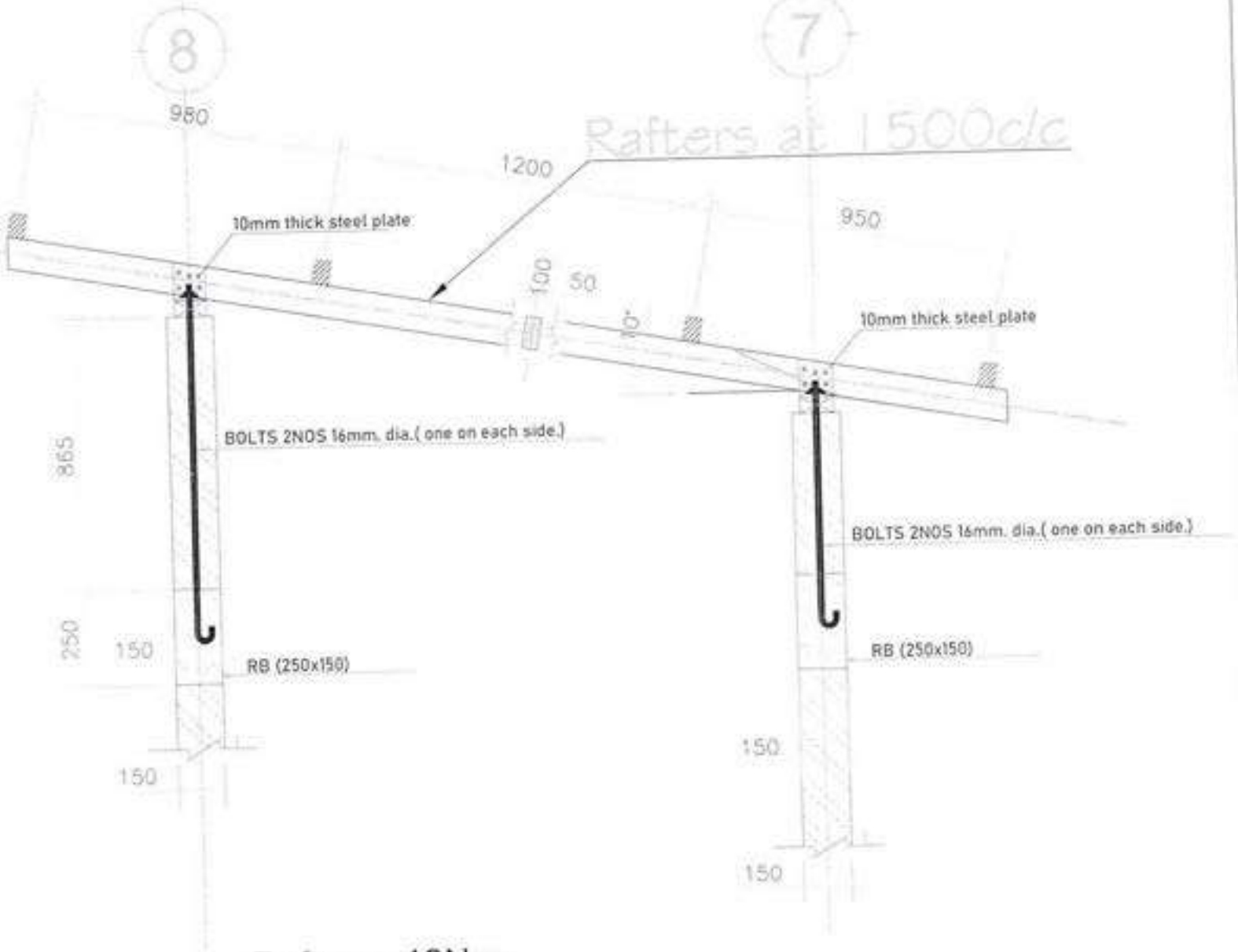
PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DRAWING TITLE:
2 BEDROOM, 3 in ONE STAFF HOUSE RURAL TYPE

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. SH/S.108	Sheet: 03



Rafters - 12Nos

NOTE:

1. All dimensions are in mm unless otherwise specified
2. All discrepancies shall be referred to the structural engineer
3. Reinforced concrete shall be of grade 25 with fcu=25N/mm² at 28 days of age
4. Main reinforcements shall be high tensile steel with fy = 460N/mm²
5. Nominal cover to the reinforcements:
   a) Foundation 50mm
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   c) Beam 25mm
   d) Slab 25mm

MINISTRY OF HEALTH,COMMUNITY DEVELOPMENT,GENDER, ELDERLY AND CHILDREN

In Collaboration with

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

PROJECT:

PROPOSED STANDARD DRAWINGS FOR COUNCIL HOSPITALS IN TANZANIA

CLIENT:

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

Designed by:	Eng. A.M.A
Drawn by:	Eng. A.M.A
Checked by:	ENG. E.M
Approved by:	
Date: 2021	Scale:
Drawing No. ISO/S.109	Sheet: 04

SECTION VIII : SPECIFICATIONS

SECTION VI A: GENERAL SPECIFICATIONS

1 PRELIMINARY AND GENERAL

1.1 Language of Records

Manuals, time sheets, records, notes, drawings, documents, etc. shall be in the English language. If the original documents are in another language a certified translation in English shall be submitted to the Engineer.

1.2 Standards

In the Specifications, Bills of Quantities and Drawings, reference has been made to relevant British Standard Specifications and Codes of Practice - with which the materials and workmanship should comply. However, the materials and workmanship complying with International Standards Organization (ISO) Standards for that particular material or workmanship will also be acceptable.

1.3 Specification

All measurements shall be taken jointly by the Contractor and the Engineer as and when the latter so directs and shall be made in accordance with the Specifications and Preamble to Bills of Quantities notwithstanding local or other customs.
Where no particular specification is given for any material or item of work, the latest edition of relevant British Standard Specification shall apply.

1.4 Precedence of Contract Documents

Should the provisions of any clauses of any or all of the Contract Documents be shown to be mutually at variance or exclusive, the following order of precedence shall be applied in order to establish which of the said provisions, mutually at variance or exclusive, shall be deemed to be the true and correct intent of the Contract entered into by Employer, and the contractor shall forthwith be absolved from any liability under the provisions not so proved to be the true and correct intent of the Contract, provided that in the execution of the Contract the contractor has, or shall have complied with such true and correct intent.

1.5 Drawings

Drawings are provided with the Particular Specifications and with the Drawing Volumes as part of the Tender Documents. The Works shall correspond in all particulars with the Tender Drawings and the Particular Specifications.

The Contractor shall verify all dimensions, quantities and details shown on the Drawings or other data received from the Engineer, and shall notify him immediately of any error, discrepancy or conflict found therein. Failure to discover such errors, discrepancies or conflicts shall not relieve the Contractor of full responsibility for unsatisfactory work, nor from rectifying such work at his own expense.

The designs of all structures and installations as shown on the Drawings and Specifications are in conformity with structural requirements according to the relevant DIN standards and the site conditions and loads applied for the function and purpose designed. However, the Contractor shall be responsible to check and verify the suitability of the design with regard to stability and structural requirements.
Three copies of the Tender Drawings and any drawings subsequently issued will be supplied free of charge to the Contractor. Any additional copies required by the Contractor will be furnished at the cost of printing. These drawings will become Contract Drawings.

The Engineer reserves the right to issue additional drawings throughout the progress of the Works and these will constitute complementary Contract Drawings.

1.6 Working Drawings

If required for the execution of this Contract or requested by the Engineer, the Contractor shall incorporate in the Tender Drawings all openings, ducts, recesses, anchor holes, etc., as required for the mechanical, electrical or other installations. All related costs are considered included in the Contract Price.

Drawings from Sub-Contractors shall be checked, signed and stamped by the Contractor before being forwarded to the Engineer, who shall deal in all respects only with the Contractor.

When the Engineer approves a Working Drawing, he shall return a copy marked "Approved" to the Contractor, who shall then insert the date of approval on the tracing and furnish the Engineer with three prints of the working drawings as approved.

Approval of a working drawing by the Engineer will only signify his general approval of the design and shall not make him liable for any error of the Contractor in detail or lack of strength or efficiency of any part. Where errors, deviations and/or omissions are discovered later, they shall be made good by the Contractor at his own expense irrespective of any approval by the Engineer.

1.7 Technical Records

The Contractor shall submit to the Engineer not later than one month before commissioning draft copies in English of technical data as the following:

Information on suppliers (address, fax, telephone) of all pipes, fittings, other installations and materials, equipment and tools with full technical documentation.

Step-by-step description of the preparation for and commissioning of the pipelines and all installed devices.

Not later than at taking over of the Works, the Contractor shall provide four copies of instruction manuals in English to the approval of the Engineer to cover all details of normal operation of each item together with routine maintenance instructions.

1.8 As-Built Drawings

Prior to handing over of completed works and issue of the Completion Certificate, the Contractor shall prepare As-Built Drawings and submit these to the Engineer for approval.

1.9 Program for the Execution of Works

In accordance with clause 14 of the conditions of contract, the Contractor upon receiving Engineer's order to commence shall within 14 days draw up a working program setting out order in which the works are to be carried out with appropriate dates thereof together with delivery dates for materials. The Contractor shall together with his work program supply an expenditure chart showing monthly anticipated expenditure.
The program shall be deemed to have taken into account normal variations in climatic conditions to provide for completion of the works in the order and within the times specified therein.

The order in which it is proposed to execute the permanent works shall be subject to adjustment and approval by the Engineer, and Contractor's price shall be held to include for any reasonable and necessary adjustment required by the Engineer during the course of the works.

The Contractor shall carry out the Contract in accordance with the program agreed with the Engineer, but he shall in no manner be relieved by the Engineer's approval of the program of his obligations to complete the Works in the prescribed order and by the prescribed completion date and he shall from time to time review his progress and make such amendments to his rate or executions of the works as may be necessary to fulfill these obligations.

Once the proposed program is approved by the Engineer, the contractor shall not depart from the program without the written consent of the Engineer. In the event of unforeseen difficulties or disturbances arising, which forces the Contractor to depart from the approved program of Works, he shall advise the Engineer in writing of such occurrences without delay and submit proposals for any necessary remedial measures, for which he shall obtain the Engineer's approval before putting such measures into effect.

The contractor shall furnish the Engineer with a monthly statement of all works done on the contract and of all materials on site.

1.10 Trade Names

Trade Names and Catalogue References are given solely as the guide to the quality and alternative manufacturers of the materials or goods of equivalent quality will be accepted at the discretion of the Engineer.

All sampling of materials on the site must be done by or in the presence of the Engineer. All other samples will be deemed not to be valid under the Contract.

All material delivered to the site or intended for the works not equal or better than the samples approved by the Engineer shall be removed and replaced at the Contractor's expense.

1.11 Quality of Materials and Workmanship

The materials and workmanship shall be of the best of their respective kinds and shall be to the approval of the Engineer. In reading of these Specifications, the words "to the approval of the Engineer" shall be deemed to be included in the description of all materials incorporated in the Works, whether manufactured or natural, and in the description of all operations for the due execution of the Works.

No materials of any description shall be used without prior approval by the Engineer and any material condemned as unfit for use in the works shall be removed immediately from the site by, and without recompense to, the contractor. All works or parts thereof shall be in accordance with the latest edition of British Standard (B.S.) Specifications and British Codes of Practice (C.P.) as published by British Standards Institution.

All materials shall be of approved manufacture and origin and the best quality of their respective kind, equal to sample and delivered on to the Site a sufficient period before they are required to be used in the Works to enable the Engineer to take such samples as he may require for testing or approval, and the Contractor shall furnish any information required by the Engineer as to the quality, weight, strength, description, etc. of the materials. No materials of any description shall be used without prior approval by the Engineer and any material condemned as unfit for use in

the Works shall be removed immediately from the Site by, and without recompense to, the Contractor.

1.12 Protection from Water and Weather

Unless otherwise mentioned, the Contractor shall keep the whole of the Works free from water and allow in his rates for all dams, coffer dams, pumping, piling, shoring, temporary drains, slumps, etc., necessary for this purpose and shall make good at his own costs all damage caused thereby.

All materials shall be stored on site in a manner approved by the Engineer's Representative and the Contractor shall carefully protect from weather all works and materials which may be affected thereby.

No separate payment will be made for this and Contractor will allow in his rates for this.

The Contractor shall be deemed to take into account all possible weather conditions when preparing his tender and he shall not be entitled for extra payment by the reason of the occurrence or effect of high winds, excessive rainfall, temperature or any other meteorological phenomena.

1.13 Contractor's Monthly Progress Reports

The Contractor shall report monthly progress to the Engineer on charts submitted in triplicate showing actual work done superimposed on copies of his agreed program. He shall provide an explanation for any deviation from his program and shall in the case of delays propose strategies for improving progress.

The reports shall be delivered to the Engineer within one week after the end of each month.

The Contractor shall include with his monthly reports details of all plant, (including their values) and labor force employed on the Site together with a description of their deployment. He shall also provide a list of all materials intended for use in the Permanent Works delivered to the Site.

1.14 Forms for Monthly Statements

Monthly statements pursuant to Clause 42 of the conditions of contract shall be submitted in the manner set out hereunder on forms to be provided by the Contractor. Each statement shall be submitted to the Engineer through his representative, interim statements being in quadruplicate and the final statement being quantiriplicate (5Nos).

Such forms shall be printed or duplicated to the approval of the Engineer's Representative as soon as practicable after the order to commence the Work has been given.

Form for Monthly Statements – Page 1. Summary Sheet

FULL TITLE OF CONTRACT

Interim Statement No .....for period ending .....

SUMMARY

Tshs.

Total of billed items and Variation Orders:-

Section A: General :

B: :

C: :

D: :

etc. _____

Less: Retention money .....% Tshs.

(Limit Tshs.) Tshs._____

TOTAL AMOUNT DUE **Tshs.** _____

Less: Amount Previously Certified Tshs. _____

AMOUNT NOW DUE **Tshs.** _____

Signed .....Signed .....

(Engineer's Representative) **(For Contractor)**

Date: .....Date: .....

The measurement pages of the statement shall be set out as follows:

Item	Brief Description	Unit	In BOQ	In last Statement	Since Last statement	Total To date	Rate	Amount Tshs.

NOTES: a. Each page shall be numbered consecutively and blank pages shall be provided for listing Variation Orders .

b. The total of each page shall be carried to a collection sheet for each Section of the Bill of Quantities.

c. The first four columns and the Rate column shall be completed at the time of printing or duplicating.

Total and summary Sheet Tshs. _____

Page .....

1.15 Photographic Records

The Contractor shall provide a photographic record of the execution of the Works by having photographs taken at monthly intervals from such points as the Engineer may specify from time to time. The number of such photographs shall at least be fifty per month.
The Contractor shall supply three sets of colour prints, size 9 x 13 cm mounted on album sheets, dated and described.

1.16 Site Meetings

Site meetings will normally be held monthly, but will be called for whenever the progress of the works so require or when demanded by the Engineer.

The Contractor shall at all meetings be represented by a responsible representative other than the site Agent, who has the powers to commit the Contractor in all matters concerning the Contract.

In the event, no responsible representative of the Contractor is present at the meetings; any decision taken by the Engineer at the meeting will be binding upon the Contractor.

1.17 Contractor's Compounds

An item is provided in the Bill of Quantities to cover the cost to the Contractor of providing and maintaining the offices, compounds, workshop and housing necessary for the proper organization and superintendence of the Works. The necessary land for the compounds will be provided by the Employer.

The Contractor has to submit to the Engineer the layout and design of his compounds showing areas required for workshops, garages, concrete yards, stores, housing etc., for his approval.

On the completion of the Contract, the Contractor shall if so requested take down and remove all structures connected with his camp, and shall take up all pipes, drains and culverts, backfill trenches, fill up all latrine pits, soak ways and other sewage disposal excavations and shall restore the site as far as practicable to its origin condition and leave it neat and tidy to the satisfaction of the Engineer.

1.18 Accommodation and Transportation for Workmen

The Contractor shall provide and maintain suitable shelters and mess facilities for his workmen and supervisory staff. The facilities shall be of sufficient size and to a standard considered satisfactory by the Engineer. The Contractor shall throughout the contract provide an adequate supply of potable water for the workmen.

1.19 Normal Working Hours

The contractor shall inform the Engineer in writing, at the time of submitting the Work Program, the normal working hours. The contractor shall respect all Public Holidays. Where the Contractor wishes to work outside these hours, he shall request the Engineer in writing at least 24 hours in advance for consideration. The Contractor shall compensate the extra hours to his workers and Engineer's staff on duty, at his own costs.

1.20 Nominated Sub-Contractors and Nominated Suppliers

The Contractor shall be responsible for Nominated Sub-Contractor in every respect. In particular, it shall be the Contractor's responsibility to ensure that each sub-Contractor commences and completes the work in a manner so as to conform to the working program, as specified above. It is also the responsibility of the Contractor to ensure a satisfactory progress of the works and to ensure that the works are completed to a standard satisfactory to the Engineer.

1.21 Offices and Accommodation for the Engineer

The Contractor shall provide and maintain for the period of execution of the works, and remove on completion of the works Offices and Laboratory buildings for the Engineer and his staff. The offices shall be provided, decorated, furnished and equipped as indicated herein, shall be provided within the project area or at the contractor's compound, ready for exclusive use by the Engineer and staff within 14 days after the commencement date stated in the Notice to Commence. The Contractor's attention is directed to the condition that no payment for Advance Payment, or any part thereof, will be approved for payment under the Contract until the field office facilities indicated herein have been provided.

The office shall have as minimum 2 private offices, one conference room and one common area that can accommodate at least 2 desks, 4 filing cabinets, 1 plan table, and 2 bookcases, well lighted, air conditioned, with a toilet room containing a water closet and lavatory partitioned off from the working area. The water closet may be of the chemical type; provided that it is a flush type with an approved holding tank. The toilet room door shall be provided with a latch set. The office shall have an outside door lock.

Furnishings shall include desks, chairs, tables, bookcases, fans, heaters, kitchen appliances for making tea and coffee and electrical service.

The contractor shall maintain the photocopier in working order for the duration of the contract (Copier to be the property of the Employer on Contract completion).

The Contractor shall provide and maintain for the period of execution of the works or as otherwise directed by the Engineer Housing for the Engineer and his staff. The housing shall be provided, decorated, furnished and equipped as detailed in the Contract to the satisfaction of the Engineer.

Payment of Resident Engineer is obligation of the Contractor and his Engineer.

The Contractor shall provide sufficient and regular supply of fresh water and normal stationery and consumables and other office requisites required by the Engineer and his staff.

The Contractor shall also provide regular daily janitorial services during working hours. Offices shall be swept, dusted, and waste receptacles emptied. Toilet facilities shall be sanitized and cleaned daily, and paper supplies shall be replenished.

For the duration of the Contract;

a. The Contractor shall provide all assistance including laborers, chainmen, clerks and junior staff as and when required by the Engineer for checking, setting out, surveying measuring or for testing of work. The Contractor shall also provide a full time typist in the Resident Engineer's office.
b. The Contractor shall provide all tools and protective clothing, wooden pegs, iron pins and pickets, water cement and aggregate for concreting, transport for laborers and

materials as may be required by the Engineer and his staff for checking, setting out, surveying, measuring or testing of the work.

The contractor shall provide adequate first-aid equipment on the site, and ensure that at least two of his site staff is competently trained in first aid.

1.22 Equipment

Generally all Equipment shall be brand new.

Pickup Trucks - Supply two 4WD pickup cars, double cabin, long base and white in colour.

Backhoe Loader- Supply one backhoe loader complying with the following specifications:

Generator shall be heavy duty and equipped with diesel engine.

1.23 Tests and Test Certificates

Samples of all materials shall be deposited with the Engineer and approved prior to ordering or delivery to site. The engineer reserves his right to test any sample to destruction and retain samples until the end of the maintenance period. No payment will be made for samples and the Contractor must allow for costs of samples in the rates of prices. All materials delivered to site shall be equal or better in all respects than the samples delivered to the Engineer.

The Engineer may examine and may require testing of any materials or goods to be used in the Works at any place inside or outside of Tanzania. The Contractor shall give the Engineer unrestricted access to his and his Sub-Contractor's premises and suppliers for such purposes at all times.
The Contractor shall provide adequate means on site to identify the materials or goods with their respective test certificates.

1.24 Storage Spaces and Sheds

Suitable temporary stores and workshops shall be erected and later removed on completion of the works. All buildings shall be adequate for protection of the equipment or materials to be kept there-in and shall be constructed and located to the satisfaction of the Engineer.

1.25 Sanitary Arrangements

The Contractor shall provide and maintain sufficient sanitary conveniences for all operatives and site staff engaged on the Works. These shall be in accordance with any requirements and regulations of the Government of the Republic of Tanzania and subject to the approval of the Engineer. The ground shall be thoroughly disinfected at the end of the Contract.

The Contractor shall make sure that his personnel working on the site are medically fit, and he shall bear the cost of any medical test required to determine that his personnel are free from infectious diseases.

1.26 Water Supply

The Contractor shall provide water for use in the Works. He shall supply all hydrants, hose, corks, vessels and appliances necessary for the distribution there-of and shall provide pumps, tanks, carts, vessels and appliances, transport and labor when and where-ever it is necessary for water to be carted for use at the Works. All water used in connection with the Works shall if possible be obtained from a public water supply and the Contractor shall make all necessary arrangements and pay all the charges for connections to main and for water used.

1.27 Transport for the Engineer

The Contractor shall provide within 14 days after the commencement date stated in the Notice to Commence for the exclusive use of the Engineer one suitable good quality four wheel drive station wagon (e.g. Land cruiser or equivalent make) having a diesel engine capacity of not less than 1600cc and four 4WD double cabin pick up of diesel engine capacity of not less than 2400cc for the exclusive use of Engineer's site staff.

The vehicle shall be brand new, have a high quality alarm/immobilizer. It shall be licensed and insured for use on the public highway and shall have comprehensive insurance cover for any qualified driver authorized by the Engineer site staff together with any authorized passengers and carriage of goods or samples.
It shall not be lettered with any Contractors signs.

The Contractor shall provide fuel, oil and maintenance in conformity with the vehicle manufacturer's recommendation and shall clean the vehicles inside and outside as required. A suitable replacement vehicle shall be provided for any vehicle out of service for more than 12 hours. These vehicles shall be returned and be the property of the Client at the end of the contract.

The Contractor shall supply fuel for the vehicles on all business journeys and shall keep the vehicles fully taxed and insured for any licensed driver and maintained throughout the period of their use.

The Engineer shall have exclusive right of use of the vehicles stated in the Bills of Quantities and drivers shall be at the Engineer disposal within all working hours.

The Contractor shall bear all costs of purchasing the vehicle's road licenses, comprehensive insurances, safety belts, car identity protection, drivers, maintenance, fuel and lubricants and must keep the vehicles clean and in a good roadworthy condition throughout the Contract. The vehicle is however, to be registered in the joint names of Contractor and the employer.

All maintenance shall be carried out at the prescribed intervals by an approved dealer.

In the event of service and repairs with duration of more than one day, the Contractor shall provide suitable replacement vehicles to the approval of the Engineer.

The costs of the above shall upon presentation of receipts be paid against the Provisional sums entered in the Bills of Quantities.

At the completion of the works, the Contractor will bring each vehicle to the relevant dealer for testing. The dealer shall then recommend to the Engineer any necessary repairs in addition to the ordinary service. Upon such recommendation, the Engineer will give the necessary instructions.

The Contractor shall be solely responsible for safe custody of the vehicles during the construction period. In case of theft or loss of any vehicle, the Contractor shall replace such vehicle at his own cost. The registration book (log book) shall be deposited with the Engineer's representative and only taken by the contractor when renewing road licenses or similar activity.

1.28 Maintenance of the Engineer and his Staff Houses, Offices, Furniture and Equipment

For the entire duration of the Contract, the Contractor will:

- For rented houses, ensure that the landlord attends to any maintenance problems regularly. The furniture shall be maintained by the contractor.
- Keep all buildings provided by him, for the use of the Engineer and his staff, in well maintained, clean and fully habitable condition, and shall maintain all access roads, car parks, footpaths, fences, gates, drains, potable water supplies, gas, electricity and water-borne sewage disposal system in good stage of repair, all to the satisfaction of the Engineer.
- The Contractor shall maintain all furniture and equipment provided by him in a reasonable state of repair and usable condition and shall replace promptly any item which becomes unserviceable or is lost.
- The Contractor shall provide day and night watchmen for the Engineer and his staff houses whether rented or constructed by him.

The Contractor shall insert his rate against lump sum item included in Bills of Quantities for the maintenance of offices, houses equipment and furniture.

Payment for the maintenance of the Engineer and his staff house, offices furniture and equipment will be spread over in equal monthly installments, spread over from the time houses or offices as appropriate are taken over by the Engineer until the end of the Contract. (In event, no interim certificate is issued in any month then the installment shall be added to subsequent certificate).

1.29 Entry upon Land, Working Site and Adjoining Lands

- The employer shall provide land, right of ways and way leaves for the Works specified in the contract.
- If nothing else is mentioned, the Contractor will be allotted for execution of the works only the actual area as necessary for the extent of the construction.
- The Contractor shall give notice to the Engineer at least 30 days before he wishes to enter onto the land required to carry out the Contract.
- The Contractor shall on his own accord obtain rights of admission, and Rights of using all other areas which are necessary for storing and manufacturing or for setting up site offices and Resident Engineer's office or whatsoever will be necessary.
- No separate payment will be made to the Contractor on account of these items and the Contractor must make due allowance for them in his rates.

1.30 Existing Public Services

- The contractor shall acquaint himself with the positions of all existing overhead and underground cables, drains and other services before carrying out the works.
- Drains, pipes, cables and similar services encountered in the course of the Works shall be guarded from damage by the Contractor at his own costs to safeguard a continued

uninterrupted use to the satisfaction of the owners thereof, and the Contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.

- The Contractor shall on the Engineer's direction arrange for the construction of permanent or temporary diversions of the said drains etc., together with their reinstatement in liaison with the respective Departments, Bodies, Corporations or Authorities. The cost of such works or diversions including reinstatement shall be charged against the appropriate provisional Sum provided into the Bills of Quantities. The Contractor shall be at liberty, subject to the approval of the works, to bear the cost of reinstatement of additional diversions. No services may be tampered with by the Contractor, and all works in connection with any kind of services shall be carried out by their respective owners. It is the responsibility of the contractor to inform the Engineer immediately any existing service is exposed.
- Existing pipes and services being affected by the construction activities have to be adequately secured in co-ordination with the respective entities.
- Where in the drawings any crossing or parallel services are shown, their location and size are approximate only; the indicated services do not necessarily represent all the existing services.
- No work that will in any way inconvenience the travelling public shall be started until adequate provision, satisfactory to and approved by the Authority concerned and the Engineer, has been made to divert or by-pass traffic in safety and comfort.
- A road shall only be closed with the written permission of the Authority concerned. All diversions shall be maintained in good condition by the Contractor and shall be at least 6 m wide. All diversions shall be to the satisfaction of the Engineer, and where existing private or public roads are used as diversions, they shall be maintained and left in a good condition upon completion of the re-routing activity.
- The Contractor will be held responsible for any accidents relating to roadways, structures, services, stream crossings and for the proper direction of traffic in a manner approved by the Highway Authority, Police and by the Engineer. It shall be the Contractor's responsibility to obtain the permissions required.

1.31 Safety Measures for the Works

The Contractor shall erect and maintain adequate safety measures around all trenches and other open excavations in a manner sufficient to provide maximum safety to public and vehicles at all times.

Temporary bridges shall be provided across trenches to maintain reasonable and safe access for the public and vehicles when and where required to public land and private property on either side of trenches.

1.32 Security of the Works

All buildings, furniture and equipment provided by the Contractor for the Engineer's representative shall be insured by the Contractor against loss or damage by accident, fire, theft and other risks ordinarily insured against for the duration of the Contract. The theft shall include personal belongings of the tenants in the Resident Engineer's staff houses.

Unfenced openings and surface obstructions in populated area or used by traffic shall be attended by day and night and shall be adequately lit at night.

1.33 Record of Existing Damages at Work Sites

Before commencing trench or structural excavation the Contractor shall record any existing damage to adjacent buildings and notify the Engineer thereof. Failing to do so, the Contractor may become liable to make good such damage at his own expense as it may be considered a result of his activities.

Where the work is to be executed in private land, the Employer will be responsible for negotiating and obtaining rights of way and the serving of all notices as may be required upon the owners and/or occupiers of the land and it shall be the obligation of the Contractor to keep the Employer and the Engineer fully informed concerning the rate of progress and of his intention to enter and begin work within any way leave as provided for under the Condition of Contract and required by this Specification.

The Contractor shall be held liable for all damage and interference to mains and pipes, to electric cables or lines of any kind either above or below ground caused by him or his sub-Contractors in execution of the Works, whether such services are located on the Contract Drawings or not. The Contractor must make good or report to the appropriate authorities the same without delay and do any further work considered by the Engineer or owner. The contractor shall provide for these contingencies it the rates inserted in the Bills of Quantities.

If the Contractor fails to reinstate the damaged services within the time considered as reasonable by the Engineer's Representative, then the Engineer's Representative shall be empowered to get the damaged services reinstated by any other contractor and charges there-of shall be deducted from any money due to the Contractor.

1.34 Site Clearance

The Contractor shall break up and remove all buildings and superficial obstructions of the site in the way of, or otherwise affected by the works. He shall clear each part of the site at the times and to the extent required and approved by the Engineer.

Before commencing any site clearance, general clearance, clearance of pipelines etc., the Contractor shall inform the Engineer's Representative of his intention. The Engineer's representative will by visiting the section of works concerned, determine the extent of the clearance expressly required.

1.35 Temporary Works

The Contractor shall submit to the Engineer details and calculations where appropriate of all temporary works for checking and written approval at least eight weeks before he intends to start work.

Notwithstanding the foregoing, the Safety of the temporary works remains the responsibility of the Contractor.

1.36 Traffic Safety, Road and Railway Crossing

The Contractor shall provide and maintain all temporary roads, bridges and other work required for the construction of the Works including access to quarries, borrow-pits, accommodation etc.

Wherever the pipelines cross classified roads and railway line, the Contractor will contact the relevant authorities in advance and obtain necessary permission to dig across the road and railway-line in accordance with requirement of the authorities concerned and shall pay any royalties connected with this work, and the Contractor will provide temporary detour road together with any warning signs necessary. There will be no separate payment for this and cost of all expenses connected with road and railway crossing for which no separate items have been included in the Bills of Quantities.

1.37 Temporary Diversion of Traffic

The Contractor shall construct temporary diversions wherever the works will interfere with existing public or private roads, tracks or paths.

Diversions must be constructed in advance of any interference with the existing way and shall be maintained in a condition satisfactory to the Engineer for as long a required.

The provisions of this clause do not apply to any temporary access which the Contractor may construct of his sole use in the execution of the works.

1.38 Control of Construction Noise

The Contractor shall employ the best practical means to minimize noise and vibration produced by his operations.

1.39 Setting Out of Works

The Contractor shall supply surveying instruments, tapes etc, as detailed in the Contract for the exclusive use of the Resident Engineer and his staff during the period of execution of the works or as otherwise directed.

The contractor shall clear the site and set out the Works well in advance to enable the Engineer to inspect and approve the setting out prior to commencement of the Works. The Contractor shall amend at his own cost any error due to inaccurate setting out.

The levels and coordinates of the bench marks and control points will be determined on site and approved as necessary by the Engineer. The levels and coordinates shall be based on the data of bench marks provided by the Engineer.

1.40 Borrow pits

No borrow pit or access road shall be opened up without the approval of the Engineer and the permission in writing of the landowners.

1.41 Backfilling of Holes and Trenches

The contractor shall immediately upon approval of any work at his own expense and to the satisfaction of the Engineer backfill all holes, trenches and temporary quarries which have been made (except permanent borrow pits), level all mounds or heaps of earth that may have been raised or made and clear away all rubbish caused by the execution of the work. The Contractor shall bear and pay all costs, charges, damages, and expenses of any kind whatsoever which may occur by reason of holes and trenches connected with the Works or materials, tools or plant being left or placed in improper situation.

1.41 Liaison with Police, etc

The Contractor shall keep himself in close contact with the Police, Labour Officers and other officials in the areas concerned regarding their requirements in the control of workmen, passage through townships, or other matters and shall provide all assistance and/or facilities which may be required by such officials in execution of their duties in connection with the Works.

1.43 Explosives and Blasting

The Contractor shall provide suitable storage for explosives and other dangerous materials which shall be approved in writing by the Engineer.

1.44 Signboard

The Contractor shall provide and erect a signboard of approved design measuring not less that 1m by 2m at the entrance of the works, and elsewhere as directed, which shall state the title of the works as in the tender documents, and the names of the Employer, the engineer, and Contractor and Nominated sub-contractors if any.

1.45 Inspection of Works

No part of the Works shall be built in or covered over until it has been inspected and approved by the Engineer and the Contractor must give due notice in writing to the Engineer's Representative when any part of the Works are ready for inspection.

1.46 Substantial (Practical) Completion

Substantial or Practical Completion of Works is to be understood as a state of completion, which leaves out only minor outstanding items that can be readily completed within a period of less than 1 month without interfering with the normal operation of the Works.

The works will not be considered as substantially or practically completed without the works being capable of being used by the Employer in accordance with the purpose of the works. This means amongst other things, that all final tests to the works have been carried out, the pumping stations and treatment plants fully operational to the required capacity, operation manuals provided and clearance of the site upon completion of the works has been carried out, all to the satisfaction of the Engineer.

The Contractor shall allow for a period of one month for the completion by others of as built drawings before the works are handed over to the Employer.

Before final acceptance upon the completion of the Works, the Contractor shall, at his own expense, remove and dispose of all rubbish and remove all equipment, surplus materials, camps and buildings, which the Contractor has provided, and temporary works ordered by the Engineer and shall leave the Site absolutely clear thereof and in good order and condition to the entire satisfaction of the Engineer.

2. MATERIALS

2.1 Submission of Samples

The Contractor shall submit to the Engineer a list of suppliers from who he proposes to purchase the materials necessary for the execution of works. Each supplier must be willing to admit the

Engineer or his representative to his premises during normal working hours for the purpose of obtaining samples of the material in question. Alternatively, if required by the Engineer the Contractor shall deliver the samples of the materials to the Engineer's office. Samples shall be taken in accordance with the relevant British Standard where applicable.

No sources of supply shall be changed without prior approval.

All sub-standard material or material which becomes damaged or contaminated or deteriorates so as not to comply with this specification shall be rejected by the Engineer and shall be removed from the site immediately and replaced at the Contractor's expense.

2.2 Aggregate for Concrete

Aggregates for concrete shall consist of naturally occurring material complying with the requirements of BS 882 and 1201 Part 2: 1973 Aggregates from and sources for concrete.

The aggregates shall be free from dust, decomposed material, clay, earthy matter, foreign substances or friable, or laminated material. The fine aggregate shall be of approved river sand.

For structural concrete of specified compressive strength 40 N/mm2 or more at 28 days, the 'ten per cent fines' value of the coarse aggregate determined in accordance with shall not be less than 100kN and for other structural concrete not less than 50kN

Coarse and fine aggregates shall be stored on the sites in separate heaps so that no possibility of any intermixing of the two shall occur. Any materials, which have become intermixed, shall be removed by the Contractor forthwith.

A sample of all aggregates shall be delivered to the site for the approval of the Engineer, and it shall remain on the site until all concrete work is finished.

Should the Engineer so require, the Contractor shall furnish a certificate from an approved testing laboratory in connection with each source of fine and coarse aggregates showing that materials comply with the specification. All such testing shall be carried out at the Contractor's expense.

2.3 Cement

Ordinary Portland cement shall normally be used and shall comply with the requirements of BS 12 Part 2:1971. Portland cement (ordinary and rapid hardening)

Cement shall be stored in a weather proof shed with poised floor of approved design. Any cement damaged by water or proving defective shall be removed from the site immediately.

2.4 Water for Concrete

All water to be used for concrete, mortar and curing shall be of good drinkable quality, free from humus acid, chemicals, salts or other matters that in any way whatsoever, may be harmful to the concrete, either by diminishing the strength or causing a discolouration of the concrete.

Generally, water from Public mains shall be used, but if this is not possible, the contractor shall obtain water from other sources approved by the Engineer. The contractor may be requested to provide test analysis according to BS 3148 from an approved laboratory.

2.5 Admixture

Admixture of any kind of accelerating the setting of cement, plasticizers, water proffers, etc. shall not be used except by written permission of the Engineer. The Contractor must by request supply all details of any admixture.

2.6 Mortar and Grout

Mortar and grout shall be mixed in the proportions given in Table 2.6 according to the mortar class described in the Contract.

For work in which a Class 3 and 4 mortar is required, the Contractor shall select the appropriate mortar from one of the mixes for this class given in Table 2.5. If this works is to be carried out in the frosty weather and the bricks are wet when laid, then a 1:5-6 cement, sand mortar with an approved air entraining plasticizer shall be used. The plasticizer shall be free from calcium chloride or similar salts.

Table 2.5: Mortar Mixes

Location	Class of Mortar		
External Walls above D. P. C External Walls below D.P.C Engineering Construction Internal Walls	3 2 or 3 2 4		
Class	Proportions By Volume		
	Portland Cement: Sand	Portland Cement: Lime: Sand	Portland Cement: Sand with Plasticizer
1 2 3 4	1.2 1:3 1:3	 1 : 5 – 6 2 : 8 - 9	 1 : 5 – 6 1 : 8

The proportions of lime given in Table 2.5 are for lime putty. If the lime is measured as the dry hydrate, the amount may be increased up to 1 ½ volumes for each volume of lime putty. Where a range of sand contents is given in Table 2.5, the higher shall be used for sand that is well graded and the lower for coarse or uniformly fine sand.
Sand shall be natural sand or crushed natural stone or a combination of both as specified in BS 1200: 1955 Building sand from natural sand.
Mortar shall be mixed thoroughly either by hand or mechanically until its color and consistency are uniform. Mortar which has begun to set or which has been mixed for a period of more than 30 minutes in the case of Classes 1 and 2 mortars, or more than 2 hours in the case of other classes shall be discarded.

2.7 Steel Reinforcement

Mild Steel bar reinforcement shall comply with the requirements or BS 4449:1969 Hot rolled steel bars for the reinforcement of concrete.

Cold worked steel bar reinforcement shall comply with the requirements of BS 4461:1969 cold worked steel bars for the reinforcement of concrete.

Steel fabric reinforcement shall comply with the requirement of BS4483: 1969 Steel fabric for the reinforcement of concrete.

The Contractor shall procure and furnish to the Engineer certificates from the manufacturers that all steel supplied is in accordance with these conditions.

Reinforcement shall be accurately placed and maintained in the position shown on the drawings. Unless otherwise approved all intersecting bars shall be tied together and the ends of the tying will shall be turned into the main body of the concrete.

The Contractor shall use approved methods for supporting the steel in the correct position

Unless otherwise described in the Contract the following concrete cover to all steel reinforcement shall be used:

a.	Internal	20mm
b.	Below ground	75mm
c.	External above ground	40mm
d.	Columns	40mm to main steel

2.8 Timber

Timber for structural use must comply with the requirements of CP. 112. Timber for carpentry and joining shall be governed by the relevant clauses in Section 2 of this Specification.

2.9 Bituminous Materials

Unless otherwise directed by the Engineer the binder will conform to the Central African Standard A 12 for straight run bitumen grade 80/100 Penetration.
Cutback grades of bitumen shall comply with the requirements given in Table B2 for grades M.C. 30, 70, 250, 800, 3000.
Bitumen emulsion used shall comply with BS 434 except that the bitumen to be used in the manufacturer of the emulsion shall be grade 80/100 Penetration complying with Central African Standard A. 12.

2.10 Nails

Nails shall comply with the requirements of BS 1202.

2.11 Paint and Other Protective Coatings for Steelwork

All paints shall be obtained form approved suppliers. Unless otherwise agreed, all paints forming part of any one painting system shall be obtained from the same source. Paint shall be supplied in sealed containers of not more than 5 litre capacity and shall be used in strict rotation. Unless otherwise agreed samples of paint of not less than 2.5 liters shall be submitted for testing to the Engineer or his nominated testing authority.

2.12 Brick

Bricks shall comply with the particular requirements of BS 3921: Part 2, or BS 1180 as described in the Contract.
Bricks for the construction of machines, inspection chambers, catch pits, etc. shall be clay engineering bricks conforming to BS 3921 Class B unless otherwise directed.
Samples of all bricks shall be submitted for approval before us.

2.13 P.T.F.E. Tape

Polytetrafluoroethylone tape for thread sealing applications shall comply with the requirements of BS 4375.
The tape shall be supplied on spools and shall be approximately 12mm wide by 0.075mm tick.
The tape shall be wound from the unscrewed portion of the bolt or pipe in a direction counter to the thread, with a 50 percent overlap, to completely cover the treads without protruding at the end, and using sufficient tension for the tape to assume the form of the thread. Wrapping shall be done immediately prior to assembly of the joint.

2.14 Electrodes for Welding

Welding electrodes for the manual are welding of grades of steel to BS 4360 shall comply with the requirements of BS 153: Part 1, BS 639 and BS 1719: Part 1.
Electrode wires and fluxes for submerged arc welding shall comply with BS 4165.
Weld metal deposited by an automatic or semiautomatic process except submerged are shall comply with the requirements of BS 153: Part 1.

2.15 Fencing Wire

Fencing wire shall comply with BS 4102

- Plain wire shall be 6 S.W.G galvanized wire.
- Barbed wire shall be twin ply 12 ½ S.W.G , galvanized wire.
- Chain link mesh shall consist of 12 S.W.G galvanized wires with 62 mm mesh size.

2.16 Bolts, Nuts and Washers

Mild steel bolts and nuts shall comply with the requirements of BS 153: Part 1 and either BS 916 or BS 2708.
Structural quality high tensile steel bolts and nuts shall be manufactured from materials as specified in BS 153: Part 1.
Special quality high tensile steel bolts and nuts shall comply with the requirements of BS 153: Part 1 and either BS 1768 or BS 1083.
High strength friction grip bolts, nuts and washers shall comply with the requirements of BS 3139.
Special quality high strength friction grip bolts, nuts and washers shall comply generally with the requirements of BS 3139 for dimensions and BS 1768 for material.
Plain and tapered washers other than for high strength friction grip bolts shall comply with the requirements of BS 153: Part 1 and 3410.

2.17 Joint Sealing Compound

Poured joint sealing compound shall consist of hot or cold poured material as described in the Contract.
Hot poured compound shall comply with the requirements of BS 2499.

3. EARTH WORKS

3.1 Definitions

The following definitions of earthworks materials shall apply:

'Formation Level' shall mean the surface level of the ground obtained after completion of the earthworks.
'Sub grade' shall mean all material either naturally occurring or imported below formation level.
'Topsoil for Re-use' shall include any of the "red soils" and shall be taken as being uniformly 250mm thick. This material shall be stored in heaps not exceeding 2m in height and shall be spread over the excavated areas during reinstatement and replanted with plants, trees, bushes etc., at least equal to those existing before the ground was disturbed.
'Murram' shall be from an approved source quarried so as to exclude vegetable matter, loam, to soil or clay. The California Bearing Ratio of the murram, as determined for a sample compacted to maximum density (as defined under B. S. 1377) and allow 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.

3.2 Right of Way

Right of Way shall be the area(s) allocated to the Contractor to enable execution of the Works in accordance with the Contract. Due to physical statutory other special conditions the working width of Right of Way may be restricted (including restricted access to working sites). The Contractor is deemed to have included in his Contract Price all costs encountered for complying with such restrictions.

In general the maximum working width (Right of Way) for any section of trench work in the city street, agricultural land, garden, etc. shall be not more than 5 m. For access to the site of Works the working width shall be not more then 6 m. For isolated compact sites an all around width of 12 m beyond the net sizes of the units will be allowed, unless the area is otherwise defined by the Engineer.

All fences, walls, structures, buildings, etc. affected by the Contractor's work shall be reinstated to the satisfaction of the owner and the Engineer.

Trees within the Right of Way may be cut down only after having received the City Council's and the Engineer's permission. Any damage to trees, whether accidental or otherwise, shall be reported to the Engineer.

3.3 Measurement of Excavation Work

Excavated material will be measure, in cubic meters in excavation to the lines shown on the drawings or described in these specifications and will include only material that is actually removed at the direction of the Engineer.
Where excavation lines are not shown on the drawings, the excavation will be measured to the most practicable lines, grades, and dimensions as directed by the Engineer.
Pipe trenches are measured in linear meters as one item for each pipe size with a minimum width and depth as indicated on the drawings. Extra excavation for deeper trenches will be measured on cubic meters and paid for where ordered by the Engineer.

Rates for excavation shall include for all labor, equipment; preparation of bottoms for receiving concrete or granular soil beds; for forming joint holes where applicable, for preserving surfaces of excavation; for returning excavated material as rammed backfill and for carting away surplus to dump.

Further, the rates in the Bills of Quantities for excavation in open cut shall include the entire cost of:

- Transportation of materials from the excavation to points of final use, to disposal areas, to temporary stockpiles, and from temporarily stockpiles to points of final use.
- Re-handling the excavated materials which have been deposited temporarily in stockpiles.
- Removal of oversize materials from otherwise suitable materials and disposal of the same.

No extra payment shall be made to the Contractor for working in confined space or if the position of the Works as set out or ordered will not allow the use of mechanical excavators.

50% of the rate for excavation, backfilling and disposal of surplus materials will become due for payment when trenches have been backfilled to a depth of 150 mm over the pipe barrel. Excavation for structure foundations will be authorized for payment of 50 % of the rate, when the excavation has been approved and the surface blinded.

3.4 Excavation Rates

The rates for excavation shall include for:

- Excavation in any material other than Rock.
- Careful removal, storage and replacement of top soil as directed by the Engineer.
- Bulking of the excavated material.
- Temporarily supporting the sides of the excavations.
- Additional excavation to accommodate the temporary supports and all working space necessary to carry out the work together with all subsequent backfilling and compaction using approved excavated material.
- Keeping the excavations clear of water (including groundwater) and all dirt at all times until pipe laying and testing or construction work is completed and permission for backfilling is obtained.
- Trimming, compacting and protecting the formation level.
- Formations of all temporary spoil heaps and all double handling necessary, and carting away excess material to tip.

All surface areas for which items for stripping turf and top soil have not been included in the Bills of Quantities and which have been disturbed by the Contractor's workings or operations shall be reinstated to the original condition including providing and laying top soil to a minimum thickness of 150 mm all at the Contractor's expense where directed by the Engineer.

3.5 Excavation in Open Cut

All open cut excavation shall be performed in accordance with this section to the lines, grades and dimensions shown on the drawings or as directed by the Engineer. The Engineer reserves his right to at any time during the progress of the work to vary the slopes or dimensions of the excavations from those previously specified.

In the case of excavations in roads, and in other cases which in the opinion of the Engineer are likely to cause interference to the public, the Contractor shall organize his

operations in such a way as to reduce to a minimum the interval between opening up and backfilling the excavations. No permanent work shall commence until the Engineer has inspected and approved the excavation

Construction traffic shall not use the bottom surface of cuttings unless the cutting is in rock or the contractor maintains the level of the bottom surface at least 300 mm above foundation level. Any damage to the sub-grade arising from such use shall be made good by the Contractor using suitable material approved by the Engineer.

Any excess depth excavated below the formation level shall be made good by backfilling with suitable material well compacted.

3.6 Foundation for structures

'Common material': The bottom and side slopes of common material upon or against which concrete is to be placed shall be finished accurately to the established lines and grades, and loose materials on surfaces so prepared shall be moistened with water and tamped or rolled with suitable tools and equipment to form a firm foundation for the concrete structure. If, at any point in common material, material is excavated beyond the established excavation lines, for any reason except by written orders from the Engineer, then the over-excavation resulting voids shall be filled with consolidated concrete Grade 10 at the Contractors expense.

If the excavation is carried out in advance, a protective layer of 150 mm thickness shall be left above the foundation level until immediately before the Contractor is ready to pour the blinding concrete.

The Contractor shall, at his own expense, make good with suitable material or concrete as directed by the Engineer any excavation greater than the let volume required for the works or any additional excavation below the bottom of the foundation level required to remove material which the Contractor has allowed to become unsuitable.

Any road bottoming and surfacing material which the Engineer deems suitable for re-use shall be laid aside and kept separate from other excavated materials.

3.7 Trench Excavations for Pipe laying

- Trenches for pipelines shall be excavated to a sufficient depth and width to enable the pipe and the specified or other approved joint, bed, haunch and surround to be accommodated.
- The width of trenches shall be within the limits of width shown in Table 3.10.
- Where rock or boulders are present in pipe trenches the side of the trench shall be so trimmed that when the pipe is laid to the correct level and alignment no project of rock come within 100mm of the outside of the pipe barrel at any point.
- The Contractor shall fill up with well compacted granular bedding material or with concrete where ordered by the Engineer, any excessive depth of trench arising from his method of working.
- Where directed trenches close to existing structures partly filled with concrete or other approved material.
- All surface material including top soil which differs in any nature whatsoever from the sub-strata shall in every case be carefully set aside and stored separately from other

excavated material. No extra claim will be allowed for setting aside surface matter or topsoil for later use.

- Trench excavation shall be carried out with great care, true to line and gradient and as near as practicable to the size required for construction of the permanent work. Nowhere shall the external dimensions of the excavations be less than the dimensions of the permanent work shown on the Drawings or directed by the Engineer.
- If the bottom of the excavation becomes weathered prior to pipe laying, due to fault of the contractor, the weathered soil shall be replaced with suitable compacted material to the original formation level at the contractor's expense. The pipe trench shall be excavated to a depth of 150 mm below the invert level of the pipe and refilled with sand, gravel or other selected materials free from stones and well rammed in order to provide a smooth bed for the pipes.
- Where concrete pipes are laid in concrete, the pipe trench shall be excavated to a depth of 150 mm below the invert level or the pipe and the width shall be equal to the breadth of concrete bedding for the pipes plus 150 mm on either side.
- No pipes shall be laid and no excavation filled in or covered with concrete until the formation has been inspected and permission to proceed with the work obtained.
- Where UPVC or HDPE pipes are being laid, the bottom of the trench must be completely free from stones, and a smooth bed of fine material must be provided. Where the bed of the trench for UPVC or HDPE pipes is excavated in rock, this must be to a depth of not less than 100 mm below the bottom of the pipe, and refilled with selected fine granular material to make a smooth bed for the pipe.
- The width of the trench to be excavated will depend on the size and type of pipe being laid as specified on the drawings. Sufficient width must be excavated to allow the pipe to be correctly bedded and aligned, and to allow for the joints to be correctly made. Generally, the grade of the pipe will conform to the grade of the ground, but the excavation must be deepened where necessary to avoid backfills in any section. Minimum gradients for sewer lines are shown on the drawings.
- Any excavated material stored on site for backfilling or other purposes shall be deposited alongside the excavation at a minimum distance of 0.5 m in such a manner that it will cause no damage and as little inconvenience as possible.

3.8 Trench Widths

The minimum width is that width between the faces of the soil required to ensure the correct placing and compaction of bedding materials equally on either side of the pipe. All sheeting and supports are to be outside this width.

The maximum width is that between the faces of the soil which has been in the structural design of the pipeline and it includes an allowance for sheeting and tolerance.

Table 3.10 Trench Width for Pipelines

Nominal Internal diameter mm	Minimum Trench width mm	Maximum Trench width mm
100	430	630
150	490	690
225	580	780
300	680	880
375	950	1150
450	1030	1230
525	1120	1320
600	1240	1440
675	1330	1530
750	1400	1600
825	1490	1690
900	1920	2120
105o	2100	2300
1200	2290	2490
Above 1200	Outside diameter of pipe plus 800 mm	Outside diameter pipe plus 1000mm

3.9 Refilling Excavations

- No backfilling or refilling shall commence without the Engineer's approval.
- The refilling of excavations shall be commenced as shown as practicable after the permanent works have been tested where so required and inspected and approved by the Engineer. In particular, the back filling of trenches shall be carried out expeditiously to reduce lengths of trenches open at any one time.
- As soon as UPVC or HDPE pipes are laid and jointed in their final positions, they should be protected from possible damage by carefully backfilling of fine granular material brought up to about 150 mm over the top of the pipe, for the full width of the trench, and well compacted.
- Joints must be left open for inspection until the pressure test is completed.
- Backfilling shall be executed with selected materials in 150 mm layers (for a 300 mm layers, a mechanical hammer are used) each layer being well rammed and watered to obtain the maximum compaction. Care shall be taken to ensure that no stone or other material, which could damage pipes or other work, is placed within 300 mm of such work.
- Regardless of the means of backfilling adopted, it is the Contractor's responsibility to ensure that he satisfactorily backfills all excavations and causes no damage to permanent work or adjacent structures, and he shall at his own expense take all steps necessary to comply with this obligation.
- The Contractor shall at all times be responsible for damage caused to permanent work through his backfilling operations or throughout he premature opening to traffic of a backfilled surface.
- Where required to meet the specification for testing pipelines, trenches shall be partially backfilled to provide anchorage but joints shall be left exposed.

3.10 Reinstatement of Surfaces

- Generally all trenches and backfilled excavations shall be reinstated to equal surface as before excavation.

- Trenches in any existing road shall be refilled to the level of natural soil below the road with sub-soil in 75 mm layers, each layer being carefully tamped with rammers. The remaining top layer shall be filled to the road surface with materials equal in type, quantity and compaction to materials used for the existing road.
- The trench shall then be left to settle for 30 days. At the expiration of this period, the surface shall be made up to level and tamped or rolled to the approval of the Engineer, who will decide on the particular surfacing employed in accordance with the existing surface of the road.
- Where shown on the drawings or directed by the Engineer existing ditches shall be cleared by removing vegetable growth and deposits. The sides shall be trimmed throughout and the bottoms uniformly graded. The ditches shall be kept clear and maintained for the period of the works. Materials removed from existing ditched shall be disposed of in approved tipping areas clear of the site.
- Before expiration of the maintenance period, the Contractor shall make good any defaults in reinstatements.

3.11 Excavation to be kept Free from Water

- Where excavations are required below the existing water level, the Contractor shall make arrangements to keep the excavation dry and shall produce drawings and written explanations of the method to be used to enable the Engineer to determine the adequacy of the method, before commencing the excavation.
- Except where provision for dewatering is made elsewhere within the contract the contractor shall allow for this in his rates for earthworks.

3.12 Removal of Surplus Excavated Material

- Excavated material, which is not needed either for backfilling trenches or other excavations or use in embankments or otherwise, shall be removed and disposed of to tipping places obtained by the Contractor. All rubbish and waste material shall similarly be removed by the Contractor. All Surplus excavated material shall be spread and levelled in the tipping places in accordance with such directions as the Engineer may give, and the Contractor's rates for disposal shall include for the costs of such operations.
- The contactor shall take every practical precaution against causing any nuisance, damage, injury or inconvenience in the handling, stacking, carting or disposal of excavated materials or any other operation matter or thing in connection therewith.
- No excavated material shall be placed in any position here it may be washed away or may be liable to fall or spread into any private property or across a road or footpath, should such occur, the Contractor Shall forthwith remove the same at his own costs.
- Should the Engineer direct the Contractor to tip certain surplus excavated materials in a particular place (other than the tipping places obtained by the Contractor) the Contractor shall abide by such instruction and shall make no charge in consequence thereof unless the place specified entails a longer haul than what would be incurred by tipping at the place or places obtained by the Contractor.

3.13 Borrow Pits.

- No borrow pits will be allowed to be opened on the site unless permission in writing has been obtained from the Engineer.

- Before the excavation of an approved borrow area is commenced, the Contractor shall clear the surface and strip the topsoil in accordance with Clauses 3.4.1 and 3.4.2.
- Measurement for payment of excavation in borrows areas will only include for the quantities of materials utilized for construction of embankments etc. Any costs of excess excavated material, except if directed by the Engineer shall be borne fully by the Contractor.

3.14 Hardcore and Earth Filling

- The hardcore shall be well packed, rammed and where possible rolled with a 5 ton roller. Where rolling is impossible, compaction shall be by hand or by mechanical tampers. Before any concrete is laid on hardcore, the hardcore shall be levelled and blinded with fine stone chipping, rolled and watered as necessary. Hardcore filling is measured after compaction.
- Earth not suitable to be used in filling may at any time be rejected by the Engineer. If there is a deficit of soil, the Contractor shall from approved borrow pits supply selected material in the ordered amount.
- Before commencement of filling, the topsoil shall be removed, if so ordered by the Engineer. The removal of this layer will be separately priced in the Bills of Quantities. The contractor shall carry out the forming of embankments in accordance with the drawings and shall adhere to the slopes, levels, depths and heights shown thereof.
- Before earth filling, the sand or gravel bedding of the pipes, according to the drawings shall be made. Soil filled to 500 mm over the top of pipes shall be free from stones and be filled in by hand with the utmost care to avoid replacement of pipes

3.15 Compaction of Fill

- The 500 mm fill over the pipe shall be compacted carefully by hand. In other areas, after removal of topsoil as specified, fill material shall be spread in even layers over the full width of the area to be filled. Each layer shall not exceed 300 mm in thickness after compaction.
- The water content of the earth fill material prior to and during compaction shall be distributed uniformly throughout each layer of the material. The allowable ranges of placement water content are based on design considerations. In general, the average placement water content will be required to be maintained at the Proctor Laboratory standard optimum condition. This standard optimum water content is defined as, "That water content which will result in a maximum dry unit weight of the soil when subjected to the standard Proctor Compaction Test".
- As far as practicable, the material shall be brought to the proper water content in the borrow pit before excavation. Supplementary water, if required, shall be added to the material by sprinkling on the earth fill and shall be mixed uniformly throughout the layer.
- The number of tests to be made shall be agreed upon by the Engineer and the Contractor at commencement of the work.
- The Contractor shall take care that each separate layer is formed with side slopes to ensure that water cannot gather on the surface, thus causing softening of the soil. Compaction shall start from the side of the embankment and continue towards the middle.

- On completion of the embankment to formation level and stipulated side slopes, the layer of topsoil shall be applied. Earth fill is measured after compaction.

- Any new layer of less than 100mm in compacted thickness shall be bonded to the underlying material by scarifying the latter to a depth of not less than 22mm. The total depth of loosed and added material shall not be less than 100mm after compaction.
- The compacted density (Field Dry Density) at any point in the fill shall not be less than ninety three percent of the Higher Compactive Effort Density unless otherwise directed. The California Bearing Ratio shall be at least 10.
- Where directed the density of the upper 150mm layer of the sub grade in cuttings or fills shall be raised to a higher density by scarifying and re-compaction of material.
- Rock fill shall be compacted by at least 12 passes of a towed vibrating roller with a static load per 100mm width of roll of at least 1.75, or other approved plant.

3.16 Compaction Trials

- Compaction trials as described herein shall be held to determine the type of compaction plant and number of passes to be used but results obtained shall be considered as a guide only.
- At the last commencement of construction, compaction trials shall be carried out by the Contractor in fill areas selected by the Engineer using the actual items of compaction plant which he proposes to use in the works.
- The Contractor shall test one item of each different class and/or weight of compaction plant to be used on the fill selected.
- The method conducting the compaction trials shall be as described hereunder:-
- A layer of material to be used in the fill construction shall be laid in the fill area to a depth which gives a compacted thickness of 150mm and its moisture content adjusted to within 1% and 2% of the Higher Compactive Effort optimum moisture content.
- The layer shall then be given an agreed number of passes of the compaction plant after which agreed number in situ density tests shall be carried out at locations chosen by the Engineer. This process shall be repeated with additional passes until the required degree of compaction is reached.
- The Contractor shall be responsible for carrying out all necessary tests in connection with the trials to the Engineer's approval, and shall present the test results to the Engineer.

- The Contractor shall be responsible for carrying out all necessary tests in connection with the trials to the Engineer's approval, and shall present the test results to the Engineer.

3.17 Water Courses

- Excavation carried out in the a diversion, enlargement, deepening or straightening of watercourses shall include the operations of any necessary trimming of slopes, grading of beds, disposal of excavated materials for dealing with the flow of water.
- The beds and sloping sides of water course shall be protected against the action of water as directed in the contract.
- Where watercourses have to be diverted from the sites of embankment or other works, the original channels shall be cleared of all vegetable growth and soft deposits and carefully filled with suitable material deposited and well compacted.

3.18 Grass Planting and Top Soil

- Top soil shall be selected vegetable soil, well compacted and except where otherwise specified by of 150 mm thickness.
- The Contractor shall trim the faces of the side slopes to open channels and elsewhere where directed to the dimensions, inclinations and curves shown on the Drawings, remove all excess material and make good all depressions with suitable material.
- Where instructed by the Engineer, the Contractor shall plant approved grass at the rate of 16 plants per m2 corresponding to 250 mm c/c. The Engineer shall satisfy himself that natural growth of grass will not take place within a reasonable time before instructing the Contractor to grass specified areas.
- The Contractor shall re-plant areas greater than 200 mm x 200 mm which show germinations. Planting will be deemed successful where at least 80% of the splits take root.

3.19 Ant- termite proofing

Where an ant- termite proof course has been specified, it should be made by application of approved concentrate diluted one part concentrate to forty pars water (by weight) at the rate of 5 liters solution to 1 sq. meter to the whole area of the building immediately before (36 hours maximum) the concrete is poured. Additionally to all critical areas, i.e. both sides of wall foundations, piers and porches the application should be 5 liters per running meter. Treatment should not be made when the soil is excessively wet. Precautions should be taken to prevent disturbance of the treated areas before they are covered. Ant- termite proofing is measured in square meters.

3.20 Construction Procedure – Concrete Bedding

- The concrete bedding shall be formed to the dimensions given in the Drawings.
- Lateral support of the pipe by the bedding material is essential for the structural stability of the pipe and care must be exercised in placing and compaction of the bedding material.
- The trench shall be bottomed to the dimensions given in the Drawings
- Where soft areas below formation level have been the Engineer may instruct that a 50 mm thickness of concrete, be placed over the approved fill material for the full width of the trench. The concrete shall be finished at a level to allow the full thickness of bedding to be placed subsequently below the barrel and socket of the pipe.
- Concrete bedding to pipes shall not be placed without the consent of the Engineer.
- The concrete for bedding shall be suitably protected and cured and no backfilling shall take place until the concrete has attained minimum cube strength of 10.0 N/mm².
- After laying the pipe the concrete shall be carefully placed on one side of the pipeline only and worked under the pipes ensuring that no voids are left below the pipes. It shall then be brought up equally on each side of the pipe to the required finished level care being taken to prevent floating of pipes.
- Trench supports shall be withdrawn in steps to minimize disturbance of the pipe and its bedding.
- The concrete shall be carefully placed and vibrated to avoid disturbance of the pipes.
- Where the pipes are temporarily supported on hard blocks to allow space between the pipe and trench formation to receive the concrete bedding the blocks shall include a layer of compressible material as a contact padding to ensure complete support of the

pipe by the concrete bedding and to avoid bridging of the pipeline between the support blocks.

- Upon consent of the Engineer the trench shall be backfilled.

3.21 Construction Procedure – Granular Bedding and Pipe Cover

- The material shall preferably be clean hard coarse sand, or broken stone or gravel. Limestone shall not be used. Broken stone or gravel shall pass a 5 mm sieve and shall be retained on a 0.5 mm sieve. The material shall be readily compactable. Locally excavated material shall be graded conform to the above requirements. The proposed material shall be submitted to the Engineer for approval.

- Sand or granular bedding for the pipes shall be as follows:

1. Under: Shall have a minimum thickness of 150 mm.
2. Sides: Shall be for the full width of the trench.
3. Cover: Shall be a minimum thickness of 300 mm.

- The bedding shall be evenly spread and carefully compacted up to the level of the underside of the pipe barrel and the surface worked to the correct gradient.
- After laying the pipe the bedding shall be brought up evenly on each side of the pipe in carefully compacted layers, not exceeding 150 mm thickness, to the required level. Care shall be taken to ensure that the bedding is compacted under and along the sides of the pipe and laterally to the undisturbed sides of the trench.
- The bedding for pipes shall be brought up to the middle of the pipe, compacted and finished level to the full width of the trench prior to placing the specified cover and backfill. Before bedding trench supports shall be withdrawn in steps to minimise disturbance of the bedding material.

4. CONCRETE WORK

4.1 Construction of Formwork

- The Contractor shall be responsible for the design of all formwork.

- All formwork shall be substantially and rigidly constructed of timber or steel or pre-cast concrete or other approved material and shall be true to the shape, line, level and dimensions shown on the Drawings.
- Forms shall be constructed so that the concrete can be properly placed and compacted and so that the hardened concrete will conform accurately to the required shape, position and level, and to the finishes specified. Care should be taken to maintain the stability of the formwork during vibrating operations.
- All formwork shall be thoroughly cleaned and coated with an approved type of oil before it is fixed in position. Immediately before concreting the formwork shall be watered thoroughly and washed out to remove sawdust, shavings or other rubbish. Where the appearance of the concrete face is important, the position and direction of the joints shall be as directed.
- Joints in forms shall be sufficient tight to prevent the leakage of mortar. Unless specified otherwise all joints shall be either horizontal of vertical.
- Formwork shall be erected true to line and braced and strutted to prevent deformation under the weight and pressure of the wet concrete, construction loads, wind pressure or other forces. Forming for beam soffits shall be erected with an upward camber as shown on the Drawings or as directed by the Engineer or of 2 mm for each 1 m of horizontal span.
- The preparation of the formwork shall be approved before concrete is placed.
- All faces of formwork that will come in contact with wet concrete shall be treated with approved mould oil or other coating to prevent adherence to the concrete. Such coatings shall be insoluble in water, non-staining, nor injurious to the concrete, shall not become flaky and shall not be removable by rain or wash-water.
- The Contractor shall be responsible for the co-ordination with the Sub-contractors for the setting out and fixing of all pipes and holes, pockets and chases for pipes. Sleeves provided by the sub-contractors are to be accurately set out and cast in and cutting away in completed concrete work is to be minimized.

4.2 Removal of Formwork

- Formwork shall be left in position until the concrete has attained sufficient strength to be self-supporting. The Contractor shall be responsible for the safe removal of the formwork without shock or vibration - which would damage the concrete.
- Any work showing sign of damage through premature removal of formwork or through premature loading shall be entirely reconstructed at the Contractor's expense. The Engineer may delay the time of removal of formwork if necessary.
- Forms shall be removed without shock, vibration or other damage to the concrete. The Engineer may direct the manner in which the forms are struck.
- The Contractor's attention is drawn to the necessity for the props to remain in position when striking the form. Should the design of the formwork necessitate the removal of the props at the same as the forms, both are forms and props shall remain in position for the longer period.
- When formwork is removed after 3 days, it will be necessary to ensure that the exposed surfaces of the concrete are kept thoroughly wet for the period of curing.
- The Contractor shall give the Engineer not less than 24 hours notice of his intention to strike any formwork. The time at which the formwork is struck shall be the Contractor's responsibility, but the minimum periods between concreting and the removal of forms, unless otherwise approved, shall be as shown in Table 4.1:

Table 4.1– Minimum Formwork Striking Times

Location	Ordinary Portland Cement Concrete
Side of Beams, Walls, Columns and Piles (unloaded)	3 days
Slab Soffit Forms (props left under)	7 days
Beam Soffit Forms (Propos left under)	7days
Props to slabs	21 days
Props to beams	21 days

4.3 Inspection of Reinforcement and Formwork

No concreting shall commence until the reinforcement and formwork have been inspected and approved by the Engineer, Reinforcement in walls and columns shall be inspected and approved before being enclosed in the formwork. Before concreting any part of the Work, the Contractor shall give at least 24 hours notice in writing to the Engineer and obtain his approval.

4.4 Manufacture of Precast Units off the Site

- Precast concrete blocks shall comply with the requirements of BS 2028, 1364.
- Unless otherwise described in the Contract, precast concrete copings shall comply with the requirements of BS 3798.
- Precast concrete flags shall unless otherwise described in the Contract be hydraulically pressed and shall comply with the requirements of BS 368. The flags shall be 50mm thick and, except where cutting is necessary, of a uniform width of 600 mm a minimum length of 900 mm.
- Precast concrete lintels shall unless otherwise described in the Contract comply with the requirements of BS 1239.
- Unless otherwise described in the Contract, precast concrete kerbs, channels and edgings shall be hydraulically pressed and they and precast concrete quadrants shall comply with the requirements of BS 340.
- Precast concrete sills shall unless otherwise described in the Contract comply with the requirements of BS 4374.

4.5 Mixing of Concrete

Ready – mixed concrete shall comply with the requirements of the Contract and BS 1926.

Concrete for grade 20 and grade 25 shall be mixed by weight batching only, unless approval has been obtained from the Engineer for the concrete materials to be mixed by volume. Concrete for grade 10 and 15 can be mixed by volume.

The weight of coarse and fine aggregates in each batch shall be so computed that each batch contains one or more full 50 kg bags of cement.

All concrete is to be mechanically mixed in a batch mixer of an approved type. The dry materials for concrete shall be mixed in the mixer until a uniform colour is obtained after which the gauged quantity of water shall be gradually added. After all the water has been added, the mixer shall continue to mix for a period of not less than two minutes.

The mixers shall be equipped with an adjustable device capable of supplying a predetermined amount of water.

On the completion of each mixed batch of concrete, the mixer drum shall be completely emptied before a fresh batch is placed therein. On the cessation of work, the mixer ad all handling plant shall be washed out and shall always be left clean and free from hardened concrete.

Any mix considered to be unsatisfactory by the Engineer for any reason, will be discharged to waste at the Contractor's expense, as and where directed by the Engineer, well clear of all mixed and placing operations in such a manner as to avoid the risk of defective concrete being incorporated in the Works.

The mixer shall be maintained in a first class condition throughout the Contract and any mixer or plant, which is faulty in any respect, shall not be used. The drums of all mixers shall revolve at the speed recommended by the makers. A mixer which has been out of use for more than 20 minutes shall be thoroughly cleaned out before any fresh concrete is mixed.

The Contractor shall always have one spare mixer ready on the site to avoid interruption in the mixing and casting of concrete.

4.6 Transportation and Placing of Concrete

Concrete shall be transported in a manner which will avoid a segregation of the constituent material, and placing in the forms shall be completed before the concrete has taken its initial set. In no case shall concrete be placed in the Works more than 30 minutes after mixing.

Concrete shall not be dropped through a height greater than 1.2 m. Chutes may be used if they are constantly kept free from coatings of hardened concrete or other obstructions. Pumping of concrete through delivery pipes may be used, but only with the prior approval of the Engineer.

Concrete of any unit or section of the work shall be carried out in one continuous operation, and no interruption of the concreting will be allowed without the approval of the Engineer.

The concrete shall be placed in layers as directed by the Engineer over the whole area to be concreted and the second layer shall not be commenced until the first is completed. Sloping beds will not be allowed when placing concrete. Should any accidental segregation occur, the affected area shall be thoroughly turned over by hand until a homogeneous mix has been obtained.

When concreting walls and columns, the mix proportions of the first 250 mm depth of concrete placed in contact with the horizontal joint should be adjusted by reducing the amount of coarse aggregate.

4.7 Placing of Concrete under Water

Concrete shall only be placed under water with the prior approval of the Engineer who shall likewise approve the method to be used and the precautions necessary to prevent loss of material. In no circumstances shall concrete be dropped or placed in water in a loose

condition or be placed in flowing water. In all cases the cement content shall be increased by 25 per cent for each class of concrete at the Contractor's Expense.

4.8 Placing of Concrete on Earth Surfaces

Earth surfaces on which concrete is to be placed shall be clean, firm and free from standing or flowing water. After the excavation has been completed to the approved lines, levels and dimensions it shall be kept as damp as practicable to reduce absorption of water from the concrete to a minimum.

No concrete shall be placed until the prepared earth surface has been approved by the Engineer.

4.9 Compaction

After the concrete has been placed in a position it shall be compacted by vibration with a rigid poker type with internal vibrator approved by the Engineer. The Concrete shall be worked well up against the form, joints and around the reinforcement and be free from voids and other imperfections. Under no circumstances shall the concrete be shifted or transported inside the form with vibrator.

In the case of reinforced concrete, a competent steel fixer shall be in constant attendance during the placing of concrete to adjust and correct the position of the reinforcement, if so required, immediately before the concrete is placed. In no case shall the vibrators be attached to or be allowed to come into contact with the reinforcement.

Each freshly placed layer of concrete must be thoroughly compacted and worked into the preceding one but care shall be taken that no damage is done to previous work that has already set. Excessive compaction of concrete shall be avoided.

The upper surface of slabs shall be compacted by an approved external vibrator.

4.10 Construction and Expansion Joints

The position and arrangement of construction and expansion joints shall be as shown on the drawings. Where additional joints are requested, the positions must be approved by the Engineer.

All construction joints shall be rebated to form a key with subsequent work. Concreting of any unit or section of the work shall be carried out in one continuous operation up to construction joints and no interruption of the concreting will be allowed without approval.

Where shown on the drawings construction and expansion joints shall be provided with water bars of P.V.C. or other approved material. The widths and shapes of the water bars shall be as specified on the drawings and all joints shall be used.

4.11 Curing and Protection of Concrete

Curing shall begin as soon as the surface of the concrete has hardened sufficiently. All exposed concrete surfaces shall be cured for a period of seven days by covering them with a layer of sand, hessian canvas or other approved material kept damp. Concrete shall be protected from sun, wind, heavy rains and flowing water for at least three days after placing.

4.12 Finishes of Horizontal Surfaces

Concrete surfaces for floors shall be true to level and falls as shown on the drawings. Water coming to the surface when vibrating shall be removed.

After casting the surface shall be smoothened with a wooden flat. After some hours, when the surface has dried up, the surface shall be trowelled smooth with a steel trowel. All other horizontal surfaces shall have the same surface finish except for the final trowelling with steel trowel.

4.13 Finishes of Vertical Surfaces

The shuttering for exposed concrete faces shall be so constructed that the latter shall be true to line and surface. The concrete shall be consolidated as specified against the shuttering to keep the face of the work free from honeycombing and other blemishes.

After removal of the shuttering, no concrete surfaces shall be treated in any way until they have been inspected by the Engineer.

If upon removal of the shuttering, the line or surface of the work is, in the opinion of the Engineer, unsightly and not in accordance with the requirements of the Contract, the Contractor shall at his own expense cut out and make good such portions of the work as the Engineer directs.

Rendering over defective surfaces shall not be permitted. Areas of honeycombing shall with the approval of the Engineer be made good immediately upon removal of the shuttering, and isolated superficial air and water holes shall be filled. Care shall be taken not to leave mortar or cement on parts f the surface which have been cast smooth and without pores.

The under listed classes of finish on **formed surfaces** shall be used.

a. **Class F1 Finish** is for surfaces against which backfill or further concrete will be placed. Formwork shall consist of sawn boards, sheet metal or any other material which will prevent the loss of material from the concrete when it is vibrated.
b. **Class F2 Finish** is for surfaces which are permanently exposed to view but where highest standard of finish is not required. Forms shall be faced with wrought and thicknesses boards with square edges arranged in ..... uniform pattern. Alternatively, plywood or metal panels may be used if they are free from defects likely to detract form the general appearance of the surface. This finish shall be such as to require no general filling of surface pitting, but fins, surface discoloration, and other minor defects shall be remedied by approved methods.
c. **Class F3 Finish** is for surface prominently exposed to view where good appearance, uniform color, and alignment are of special importance. To achieve this finish, which shall be free of board marks, the formwork shall be faced with plywood or equivalent material in large sheets. The sheets shall be arranged in an large sheets. The sheets shall be arranged in an approved uniform pattern. Wherever possible, joints between sheets shall be arranged to coincide with architectural features, cills, window heads, or changes in direction of the surface. All joints between panels shall be vertical and horizontal unless otherwise directed.

Where an applied finish is to be used the concrete shall normally be finished to given class. Approved faces shall be treated in one application and dry joints shall be made where directed. After application no remedial treatment will be permitted to any face apart from complete reapplication.

4.14 Accuracy of Finish

The arrangement of all formwork shall be made in such a way that all dimensions shall comply as exactly as possible with those given on the drawings. The following tolerances shall be respected:

a. Foundations – 50mm
b. Position of columns and Walls – 5mm
c. Thickness of walls – 5mm
d. Lateral dimensions of columns – 5mm
e. Level of slabs, beams – 5mm
f. Slab thickness – 5mm
g. Lateral dimension of beams – 5mm
h. Plumb of columns and walls - 3 mm in each storey (non/accumulative)
i. Window and door opening sizes – 5mm

Surfaces and edges must not show any noticeable warping. On a length of less than 10 m the deviation may be 10 mm at the most.

The Contractor shall be responsible for the cost of all corrective measurers required by the Engineer to rectify work which is not constructed within the tolerance set out above.

4.15 Tolerances

The permissible tolerances in formed and unformed surfaces for the various classes of finish specified above shall not exceed the limits shown in Table 4.2

Table 4.2 – Tolerances of finished concrete work

Type of irregularity	Tolerances (Millimeters)					
	Formed Surfaces			Unformed Surfaces		
	F1 F3	F2		U1	U2	U3
Departure from alignment and grade as shown on the drawings	+25	±5	±5	±10	±5	±3
Variations in cross sectional dimension	+10 -5	±3	±3	NOT APPLICABLE		
Abrupt	+10	+ 3	+ 2	+10	+ 5	+ 3
Deviation from template in long dimensions	±10	±5	±3	+10	+5	+ 3

NB The template to be used in determining the deviation in long dimension shall be 3 meters long.

4.16 Concrete Mixes

Unless otherwise directed in the contract or approved ordinary Portland cement shall be used. The quality of water used shall not exceed that required to produce concrete with sufficient workability to the placed and compacted where required. In the case of water retaining structures the Engineer may require the Contractor to work between both minimum and maximum limits of water content. In all circumstance the cement content must be so regulated to meet the requirements of strength and water; cement ratio.

Concrete shall be "Designed mixes" for reinforced concrete and "Nominal Mixes for Mass Concrete" to BS 8110 and used as shown on the drawings and in the Bills of Quantities. The concrete mixes, maximum aggregate sizes, maximum water/cement ratio and minimum cement content shall be in accordance with the Table 4.3.

Table 4.3: Concrete Mixes

Concrete Grade	Maximum size of Coarse Aggregate	Minimum Cement Content	Maximum Water/Cement Ratio
10	40 mm	210 kg/m^3	-
15	40 mm	250 kg/m^3	-
20	20 mm	320 kg/m^3	0.5
25	14 mm	390 kg/m^3	0.5

4.17 Trial Mixes

For the trial mixes the mix proportions shall be as specified under clause 6.3 of BS 8110

The actual concrete mixes shall be determined prior to starting of concrete works according to BS 8110.

For each grade of concrete three separate batches shall be made using the actual aggregates.

The workability of each of the trial batches should be determined and two times three cubes made from each batch for test at 7 days and 28 days.

The average strength of the nine cubes shall exceed the following values:

Table 4.4: Average strength

Concrete grade	Minimum average strength of 9 cubes

	At 7 days and at 28 days	
20	21 N/mm²	31.5 N/mm²
25	24.5 N/mm²	36.5 N/mm²

4.18 Testing of Concrete

Testing of concrete shall comply with BS 8110. All test cubes shall be manufactured, cured and tested as detailed in BS 1881.

The Contractor shall provide at his own expense all the necessary labour, equipment, moulds, transport, etc., required for manufacture of the test cubes. All test cubes requested by the Engineer shall be tested by Ministry of Works, Materials Branch, and the Contractor shall allow in his rates for concrete for all costs in relation with test cubes.

Should the Contractor require independent tests, he shall make them at his own expense, and the results of such tests shall not be valid unless test cubes are manufactured in the presence of the Engineer and tested by an approved agency and to the requirements in all details of the BS mentioned above.

Sufficient moulds and equipment shall be provided to enable a minimum of six test cubes to be prepared on each day when concrete is being mixed or such other number as the Engineer may direct. The Contractor shall be responsible for delivery of the test cubes to the Ministry of Works and Communication, or other approved testing laboratory.

4.19 Standards for Acceptance of Cube Tests

The result of all cube tests shall be accepted by the Contractor and Engineer as true results of the crushing strength of the cubes. The cube strength shall be calculated from the maximum load sustained by the cube at failure.

The appropriate strength required may be considered to be satisfied if the requirements in BS 5328: Part 4, clause 3.16, is fulfilled.

If the tests fail to give the required strength, further testing of the Concrete shall be carried out. If these tests fail to prove the strength of the concrete used, the Contractor shall at his own expense remove and replace all such concrete as directed by the Engineer.

4.20 Slump Tests

Concrete consistency shall be determined by a slump test carried out in accordance with BS 1881 and at the Contractor's expense.

Unless otherwise specified by the Engineer, the following are the slumps for the particular class of work.

	Compaction by vibrator	Compaction by hand
a. Reinforced Concrete	30 to 60 mm	-
b. Mass Concrete	0 to 30 mm	30 to 80 mm

Concrete having a slump test value exceeding the values here-in specified may be rejected by the Engineer.

5 PIPE WORK

5.1 Pipes requirement

All pipes shall be supplied in accordance with the relevant Standard specified or other Standard approved by the Engineer. All pipes and fittings of any one kind shall be supplied to

the same Standard except as otherwise allowed by the Engineer. The Standard, method of manufacture, and specification shall not be changed at any time from that agreed between the Contractor and the Engineer except with the prior written approval of the Engineer.

All Pipeline Materials shall be supplied to the dimensions stated in the standards unless otherwise shown on the drawings. The Contractor may supply material to other dimensions subject to the approval of the Engineer; however, the Contractor will be responsible for any redesign or extra design work and construction resulting from the use of material to other dimensions.

Each pipe, fitting or accessory shall bear the mark of manufacturer and its country of origin, together with the nominal diameter and pressure rating. In addition where pipes or fittings are of different pressure classes a referencing system shall be agreed with and employed by the manufacturer denoting the pipeline for which the pipe or fitting is intended.

The manufacturer shall be responsible for ensuring the certification and inspection takes place at the appropriate time and the certificates are duly delivered to the Engineer by recorded or receipted delivery.

All certified records of inspection of the manufacturer shall be made available for examination by the Engineer or his agent at the manufacturer's works during the period of manufacture and shall be forwarded to the Engineer upon completion of manufacture.

Prior to delivery of the manufactured goods to the site of storage the Contractor shall obtain from the Engineer in writing the name or names of those persons responsible for final site acceptance.

The Contractor shall submit with his Tender a Certificate of Manufacturers Authorization certifying that the Contractor has obtained the Manufacturer's Authority and his quotations for pipes and fittings are from the proposed Manufacturer who agrees to supply the materials in case of award of the Tender to the Contractor. No change of the source of pipeline materials will be accepted without prior approval of the Engineer.

The Contractor shall supply all necessary materials and equipment for making good, where approved by the Engineer, any damage to coatings of pipes, fittings and valves.

The Contractor shall comply with the following requirements:

- Pipes shall not be stacked higher than recommended by the pipe manufacturer.
- Pipes, fittings and valves shall not be dropped, or allowed to land on sharp or other objects which will cause bends, dents or damage to the coating.
- When lifting pipes and fittings special lifting hooks with curved saddles to fit the curvatures of the pipe or fitting shall be used. Alternative types of lifting hooks, clamps, or slings, may be used subject to the Engineer's approval.

Pipes shall not be stacked higher than recommended by the manufacturer nor higher than two tiers without the approval of the Engineer. The area on which the pipes are to be stacked shall be free draining. Grass or other vegetation shall be kept cut and suitable timber or cradles shall be provided on which the pipes shall be laid. Secure end stops to all stacks shall also be provided.

Pipeline Materials will be finally accepted within the Site only when the following conditions have been observed:

- All damaged coatings and other repairs have been made good.

- All pipes are stacked to the satisfaction of the Engineer, laid on suitable timbers on level ground and properly cocked.
- All fittings and boxes are laid out.
- The Engineer, or his delegated representative, has carried out a satisfactory inspection.

The Contractor shall be responsible for and shall undertake any work required by the Third Party Inspector or by the Engineer or his Representative as appropriate or where necessary, replace defective pipes and fittings deemed. All expenses in connection with such remedial works or replacements shall be deemed covered by the Tender.

5.2 Flange Joints

- Where specifically called for or deemed appropriate, flanged joints shall be utilized.
- All flanges shall be faced and drilled to conform to the dimensions specified in BS 4504 for a nominal pressure of 16 bars.
- All flange and coupling assemblies shall consist of the required number of bolts, nuts, washers and gaskets (2 washers per bolt).
- Bolts and nuts shall not be inferior to BS 4504 Clause 5 and no bolt shall project more than two full threads beyond its nut after tightening. In no circumstances shall the shortening of excessively long bolts by cutting be allowed.
- Gaskets shall be made of reinforced elastomer rubber in accordance with BS 2494 Type W and of minimum thickness of 3mm, or other specification to the approval of the Engineer. They shall be stored in accordance with ISO 2230.
- Bolts, nuts and washers shall be protected to BS 3382 Part 1-4 for above ground installation and to BS 3382 Part 5&6 for below ground installation and in chambers.

5.3 Flexible joints for Ferrous Pipes

Ductile Iron pipes and fittings between sizes 80 mm diameter and 800 mm diameter shall have sockets suitable for joints to BS EN545. Rubber rings for flexible joints to Ductile Iron pipes shall comply with BS2494.

Steel pipes up to DN 500 may be plain ended suitable for jointing with flexible couplings and flange adapters or socket and spigot with rubber gaskets as described herein. Steel pipes from DN 550 upwards shall be plain ended suitable for jointing with flexible couplings and flange adaptors. Steel pipes within chambers shall be suitable for jointing as shown on Tender Drawings.

5.4 Mechanical Couplings

All plain ends of fittings shall be suitable for jointing to couplings, and to flexible socket joints. Each plain end of pipe or fitting shall be supplied with one coupling complete with bolts, nuts, joint rings etc.

Mechanical couplings shall be of the Dresser, Viking Johnson or similar type without centre register, approved by the Engineer. Joint rings used shall be of ethylene propylene rubber (EPDM) or other material approved by the Engineer.

Flange adaptors for jointing flanged fittings to plain or spigot ended pipes shall conform where applicable to this clause.

All mechanical couplings and flange adaptors including nuts, bolts and washers shall be supplied with All couplings will be coated in fusion-bonded epoxy coating or similar protection to the approval of the Engineer.

5.5 Ductile Iron Pipes and Fittings

Ductile Iron Socketed pipes shall be centrifugally cast in accordance with BSEN 545. The minimum tensile strength shall be 420 N/mm^2 and the minimum 0.2% proof stress shall be 300 N/mm^2. The quality of metal used for the manufacture of the pipes shall be of good quality grey cast iron and subject to the various quality control tests as specified in the relevant Standards.

The minimum elongation after fracture shall be 10% for nominal diameters DN 60 to 1,000 and 7% for nominal diameters DN 1,200 to 2,000.

Centrifugally cast ductile iron pipes shall be individually subjected to a works hydrostatic test of not less than 10 seconds duration. For class K9 pipes whose thickness shall be in accordance with BSEN 545, these shall be:

Table 5.1: Minimum Works Hydrostatic Test Pressure

Nominal Diameter (DN) in mm	Minimum Works Hydrostatic Test Pressure for K9 (bar)
60 – 300	50
350 – 600	40
700 – 1,000	32
1,100 – 2,000	25

5.6 High Density Polyethylene (HDPE) Pipes and Fittings

HDPE pipes and fittings shall meet the requirements of BS 3284 and 5114 respectively. They shall be transported, laid, jointed and backfilled in accordance with the manufacturers written instructions.

For diameters up to and including 63 mm they can be supplied in coils of up to 150 m long. For coils of diameters greater than 63 mm shall be supplied with each layer bound separately to facilitate safe unwinding. For diameters from 125 mm upwards they shall be supplied in lengths not exceeding 12 m. Installation – including fusion jointing work on HDPE pipelines – must be directed and supervised by suitably qualified and experienced persons and the Contractor shall have demonstrated his ability to provide this in his Tender.

Before transporting HDPE pressure pipes the loading surface of the vehicle must be cleaned and free from projecting nails, screws or other sharp objects. The bottom layer of all pipes must as far as possible be in contact with the loading surface throughout their entire length and not project beyond it. The pipes must be secured from slipping and shall not be pulled over sharp edges when loading and offloading. Pipes shall not be dragged along the ground.

Pipes, fittings and coils shall be stored in such a way that they are completely protected from direct sunlight. When covered they must be well ventilated to avoid accumulation of heat and resultant deformation. Transparent coverings shall not be used. The storage location shall be flat and shall, for pipes, support the pipes throughout their length. Stones and sharp objects shall not be present. Pipes shall not be stacked to a height exceeding 1 m. The pipes must be secured at the sides to prevent them from rolling. Contact with harmful materials shall be

avoided. As far as possible, coils shall be stored in a horizontal position. The area shall be free of stones and sharp objects. If stored upright they must be secured to avoid tilting.

5.7 Valves, Meters and Penstocks

Valves up to and including DN 300 shall be gate valves, and valves larger than DN 300 shall be butterfly valves except where otherwise specified on drawings or in bills of quantities.

All valves shall bear an identification mark on the upper body that shall include:-

- The name of the manufacturer and/or his trade mark
- The nominal diameter (DN)
- The nominal pressure (PN)

The manufacturer's full technical leaflets shall be supplied to the Engineer in triplicate by the Contractor for approval prior to confirmation of any order for valves.

All valves shall be designed for a maximum permissible pressure of 16 bars except where otherwise specified on drawings or in bills of quantities. All valves shall close when the stem rotation is in a clockwise direction unless otherwise specified.

5.8 Gate Valves

Valves shall be double flanged wedge gate valves for manual operation suitable for waterworks purposes generally complying with the requirements of BS 5163 and suitable for working pressure of 10 bar and a test pressure of 16 bar. Flanges shall conform to BS 4504 for NP 16 pressure rating.

Gate valves which satisfy the specified conditions of service and duty, but which are manufactured to standards not less than those specified, may be offered. Full descriptive details including detail drawings, which must be annotated in English, shall be supplied on all items whether as specified or as offered alternatives.

Valves up to and including DN 300 shall be of the resilient seal type and valves larger than DN 300 shall have metal seals. Spindles shall be of the non-rising type and screwed so as to close the valves when rotated in the clockwise direction. The direction of closing shall be clearly cast on the valve cap or hand wheel as appropriate.

5.9 Butterfly Valves

Butterfly valves for manual operation shall comply with BS 5155/3952, shall be suitable for a working pressure of 10 bars and a test pressure of 16 bars, and shall be double flanged, resilient and metal seated tight shut-off design and of the eccentric disc type supported from two shafts placed in self lubricating bearing bushes. The pressure rating of the valve shall be cast in the valve body.

They shall operate with a clockwise closing direction. The valve disk shall rotate though an angle between 0 degrees and 90 degrees inclusive. The sealing ring shall be made of EPDM rubber and shall be attached at the disk edge circumference by a retaining ring without adjustment to form a resilient and durable seal.

The valve disc seal shall be replaceable without dismantling the operating mechanism, disk or shafts, and without removing the valve from the pipeline.

5.10 Air Valves

Automatic air relief and vacuum break valves (air valves) shall be of the anti-shock anti-surge type designed to meet the following requirements.
The required valves shall provide all of the functions described below.

- Pipeline filling - Uninterrupted high volume air discharge through the large orifice
- Pipeline draining or Column Separation - Uninterrupted high volume air intake through the large orifice
- Pipeline full and operating - Discharge of disentranced pressurized air through the small orifice.
- Rapid Filling / Column Separation - The valve must incorporate an integral surge alleviation mechanism that will automatically dampen surge pressures due to rapid air discharge or the subsequent rejoining of separated water columns.

The air release and vacuum break valve shall be of a compact single chamber design with solid cylindrical High Density Polyethylene control floats. These shall be housed in a tubular stainless steel or corrosion protected body with epoxy powder coated cast iron, or s/steel ends secured by means of stainless steel tie rods.

The air valve shall be provided with a separate isolating gate valve or if so specified with a separate isolating butterfly valve.

Unless otherwise specified all air valves shall be provided with an integral flanged inlet with studs appropriate to BS 4504 NP 16 or as the installation demands and complying with the appropriate nominal pressure.

Air valves shall be of approved manufacture.

5.11 Fire Hydrants

Fire hydrants shall be designed and conform fully with BS 750 Type 2, with 'captive' internal valve.

Fire hydrants shall be suitable for a maximum working pressure of 10 bar and be subjected to a works hydrostatic test pressure in accordance with the procedures set down in BS 750. The pressure rating shall be cast into the body of the hydrant.

Inlet flanges to fire hydrants shall be DN80. The outlet piece shall be screwed 2½" diameter BS 750 round thread. The fire hydrants shall be capable of passing a minimum flow of 34 l/sec at a constant running pressure of 1.7 bars.

5.12 Check Valves/Non-Return Valves

Check valves shall be doubled flanged free acting type specially designed for use in pumping systems giving rapid non-slam closure, and low head characteristic when the door is in the open position. Check valves shall comply with the general requirements of BS 5153 (and suitable for a working pressure of 10 bars).

The valves shall have a high grade cast iron body and cover to BS 1452 Grade 220/260 with gun metal or nickel bronze alloy door settings and an access cover of adequate dimensions for removal of the door. The hinge pin shall be of stainless steel carried in non-corrodible bearings.

5.13 Reservoir Inlet Valves

All reservoir inlet float operated valves shall be of one of the streamline type wherein operation is effected automatically by change of displacement of the float, the alternate actuating forces provided by weight and buoyancy being transmitted by lever mechanism to the valve element.

The float action shall operate the pilot valve housed within the plunger thereby ensuring sensitive response to the small mechanical forces applied. Closure shall be drop tight and the valves shall discharge vertically downwards.

The valve shall act from fully open to fully closed with a change in reservoir water level of the order of magnitude indicated below.

Table 5.2: Reservoir Level Change

Inlet Diameter (Nominal) (mm)	Reservoir Level Change (valve open to close) Approx. (mm)
80	130
150	230
200	260
250	320
300	380
400	850

5.14 Water Meters

All meters shall be supplied complete with a removable strainer, and if so indicated on the Drawings with extended registers of the nearest but shorter standard length to that indicated.

End flanges shall be drilled to BS 4504 NP10 or equivalent and shall be supplied complete with flange gaskets, bolts, nuts and washers.

Domestic (consumer) meters will be of the single jet inferential type, with metal body and dry dial register capable of measuring to the nearest 0.001 m^3, and having an accuracy of +/- 2%. The meters shall be manufactured to BS 510 or equivalent, and shall be subject to the Engineer's approval prior to ordering. They shall be suitable for both horizontal and vertical installation and shall be supplied complete with removable strainer and non-return valve.

5.15 Surface Boxes

These shall be of cast iron, (hinged and locked) and from an approved manufacturer to BS 5834 or equivalent. They shall be sized to suit the purpose required and as otherwise shown on the relevant drawings.

5.16 Valve Keys

- These shall be of mild steel with ends to suit either valves to BS 5163, valves to BS 5155 or valves to BS 1592 fitted with valve caps, dimensioned to the appropriate Tender Drawing.
- Hand wheels and Valve Caps and Valves
- Where hand wheels are specified, they shall have cast into them the words 'open' or 'closed', together with an arrow indicating the direction for such opening or closing.
- Valves for tee-key operation shall be provided with valve caps conforming to the appropriate tender/contract drawing.

5.17 Pipe lines setting out

- The way leaves, easements or other rights of way for pipelines will be defined by the Employer across any private land and by the Engineer across any land belonging to the Employer or to the Government.
- The Contractor shall, where required by the Engineer set out the boundaries of way leaves and mark them as required.
- Before commencement of trenching, the Contractor shall, in the presence of the Engineer set out the pipeline alignments in accordance with the drawings, making any changes the Engineer may deem necessary.
- The Contractor shall then submit to the Engineer for approval, at an approved scale, a profile of ground levels after the initial clearing of the way leave, easement or other right of way showing the proposed invert levels and the precise chainage of all pipeline features.
- Following approval and before excavation of the particular pipeline commences, the Contractor shall supply to the Engineer two further copies of the approved profile, incorporating all amendments required by the Engineer. The approved drawings shall form the construction drawings for the pipeline and no trenching or pipe laying shall commence before approval of the drawings by the Engineer.

5.18 Trench Excavation and Earthworks

Where pipelines are within 20 meters of a motorable track, or through light bush or thicket a way leave clearance of 2.0 m (two) meters plus nominal bore of pipe will be allowed. Where pipelines are through dense bush, thicket or forest a way leave clearance of 5.0 m (five) meters plus nominal bore of pipe will be allowed. Payment for Site Clearance will be based upon this width except that the Engineer reserves the right to restrict this width due to the presence of obstructions, roads, houses and the like. Payments will then be according to the actual area cleared. No claims for additional space nor for inconvenience and the like caused by obstructions, will be allowed.

It shall be the Contractors obligation when trenching, to locate and avoid the damaging of any existing services, be they water, drainage, sewage, electricity or telephone. Notwithstanding this obligation and should damage occur, it will be the contractors further obligation at his own cost to urgently liase with the utility organization concerned and to bear the cost of the repair or replacement of the damaged article.

The loading, unloading and handling of pipes and fittings shall be carried out using ropes, cranes, lifting beams and slings of approved design, strictly in accordance with the recommendations of the manufacturer and to the approval of the Engineer. Particular care shall be taken at all times to avoid damage of any kind. The use of lifting hooks is not permitted.

When pipes are loaded for road transport they shall be carefully handled to prevent damage to the coating. When more than one tier of pipes is transported, intermediate cradles shall be used. Pillows shall be provided between lashing (ropes, wires or chains, etc.) and the pipes. All cradles and lashings shall be of such widths as to prevent damage to the coating of the pipe, or distortion of the pipes.
Immediately after laying, the open end of a pipe shall be sealed with a wooden plug or approved stopper of appropriate size to prevent the entry of material which might contaminated the pipeline, damage the linings, obstruct the waterway of affect the working of valves, meters etc. plugs shall be imperforated and shall be shaped to fit neatly so that water from the trench excavations shall not be allowed to gain access to the pipeline.

Water pipes and fittings 150mm and under in dia shall have a brush equal in diameter to the internal bore of the pipe drawn through them as the work proceeds. The brush shall not be removed from the pipeline from commencement until completion.

5.19 Laying of Pipes

Before a pipe is lowered into the trench, it shall be thoroughly examined to ensure that the internal coating or lining and the outer coating or sheeting is undamaged. Where necessary the interiors of pipes, specials and fittings shall be carefully brushed clean. Any damaged parts of the coatings or linings shall, before a pipe is used, be made good as directed.

Pipe laying shall not commence until the bottom of the trench, it shall be thoroughly examined to ensure that the internal coating or lining and the outer coating or sheeting are undamaged. Where necessary the interiors of pipes, specials and fittings shall be carefully brushed clean. Any damaged parts of the coatings or linings shall, before a pipe is used, be made good as directed.

Pipe jointing shall be carried out only by experienced personnel and with close supervision by the Contractor. Further pipe jointing shall not proceed until the previous joint has been inspected by the Engineer. Inspection of the joint by the Engineer shall not relieve the Contractor of his testing responsibilities.

Pipe trenches shall not be backfilled until permission to do so has been obtained from the Engineer. Subject to such permission being obtained trenches shall be backfilled without delay to at least the minimum extent required by the specification in readiness for pressure testing.

The pipes shall be laid on bedding as shown on the drawings or as directed by the Engineer. Details of pipe beddings are shown on the drawings and are specified.

5.20 Cutting Pipes

uPVC pipes shall be cut with an approved mechanical pipe cutter and bevelled, all in conformity with pipe manufacturer's recommendations. The edges of the cut shall be clean true and square.

The Contractor shall be solely responsible for the provision of all equipment necessary for the cutting and preparing of pipes.

5.21 No Flotation of Pipes

The Contractor shall be solely responsible for ensuring that flotation of the pipeline does not occur during construction. The extent of the backfill placed over each pipe after laying and before testing shall be such as will prevent flotation of the pipeline and the requirements of Clause 506.5 hereof shall not be construed as limiting in any way the extent of the backfill so placed or which may be so required.

Should any section of the pipeline float out of line or level the section of pipeline so affected shall be removed and re-laid in accordance with the Specification to the satisfaction of the Engineer and any damaged sections shall be discarded and replaced. The cost of replacing any pipe damaged and discarded through causes of flotation shall be borne by the Contractor.

5.22 Flexibility in Pipelines adjacent to Structures

Pipelines entering or leaving structures shall incorporate two flexible joints outside the structure, one at 300 mm from the structure wall, and the other at a further distance from the wall of one diameter or 300 mm, whichever is greater.

This flexibility shall not be provided in cases where the structure is a drag block, or where the structure is relied upon to restrain the pipeline in compression. Where the structure is relied upon to restrain the pipeline in tension, the two flexible joints shall be locked joints.

The provision of the necessary short pipe lengths and additional flexible joints shall be included in the rates for pipelines.

5.23 Testing Pipelines

After laying, new pipelines shall be tested under pressure and where in trench, such tests shall be made before it is completely back- filled. During the test, all joints shall be clear of earth, timber, etc to allow visual inspection. Testing shall commence when not more than 20% of all pipe work has been laid and at no time may there be more than 20% untested.

Where old pipelines that are yet to be taken into service are involved they shall be similarly tested, except that the Engineer may specify at what stage testing is required.

The pipeline shall be tested in lengths between valve locations or in such shorter lengths as the Engineer may approve on the understanding that no extra cost will be incurred to the Employer but the maximum length of main to be tested, shall not normally exceed 1.0 km.

The Contractor shall supply all necessary materials to carry out the test in accordance with the requirements including force pumps, water pressure gauges, including tools for the use of the Engineer, interconnecting pipe work, feeding tank, blank flanges, temporary stop-ends, struts and water for the test. The test section shall be capped or flanged off at each end and all branches. Testing shall not take place against closed valves.

After the main has been clear of debris, and all necessary stop- ends and gauges fitted to the Engineer's approval, the Contractor shall fill up the pipe with water free from silt, and sand and grit and bring up the pressure steadily to the nominal pressure of the pipe or incorporated fittings, whichever is the lesser, (except for old pipelines where a lower value may be specified by the Engineer), and maintain it with a force pump for 24 hours.

The pressure shall then be increased steadily in increments of 1.0 kg/cm^2 with a pause of one minute between each increment to the specified test pressure for the section. Unless otherwise specifically mentioned, the applied test pressure shall be measured at the lowest point along the section being tested.

Where the test pressure has not been specified, it shall be assumed to be 50% in excess of the nominal pressure at the lowest point of the section being tested.

After a period of half an hour, the fall in test pressure shall be recorded and sufficient water again pumped into the line under test to bring the pressure back to the test pressure. The procedure shall be repeated every half-an-hour for a total period of 3 hours, or longer, if the Engineer so directs, and the amount of water pumped in recorded.

The rate of leakage shall be calculated from the amount of water pumped in during testing and if it is less than 1 litre of water per 10 mm diameter of pipe per km of length of pipeline, for each 24 hours and for every 30 m head, the pipe line will be considered to have passed the test.

Leaks exceeding permissible amounts shall be made good. And faulty pipes, fittings, and specials, shall be replaced by the Contractor at his own expense and the section tested again before approval is given for backfilling. Payment for the section will not be certified, until the test has been passed and backfilling completed.

5.24 Flushing and Sterilization

This shall be done in accordance with the recommendations set out in BS 6700.

All pipe work shall be flushed and cleaned and all treated water pipe work shall additionally be sterilized. The rates inserted are to be for the flushing and sterilizing, and where appropriate for cleaning shall be inclusive for, sampling, testing and inclusive of the reports on the bacteriological quality of water.

Mains shall be sterilized after testing, swabbing and scouring.
Chlorine solution shall be applied at the charging point as the main is being filled and dosing shall be continued until the main is full and at least 50mg/2 of free chlorine have been made available. Chlorine gas shall not be injected direct to the main from a cylinder otherwise than through an approved chlorinator and care shall be taken to ensure that there is no flow back into the preceding sections of main.
The treated water shall be left in the main for a period as directed but not exceeding 24hours and all valves in the system shall be operated at least once during this period.
Chlorine residual tests shall then be taken at the end of the main furthest from the point of injection. The sterilizations process shall be repeated until the chlorine residual is not less than 10 mg/l.

The Contractor shall dispose of the waste chlorine solution such a manner as to avoid the pollution of natural waters and of reservoirs and artificial watercourses. The Contractor shall comply with any directions which the Engineer makes in respect of such disposal.

5.25 Pipeline Protection, Auxiliary Works and Structures

Unless otherwise provided in the Special Specification or Bills of Quantities or directed by the Engineer, a 0.15 m concrete surround shall be provided to water mains in the following circumstances:-

- Water mains with less than 0.6 m or more than 6.0 m of soil cover over the pipes.
- Water mains under carriageways if depth of soil cover is less than 1.20 m
- In the places where shown on the Drawings or directed by the Engineer.

All concrete for beds and surrounds shall be class 15 concrete.

The unit of measurement shall be cubic meter or linear meter as indicated in the Bills of Quantities.

The rate shall include for the provision, transporting and placing of concrete, all strutting and formwork, protection and curing and all labour, tools, plant, supervision overheads and profit.
The preparation of the trench bottom or surface of the bed shall be complete for at least one full pipe length in advance of the pipe laying, except where in exceptional circumstance another arrangement is approved.
No bedding material shall be placed in trenches containing water.

Where granular bedding is to be used, stones, bricks of similar materials shall not be used below or against the pipes. Sufficient of the infill materials shall be placed around the barrels of pipes to prevent movement.

5.26 On Site Protection for Ductile Iron Pipe work

Where a concrete surround is to be applied (e.g. road/track under-crossing), then prior to laying, the pipe must be wrapped by an approved petrolatum tape or alternatively polythene-sleeved to DIN 30674 to the Engineer's satisfaction.

No separate payment will be made for any site protection to be given to the pipe work.

5.27 Valve Chambers

These shall be constructed in accordance with the drawings or as directed by the Engineer using materials approved by the Engineer. Notwithstanding the size and shape of the valve to be supplied the Contractor shall ensure that the minimum clearance as indicated on the drawings is provided within the chamber.

5.28 Anchor Blocks

Pipelines with mechanical (or flexible) joints shall be adequately anchored at bends, tees, sluice or butterfly valves, tapers, blank ends, etc. Anchor blocks shall be constructed from Class 20 concrete to the dimensions indicated on Drawings unless otherwise directed by the Engineer. Support blocks shall be constructed from Class 15 concrete. Soil around anchor blocks shall be compacted thoroughly before the hydraulic testing of the pipeline. Payment for anchor blocks will be per unit volume of concrete in the blocks and shall include for the entire earthwork, formwork and other operations required for their construction. No separable payment shall be made for any temporary or permanent anchor blocks constructed by the Contractor specifically for the testing of the pipeline.

Anchor and Thrust blocks at proposed tie-in points will be cast at least 7 days prior to the proposed tie-in works and post tie-in pipeline testing for the affected section. The proposed tie-in works described in Clause 148 will therefore be preceded by the required anchor/thrust block casting.

5.29 Valve Boxes and Chambers Covers

Surface boxes and chamber covers shall be either cast iron or ductile iron and coated with a black bituminous solution. Surface boxes over gate valves shall be hinged and chained and shall generally comply with BS 5834.

Surface boxes for hydrant chambers shall have a 380 x 230 mm clear opening and shall comply with BS 750 and shall be suitable for heavy traffic loading.

Lifting keys shall be provided for each type of surface box or cover supplied. These shall be of mild steel with ends to suit either valves to BS 5163, valves to BS 5155 or valves to BS 1952 fitted with valve caps, dimensioned to the appropriate Tender Drawing. One set of keys shall be provided for every ten surface boxes or covers subject to a minimum of ten sets of keys or the actual number of covers if less than ten.

5.30 Indicator Plates and Marker Posts

Precast concrete indicator plates to the dimensions indicated on the Drawing shall be installed at all sluice valves, single-air valves, double air valves, fire hydrants and washouts, with letters SV, SAV, DAV, FH, WO, respectively, indented in them. The plates shall be painted with at least two coats of all-weather plastic emulsion paint of approved colour.

Marker posts to the dimensions indicated on Drawings shall be installed at 100 m spacing along the pipelines installed in open country or as directed by the Engineer. Marker posts shall be painted with at least two coats of all weather plastic emulsion paint of approved colour.

5.31 Tie in Works between Existing and New Pipelines

This specification clause shall apply to any tie in works between existing operational and new pipelines which involve closing down of any main which is in service supplying water, either Raw or Treated, within the existing water supply system. It shall further apply to any new fitting that has to be inserted into an existing operational pipeline.

The Contractor shall take delivery of any fittings and valves required at the Works not less than 96 hours before the commencement of the tie in operations. He shall provide all the necessary watching to ensure that such fittings do not get misplaced or stolen. The Contractor shall, check the suitability of such fittings including checking of all dimensions, particularly the external diameter of the pipe into which the connection is being made and the internal diameter(s) of couplings which are to be used for such connection. This shall be done by

measuring diameter at 4 positions to a tolerance of 0.25 mm. The Contractor shall certify the suitability of such materials to Engineer not less than 48 hours before the commencement of tie-in operations.

The Contractor shall prepare a schedule of fittings including those on existing pipes that are to be used for such tie-in or redeployed elsewhere as instructed on the drawings and shall obtain approval of the Engineer not less than 48 hours before the commencement of tie in operations of such schedule.

The Contractor shall ensure that all materials are at the site of the works not less than 24 hours before the commencement of the tie-in operation and shall inform the Engineer who shall check the materials against the schedule as approved where he deems this necessary

Any non standard fittings which are required for the execution of the tie-in works shall be fabricated under the Engineer's supervision and shall be hydro statically tested to at least one and a half times the maximum working pressure.

The Contractor shall furnish the Engineer's Representative a list of the key personnel to be involved in the tie in exercise at least 48 hours before the commencement of the exercise and shall get the Engineer's approval at least 24 hours before the commencement in respect of such personnel. To gain this approval the Engineer may require that operative is tested in the performance of his duties in the operation of the plant for which he is in attendance. In particular this requirement shall apply to all welders, pipe cutters use either mechanical or flame cutting equipment and lifting plant operators. The Contractor shall ensure that an adequate number of labourers are in attendance upon the site during the period of the tie in operation.

5.32 Pre Tie-in Works

The Contractor shall execute all works possible before the commencement of the operations which shall include blinding with concrete the bottom of the excavation and (where instructed by the Engineer) immediate working areas. Provision of any required drains a sump of adequate size from which any accumulating water is to be pumped out. Casting of the floor of any chamber which is to be constructed around such tie-in works. Casting of any thrust blocks or thrust walls or any other works necessary for effective execution of the tie-in works as may be required by the Engineer.

The Contractor shall complete these works at least 96 hours before the commencement of the tie-in operation or within a period that may be otherwise set by the Engineer upon issue of the Engineer's instruction to perform the tie-in works, and obtain the Engineer's approval not less than 24 hours before commencement of the tie-in operations.

a. The Contractor shall prepare a schedule of the plant which he proposes to have on site either to use, or on standby, or for emergency use and shall obtain the approval of the Engineer not less than 48 hours before the commencement of the tie-in operations. Such Plant shall include:-

- Excavation plant
- Cutting equipment
- Lifting equipment
- Pumping equipment (unless a drain is provided)
- Concrete Mixer
- All tools necessary for the erection and assembly of the plant.

The Contractor shall also ensure that all plant is on site not less than 24 hours before the commencement of the tie-in operation and shall inform the Engineer who shall check the plant against the schedule as approved where he deems this necessary.

5.33 Actual Tie-in Works

The Contractor shall prepare a program giving details of the proposed scheduling and sequencing of tie-in works necessary for minimizing the interruption to the existing water supply. Approval of such program by the Engineer shall be obtained not less than 72 hours before commencement of the tie-in operation.

The Contractor, unless relieved of the responsibility by the Client or the Engineer, shall first empty the section of the main on which the tie-in is to be made and shall ensure that the nearest air valves and washouts immediately upstream and downstream are all open and the washout dry.

When the Engineer is also satisfied that the main is empty of water he shall verbally give the order to commence the works from which time the Contractor shall be solely responsible for the execution and completion of the tie-in works unless relieved of such responsibility by the Engineer.

The Contractor shall provide all the insurance normally required by the Engineer and the operating FIDIC Condition of Contract and shall obtain an endorsement if necessary to ensure that the insurances remain valid in the event that the Engineer takes over the direction of the works.

When the Engineer is satisfied that the tie-in works are completed he shall give notice for the main to be re- commissioned, when this has been satisfactorily accomplished the Contractor shall re-deploy his staff on the Engineer's verbal instructions of completion of the tie-in.

5.34 Post tie-in Works

Within 48 hours of the completion of the tie-in works the Contractor shall have completed all permanent works required to support the plant installed during the tie in operation, and shall remove all temporary supports within a further 48 hours after the permanent support works have been approved by the Engineer. The temporary supports shall not be removed before such approval has been given.

SCHEDULE OF INSTRUCTION, SUBMISSIONS AND APPROVALS FOR THE TIE-IN WORKS
1. ENGINEERS INSTRUCTIONS TO PERFORM TIE IN 14 DAYS 2. MATERIALS:ACCEPTANCE BY CONTRACTOR 96 HOURS 3. CERTIFICATE OF SUITABILITY BY CONTRACTOR 48 HOURS SCHEDULE OF THOSE NEEDED SUBMISSION 4. APPROVAL 48 HOURS 5. ARRIVAL ON SITE 24 HOURS 6. CHECKED ON SITE BY THE ENGINEER

WORKS PROGRAMME OF EXECUTION SUBMISSION

7. APPROVAL 72 HOURS

SCHEDULE OF PLANT SUBMISSION

8. APPROVAL 48 HOURS
9. PLANT ARRIVAL ON SITE 24 HOURS
10. CHECKED ON SITE BY ENGINEER
11. ARTISANS APPROVED BY ENGINEER 24 HOURS
12. TESTING OF BY ENGINEER
13. NOTICE OF RESPONSIBILITY FOR DRAWING MAINS 96 HOURS
14. PRE-TIE IN WORKS COMPLETION OF 96 HOURS
15. INSPECTION BY ENGINEER 24 HOURS
16. ENGINEER'S VERBAL INSTRUCTION TO COMMENCE WHEN MAIN IS DRY
17. ENGINEER'S VERBAL INSTRUCTION TO RECOMMISSION MAIN
18. ENGINEER'S VERBAL APPROVAL OF THE TIE-IN COMPLETION
19. ENGINEER'S NOTICE OF PLANT OPERATIONS ALLOWED
20. SUPPORT WORKS: COMPLETION 48 HOURS

APPROVAL BY ENGINEER

REMOVAL OF TEMPORARY

21. POST TIE-IN WORKS COMPLETION 14 DAYS

APPROVAL BY THE ENGINEER

22. FINAL APPROVAL BY THE ENGINEER OF WHOLE WORKS 42 DAYS

6. BUILDER'S WORK

6.1 Pre-cast Concrete Block Walling

Concrete blocks shall comply with BS 6073. The blocks shall be solid or hollow, as specified on drawings, with a minimum compressive strength of 3.5 N/mm^2, tested as described in BS 6073.

All blocks must be left with good sharp edges. The standard face size of blocks for use in the works shall be 440 mm x 190 mm x 190 mm and this size of blocks shall be used wherever practicable.

No work with concrete blocks shall commence prior to a test report being presented to and accepted by the Engineer.

The contractor shall be responsible for making test blocks and experimenting with available materials to ascertain what mix will be necessary to attain the required strengths. If suitable materials are not available locally, the Contractor shall obtain them from other approved sources.

6.2 Wall Reinforcement

Reinforcement in walls made of solid blocks shall, where so specified, consist of a 25 mm wide strip of "Exmet" or similar brick reinforcement centrally placed in joints at approximately 450 mm centers (vertically) for the full length of the walls, lapped and crimped 300 mm at running joints and full width of walls at angles and intersections.

6.3 Cement and sand

The cement shall be as described in "Concrete Work". The sand for mortars shall be as described in "Concrete work", except that it shall be fine sand.

6.4 Mortar

The cement mortar shall consist of one part of Portland Cement to three 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 the sand and lime shall be mixed first, and then the cement added.

6.5 Damp-proof course

All damp-proof courses shall be of bituminous felt to BS 743 weighing not less than 3 Kg per m^2, free from tears and holes, lapped 150 mm at running joints and for full width of wall at angles and intersections and bedded on an including a 12 mm levelled screed of cement mortar.

6.6 Workmanship

Blocks shall be laid in regular even courses and shall be bedded in cement mortar consisting of one part of cement to three parts of sand. Before being laid, all blocks shall be immersed in water for at least 12 hours. All beds and vertical joints shall be filled completely with mortar when the blocks are laid, and no flushing up will be permitted. No vertical joint in any one course shall be within 100 mm of a similar joint in adjacent courses. Beds and joints shall be not less than 10 mm or more than 15 mm thick.

The Contractor shall provide proper setting out rods and set out on the same all work showing openings, heights, sills and lintels and shall build the various walls and piers to the thicknesses, widths and heights shown upon the drawings.

6.7 Block work Tanks

The concrete blocks shall be solid, type A with a minimum compressive strength of 7 N/mm^2, tested as described in BS 2028.

For circular block work tanks the blocks shall be manufactured in the required shape to fit the curvature of the tank, and all blocks shall be immersed in water for 24 hours before being laid.

Care must be taken to ensure that all joints are filled up completely. The horizontal joints to be reinforced as shown on the Drawings, with the reinforcement covered on all sides at least 6 mm of mortar, thus giving a thickness of horizontal joints of approximately 20 mm.

No parts of the wall shall be carried up more than one course above any other part of the wall. Reinforcement and holes for pipes passing through walls and floors shall meet the requirements.

Internal plaster shall be of mix 1:2, made water proof by use of approved additive.

6.8 Measurement

Walls are measured in square meters for each thickness of walls.

The prices shall include for all straight cutting, bonding plumbing angles, forming reveals, pinning up to under side of concrete soffits and cutting up to sides of columns and cutting and pinning ends of lintels and sills.

6.9 Plasterwork and other Floor, Wall and Ceiling Finishes

The cement shall be as previously described in "Concrete works".

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 the work in order to obtain the finish directed.

The lime for plastering shall comply with BS 890 Clause "A" for non-hydraulic lime and shall be as rich as obtainable and to approval. It must be freshly burnt and shall be slaked at least one month before being used by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of 3 mm meshes.

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement paving and plaster shall be kept continuously damp in the interval between application of coats and for seven days after the application of the final coat.

The Contractor shall prepare sample areas of the screed, paving and plastering as directed until the quality, texture and finish required is obtained and approved by the Engineer, after which all work executed, shall conform with the respective approved samples.

No plastering will be allowed to take place until all chases for services have been cut, services installed and chased surfaces made good. On no account may finished plaster surface be chased and made good. All work shall be to the approval of the Engineer and any work not complying with the above shall be hacked away and replaced at the Contractor's expense.

All work shall be adequately protected against damage, to the satisfaction of the Engineer until the works are handed over to the Engineer.

6.10 Carpentry and Joinery

All timber shall be in accordance with the latest approved Grading rules issued by the Government of Tanzania or other competent authority. The quality shall be as First (or Prime) Grade.

All timber work to be carried out in accordance with BS 1186 and CP 112.

Any of the following timber may be used:

Table 6.1: Recommended types of timber

Standard Common Name	Botanical Name
Podocarpus	Podocarpus Spp
Cedar	Juniperus Procera
African mahogany (Munyama)	Khaya anthotheca
Muringa	Pterocarpus Angloensis
Mvule	Chrophora Excelsa

All timber, as it arrives on the Site, shall be inspected by the Engineer, and any timber brought on the Site and not complying with the Specification or not approved must be removed forthwith from the Site, and only timber as approved shall be used in the works.

6.11 Boards and Sheets

Fibre board shall be 12 mm "Celotex" or other approved fibre board complying with BS 1142, Part 3,

Plywood shall be laminated board faced on in both sides with 4 mm plywood. Exposed edges shall be lipped with 20 mm hardwood and rates shall include for leaping.

Plastic Sheeting shall be "Formica" sheeting, 1.5 mm thick and securely fixed with approved type waterproof adhesive, and in the colors approved by the Engineer.

Flush doors shall be 45 mm thick, and shall be obtained from an approved manufacturer. The doors shall comply with BS 459, Part 2. External doors shall be framed, ledged and braced as shown on the drawings, and they shall comply with BS 459, Part 4.

6.12 Workmanship

All timber shall be as long as possible and practicable to eliminate joints. Where joints are unavoidable, surfaces shall be in contact over the whole area of the joint before fastenings are applied.

No nails, screws or bolts are to be fixed in any split end. If splitting is likely, or is encountered in the course of the work, holes for nails must be bent at right angles to the grain.

Joints in joinery must be as specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, springs, etc., are to be punched and puttied. Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not be considered and where sealed joints are required.

Glue for load bearing joints or where conditions may be damp must be of the resin type. For non-load bearing joints, or where dry conditions may be guaranteed, casein or organic glues may be used.

All exposed surfaces of joinery work shall be wrought and all arises "eased off" by planning and sandpapering to an approved finish suitable to the specified treatment.

Round wood plugs shall not be used. All work described as plugged shall be fixed with screws to plugs formed by drilling concrete, walls, etc., with a proper tool of suitable size and filling the holes completely with "Expandet" raw plastic or "Rawplugs" in accordance with the Manufacturer's instructions.

Where intended to be in contact with stone, concrete blocks, cement or plaster, the backs and other faces of all doors, windows and other frames and linings, posts, architectural skirting, fillets and fascias shall be treated with two coats of wood preservative before fixing.

Bottom edges of doors shall be painted with one coat of approved primer before fixing.

Any fixed joinery which in the opinion of the Engineer is liable to become bruised or damaged in any way shall be completely cased and protected by the Contractor until the completion of the Works.

6.13 Inspection and Testing

The Engineer shall be given facilities for inspection of all works in progress whether in workshop or on Site. The Contractor is to allow for testing of prototypes of special construction units and the Engineer shall be at liberty to select any samples he may require for the purpose

of testing, i.e. for moisture content, identification, species, strength, etc. Such tests will be carried out by the Forestry Department.

6.14 Clearing Up

The Contractor is to clear out and destroy or remove all cut ends, shavings and other wood waste from all parts of the building and the site as the work progresses and at the conclusion of the work. This is to prevent accidental borer infestation and to discourage termites and decay.

6.15 Roofing

The roof sheeting and fittings shall be corrugated iron roofing, laid and fixed in strict accordance with the manufacturer's instructions.

Fixing to be of approved type and quality.

All roof surfaces shall be kept clean and protected and handed over watertight at completion.

6.16 Steelwork

All materials shall be the best of their respective kinds and free from defects. The materials in all stages of transportation handling and stacking shall be kept clean and injury from breaking, bending and distortion prevented.

All steel and steel sections shall comply with BS 4, BS 4360 and BS 4848.

All steel shall be of approved manufacture and the Contractor shall on request deliver to the Engineer a manufacturer's test certificate for all steel used.

All structural steel shall be of Grade 43A according to BS 4360. Steel for handrails, screens etc. can be of a lower grade, but all steel shall be weldable and the grade shall be approved by the Engineer.

Electrodes shall be according to BS 639 and shall be of a class appropriate to the steel. Bolts and nuts shall be according to BS 4190.

Workmanship for all steelwork shall generally follow the requirements in BS 449 and BS 5135.

The Contractor shall prepare all the necessary workshop drawings, which shall be approved by the Engineer. The Engineer's approval shall not in any way relieve the Contractor of his responsibility for the Workshop drawings being in accordance with the contract drawings and specifications.

All welding of structural steel shall be carried out in the Contractors workshop and the whole structure or pars thereof shall be test assembled into the workshop before delivery to the site.

All external doors shall be provided with locks of cylinder type. All internal doors to be provided with approved latch locks and handles. All locks shall have two keys with attached labels with door references before being handed over to the Engineer.

6.17 Glazing Glass

All glass shall comply with BS 952 and be free from flaws, bubbles, specks and other imperfections.

Glass panes shall be cut to sizes to fit the opening with not more than 2 mm play all round and where puttied shall be clipped to the frames.

6.18 Painting, Decorating and other Surface Treatment

All work under this trade must be executed by an approved specialist unless the Engineer agrees otherwise. The paint shall be of approved manufacture.

The Contractor shall so arrange his program of work that all other trades are completed and the workmen are away from the area to be painted, when painting begins. Before painting,

the Contractor must remove all concrete and mortar dropping and the like from all work to be decorated and remove all stains as to obtain uniform colour to work to be oiled and polished.

All materials to be applied externally shall be of exterior quality and/or recommended by the manufacturers for external use, all in accordance with BS 4800 or similar.

All materials shall be delivered on site intact in the original sealed drums of tins and shall be mixed and applied strictly in accordance with the manufacturer's instruction and to the approval of the Engineer. Unless specially instructed or approved by the Engineer, no paints are to be thinned or otherwise adulterated, but are to be used as supplied by the manufacturers and direct from the tins.

The priming, undercoats and finishing coats shall each be of differing tints and the priming and undercoats shall be the correct brands and tints to suit the respective finishing coats in accordance with the manufacturer's instruction. All finishing coats shall be of colors and tints selected by the Engineer. Each coat must be approved by the Engineer before the next coat is applied.

All paints, emulsion paints and distempers shall be applied by means of a brush or spray gun or rollers of an approved type where so agreed by the Engineer.

Color cards of all paints, etc. shall be submitted to the Engineer. The Engineer may reject any materials or workmanship not in his opinion up to the approved sample, and these must be removed from the site without delay.

6.19 Preparation and Priming of Plaster Surfaces etc

Surfaces shall be perfectly smooth, free from defects and ready for decoration. All such surfaces shall be allowed to dry for a minimum period of six weeks, stopped with approved plaster compound stopping and rubbed down flush, as necessary, and then be thoroughly brushed down and left free from all efflorescence, dirt and dust immediately prior to decorating.

Plaster surfaces, which are to be finished with emulsion, oil or enamel paint, shall be primed with an alkali resisting primer complying with the particular paint Manufacturer's specification and applied in accordance with their instructions.

6.20 Preparation and Priming of Metalwork

All surfaces shall be thoroughly brushed down with wire brushes and scraped were necessary to remove all scale, rust, etc. immediately prior to decorating. Where severe rust exists and if approved by the Engineer, a Proprietary de-rusting solution may be used in accordance with the manufacturer's instructions.

Coated surfaces already treated with bituminous solution, shall be scraped to remove soft parts and then receive two isolating coats of aluminum primer or other approved anti-tar primer.

6.21 Painting Preparation and Priming Woodwork and ironmongery

All woodwork shall be rubbed down, all knots, covered with a thick coat of good shellac or aluminum knotting; primed with one coat of approved ready-mixed proprietary wood primer and all cracks, nail holes, defects and uneven surfaces, etc., stopped and faced up with hard stopping rubbed down flush.

All woodwork in contact with walling or plaster shall be treated after cutting and preparation but before assembly or fixing with one coat of approved wood preservative. The solution is to be brushed on all faces of all timbers, unless exposed to view and painted.

7. PIPELINE CHAMBERS

7.1 Chambers

Chambers shall be constructed on pipe lines in the positions indicated, or wherever ordered by the Engineer.

The chambers shall be constructed in accordance with drawings of typical chambers.

Chambers on pipe lines shall be constructed with an in-situ base in concrete Grade 15, which shall be raised to form the benching.

Chambers of precast concrete rings to be carried out as per BS 556.

Chambers of block work shall be carried out as specified on the drawings. The block work shall be rendered internally with cement mortar 1:3.

7.2 Chamber Covers

Covers shall have a clear opening of not less than 610mm diameter.
Chamber covers and frames shall be of cast iron and shall comply with the requirements of BS 497.

8. PUMPING STATION

8.1 Pumps

(1) The witnessed test shall obtain the guarantees of pump delivery, head, kW input, overall efficiency and other figures in accordance with the guarantees given in the Schedule of Particulars and shall satisfy the inspector as to the mechanical reliability of the plant and its capability of fulfilling the whole of the conditions.

(2) The guarantee duty is subject to a tolerance of ±2.5%.

(3) It is preferable that the pumps be tested with their own motors, but if this is not attainable the pumps shall be tested in conjunction with the pump manufacturer's standard or calibrated motor, but the manufacturer shall satisfy the Engineer as to the performance of the test motor so that the kW absorbed by the pumps may be accurately determined. It shall be stated in the Tender the type of apparatus available for testing at the works of the pump manufacturer and shall give particulars as to the method of measuring the pump discharge.

8.2 Motors

(1) Submersible motors shall be subject to full performance tests, which shall be witnessed by the Engineer at the motor manufacturer's works. 5.5 kW to 22 kW site rating shall be subject to performance test un-witnessed. Motors under 5.5 kW site rating shall be subject to 'type test' standards.

(2) Motor tests will be carried out in accordance with the requirements of BS 4999 as applicable. The test shall obtain the overall efficiency and other figures in accordance with the guarantees given in the Schedule of Particulars. Test Certificates as Clause 3.3 shall be provided for all sized motors.

8.3 Alternator

(1) All alternators shall be separately witness tested in conformity with BS 4999 to verify the details given in the Schedule of Particulars, to ascertain efficiency and characteristics by means of an input/output test, the alternator being driven by an AC or DC prime move and the input current shall be measured and plotted against the output of the alternator.

(2) In establishing the efficiency of the alternators, the Engineer shall be satisfied as to the performance of the test motor and recent test performance figures shall be produced. Test Certificates as Clause 3.3 shall be provided.

8.4 Diesel Engine

All engines shall be separately witness tested to BS 649 at the manufacturer's works and the fuel oil, gas and lubricating oil consumptions shall conform to and verify the figures given in the Schedule of Particulars. Test Certificates as Clause 3.3 shall be provided.

8.5 Diesel Alternator Set

(1) After individual testing and mounting on bedplate, aligning and completing with all fittings and accessories, complete diesel alternator sets shall be offered for inspection and equipment operation tests run and shall not be packed or despatched without permission of the Engineer.

(2) Tenderers are to confirm that complete diesel alternator sets with all auxiliary fittings can be test run.

8.6 Control Panels

(1) The whole of the switch and control gear shall be witness tested as integral units for a complete sequence of operation and as laid down in BS 587 and based on the completeness of the circuits in the final manufactured form within the manufacturer's works. The following tests shall be carried out:

(a) Primary injection tests to ensure correct operation of the current operated protection relays and direct acting coils, over their full range settings.

(b) Balanced earth fault stability tests by primary current injection. Care must be taken to reproduce accurately the burdens of interconnecting cables. A further test to ensure correct polarity must be made after assembly.

(c) Tests on auxiliary relays at normal operating voltage by operation of associated remote relays.

(d) Correct operation of sequencing and control circuits at normal operating voltage by operation of local control switches and simulation of operation from remote control positions.

8.7 Circuit Breakers

(1) All circuit breakers shall be subject to the following tests:

(a) Routine tests including HV pressure test, mV drop tests and mechanical tests.

(b) To ensure the operation of the DC closing coil and satisfactory closing of the circuit breaker with the voltage on the coil down to 80% of its rated voltage and that mal-operation does not occur with a voltage on the coil of 120% of its rated voltage.

(c) To ensure that satisfactory trip operation of the circuit breaker occurs at no load conditions with the trip coil energized at 50% of its rated voltage.

(d) Interchangeability of withdrawals identically equipped circuit breakers, checking of all mechanical and electrical interlocks.

(2) Type test figures for heat test runs performed on identical panel types shall be made available.

8.8 Transformer

(1) The transformers shall be witness works routine tested including the following:

- Measurement of winding resistance;
- Ratio polarity and phase relationship;
- Impedance Voltage;
- Load losses;
- No load losses and no-load current;
- Insulation resistance;
- Induced over voltage withstand;
- Separate source voltage withstand.

(2) Type Test Certificates shall be provided for the following:

- Impulse voltage withstand;
- Temperature rise.

8.9 Lifting Equipment

All lifting equipment shall be witness tested at the manufacturer's works to 25% above the rated load and test certificates shall be provided.

8.10 Cables

(1) All HV cables and armored cable shall be subject to routine tests in accordance with the relevant British Standard Specification.

(2) Test certificates shall be provided against each drum and/or cable length.

(3) The tests carried out on every cable length and/or drum at manufacturer's premises shall include:

(a) High voltage DC insulation pressure test, between cores, each core to earth, metallic sheath or armour as applicable.

(b) Insulation resistance test.

(c) Core continuity and identification.

(d) Conductor resistance test.

8.11 Pressure Switches and Gauges

(1) All pressure switches, vacuum and pressure gauges shall be subject to routine tests in accordance with the relevant British Standard Specification.

(2) Test certificates shall be provided against each item of equipment.

8.12 Co-ordination of Site Testing Programme

The Contractor shall be responsible for co-ordinating the programme of site testing of all items and to ensure that all parties concerned are present during any tests to obligate their responsibilities.

8.13 Cable Tests during Installation

(1) During the period of site installation the Engineer will carry out inspections of the works to ensure that the standards of workmanship meet the specifications and are to his satisfaction. In the event of any part of the cabling installation failing to meet these requirements the installer's supervisor or foreman will immediately be informed and shall remedy the deficiency to the satisfaction of the Engineer.

(2) The Contractor shall:

(a) Provide DC test equipment and apply (after isolation), in the presence of the Engineer, the following DC test voltages on all 11,000 Volt grade PIL SWA cable between cores and between cores and sheath:

- Between cores: 34 MΩ
- Between all cores and sheath: 25 MΩ

(b) Demonstrate correct phasing out of cores in all cables throughout the works and test the insulation of all cables both between cores and between cores and earth during installation with a 'Megger' 500 Volt hand generator.

(c) Conduct soil resistivity tests in the presence of the Engineer to obtain the most suitable location for the earth electrode system.

(d) Demonstrate to the Engineer that the resistance of earth, electrode to earth conductor continuity and earth installation is in accordance with this Specification.

(3) Tests shall be performed from each major item of plant, by using an 'Earth Megger' and auxiliary return Conductor.

(4) If any portion of the Works fails to pass the tests, test of the said portion shall be repeated within a reasonable time upon the same terms and conditions.

(5) Certificates of all tests describing and giving full particulars of such tests shall be provided.

8.14 Site Testing

(1) After erection is completed the Contractor shall test fully all items of equipment and shall include provision of:

(a) All skilled and qualified operating and test staff for the testing of all equipment;

(b) Provision and disposal of all services, lubricants, and fuels other than electricity;

(c) All measuring and testing instruments to demonstrate equipment operation to the fulfilment of the works tests;

(d) All loading weights for the load testing of all lifting equipment installations;

(e) All necessary equipment for testing of all diesel fuel bulk storage tanks and fittings.

(2) All tests shall be carried out by the Contractor but shall be supervised by the Engineer and the Engineer shall be satisfied with all tests, which shall include:

(a) Lifting Equipment

Each installation inclusive of rails and beams, if applicable, shall be tested on site with test load to prove that the whole is capable of satisfactorily lifting 25% above its rated load (over complete beam length) and certificates of site tests shall be provided.

(b) Cables

Test all cables for continuity of cores and armour, and integrity of sheath, over the whole length of cable prior to being put into service and apply DC test voltage appropriate to the grade of cable.

(c) Pumps

Each set tested for capacity, head, power consumption and mechanical reliability.

(d) Units of Equipment

Each unit tested for its purpose, stability and vibration-free running over complete operating range and full reliability in all respects.

(e) Control Panel and Switchboards

Each control panel tested to demonstrate correct operation of relaying and control equipment. All isolations, fuse switches and air circuit breakers tested for correct operation. All associated cabling tested for correct phase connection.

(f) Fuel Bulk Storage

3. Fencing is measured in linear meters and the rate shall include waste and cutting, as well as fixings to posts and all line wires, barbed wires and binding wires.

9.5 Gates

If not otherwise stated, gates shall be 4 meters wide double leaf gates, made from 40 mm galvanized steel tube frame (medium class) with 8 gauge galvanized weld mesh welded to the frame. Bracing, hinges, tower bolts and locking arrangement shall be as shown on the drawing or of other approved type. The top of the gates shall be fitted with 3 strands of 12½-gauge barbed wire. The price for the gate shall include for the manufacture, installation, all bolts and padlocks etc. and painting all as shown on the drawing. Gateposts made of rolled Hollow Square Sections as shown on the drawings are measured separately.

10. Mechanical AND ELECTRICAL WORKS

10.1 Reference Standards

Unless otherwise approved, instrumentation shall comply with relevant Reference Standards including those listed below.

Table 10.1: Reference Standards – British Standard (BS)

STANDARD	SUBJECT
BS 1041	Temperature measurement
BS 1042	Method of measurement of fluid flow in closed conduits
BS 1322	Aminoplastic molding materials
BS 1646	Identification of instruments and control functions
BS 1646	Symbolic representation for process measurement control functions and instrumentation
BS I780	Bourdon tube pressure and vacuum gauges
BS 1904	Industrial platinum resistance thermometer elements
BS 2765	Dimensions of temperature detecting elements and corresponding pockets
BS 3586	Analogue direct current signals for telemetry and control
BS 3680	Methods of measurement of liquid flow in open channels
BS 3693	Recommendations for the design of scales and indexes
BS 4509	Method of evaluating transmitters for use in process control systems
BS 4671	Method of evaluating analogue chart recorders and indicators for use in process control systems
BS 5308	Instrumentation cables intended for intrinsically safe systems
BS 5490	Specification for degrees of protection provided by enclosures

BS 5558	Methods of evaluating the performance of controllers with analogue signals for use in industrial process control
BS 5792	Electromagnetic flow meters
BS 5363	Analogue signals fox process control systems
BS 6121	Mechanical cable glands
BS 6739	Instrumentation in process control systems: installation design and practice.

10.2 General Specifications

The General Specifications for the Electrical and Mechanical Works are to be read in conjunction with other General Specifications. Both documents are to be regarded as mutually explanatory. Any discrepancy shall be reported by the Contractor to the Engineer immediately, who shall clarify and inform the Contractor of his decision.

The General Specifications for the Electrical and Mechanical Works generally refer to all machinery components, mechanical and electrical equipment; pump sets, treatment plants, control systems etc. These Specifications shall serve to specify all electrical and mechanical works wherever applicable within the scope of this Contract.

10.3 Scope of Works

These Specifications include the supply, erection, installation, site testing, painting, commissioning of the following electrical and mechanical equipment:

a. Submersible pumps and associated equipment for pumping station;
b. Pressure pipeline, fittings for all pipe work, valves etc.;
c. Power supply overhead line, transformer, metering, distribution and control panels to pump station provided under this Contract;
d. Cabling and wiring connecting up all plants provided under this Contract;
e. Spares, tools and other ancillary equipment;
f. General electrical services within all buildings and compounds;
g. Construction and equipment of sewage treatment plant including workshop and tools, electrical and mechanical equipment;
h. Conveying of power to Pumping Station, installations for lightning protection and earthing system.

10.4 Materials General

1. Where the letters "DIN" are used, they denote the German Standard Specifications.
2. Goods and materials delivered to site shall comply with the requirements of the latest issue (with up to date amendments) of the relevant DIN Standard or other National Standard Specification approved by the Engineer except where such differs from the detailed specification.
3. Goods and materials not manufactured to DIN Specification shall be of a quality not inferior to that described in the DIN Specification.
4. The substitution of any such Specification for a DIN Specification shall only be made with the approval of the Engineer.
5. If any redesign of the works is necessitated by the adoption of such alternatives the costs incurred shall be borne by the Contractor.
6. Unless otherwise specified and subject to the approval of the Engineer the use, installation, application or fixing of materials and components shall be in accordance with all applicable

recommendation of the manufacturers. Where appropriate, the Contractor shall make use of any technical advisory services offered by manufacturers.

10.5 Metric Standardisation

The entire project shall be completed in accordance with the metric system and metric units. Drawing components, dimensions and calibrations shall be in metric units and generally in accordance with the SI unit standard.

10.10 Work Program

The program of work to be executed and schedules of prices shall be divided into three periods, viz.:

a. **Delivery Period** - Design and manufacture of all equipment to be supplied under the Contract. Inspection and Works Testing of individual items and complete units and secure packing for overseas transportation.
b. **Carriage** - Transportation CIF charges, customs duties, loading and off-loading at all points and delivery to site.
c. **Erection Period** - Erection/Installation of all items, Site Testing, Safe Keeping, Commissioning and Site Attendance Period, including all insurance.

10.11 Schedule of Particulars

Particulars given in the schedules shall be binding for the Contractor and may not be varied, except with the Engineer's written approval. The Engineer's approval shall not in any way relieve the Contractor of any of his obligations under the Contract.

10.12 Spare Parts

The Employer shall in no way be deemed to be placed under any obligation to purchase all or any of the spare parts listed or recommended in the various schedules of spare parts section. The Contractor shall obtain and provide detailed schedules in duplicate of all the spare parts supplied. During commissioning on site, all spare parts shall be checked against the schedule and the Contractor shall obtain a certificate of 'Take Over' from the Engineer.

10.13 Drawings and Data to be supplied after Award

The following drawings and data shall be supplied by the Contractor after Award of the Contract:

- Drawings showing the general arrangement, typical details and dimensions of the installation of the plant and associated pipe work and lifting equipment, power supply, control panels, distribution panels, transformers, etc. and general electrical installation;
- Detailed specification of the various items proposed by the Contractor;
- Preliminary curves for all pumping units indicating Net Head/Efficiency/kW absorbed, plotted against delivery.
-

The drawings and data shall be accompanied by:

- System descriptions with principles of scheme;
- Motor list/connected loads/power demand;
- Functional description of power supply and distribution;
- Information pertaining to proposed battery systems with anticipated location/space requirements;
- Construction proposals for switch gear;
- Proposals for cabling (interior/exterior), high/low voltage, indicating cable types;
- Cable lists which served as basis for cost calculation of Tender.

Subject to the requirements and limitations of this Specification, the Contractor shall be responsible for the general and detailed design of all plant, associated pipe work and lifting equipment, power supply, control panels and wiring details etc.

Enclosed with this document shall be drawings showing the proposed arrangement of the various installations. The Contractor is required to maintain the arrangements shown in the Tender Drawings as far as possible, subject to the differences in the physical dimensions of the equipment offered.

The Contractor may submit alternative arrangements and proposals, etc. but these shall be quoted as alternatives to the design detailed in this document. Any alternative design proposed must be fully described to facilitate a detailed comparison.

In case where the Contractor has proposed his own design, he shall be responsible for preparing any necessary modifications to the design and drawings.

All drawings shall be dimensioned and detailed in SI (metric) units.

10.14 Working Drawings

Within a period of eight weeks following the Letter of Acceptance the Contractor shall submit to the Engineer in triplicate the following drawings for approval:

- General arrangement drawings and sectional views which shall be fully dimensioned showing in detail plant and ancillary equipment to be supplied under the Contract;
- Foundation drawings for each item of plant, showing weights of plant, recommended foundations, kinds of materials and finishes, detailing all plinths, thrust blocks, ducts, openings, motor support structural members and chequer plate flooring, bolt holes, chases and all other works which have to be incorporated in the Civil Engineering works. The drawings shall also indicate minimum door openings required to ensure ease of entry for pumps, motors, control panels etc.;
- Drawings indicating loads at points of concentration, the stresses in structures due to temporary loads, the size and class of materials of temporary members and supports used for installation of plant and such calculations to show that the temporary support equipment will not damage any portion of the completed structure;

Electrical Drawings: On the basis of the simplified documents the Contractor shall prepare the following supplementary details:

- Wiring diagrams, calculations and construction plans and drawings, installation plans, complete cable lists, clamping plans etc., as well as lists of parts, clearly indicating material and type of proposed equipment;
- This also applies to the control and signal circuits as well as interlocking and interrelated control of other technical sectors;
- A clear illustration according to pertinent standards is imperative;
- A complete documentation (lists of parts, descriptions, operation and maintenance instructions, test reports and certificates, PTB-certificates with type approval of explosion protected equipment etc.) shall be submitted prior to the commencement of installation.
- Copies of proposed panel layouts.

One copy of the drawings will be retained for record purposes whilst one copy will be returned to the Contractor stamped "APPROVED" and/or marked up with any necessary modifications

or revisions. Where any modifications or revisions are marked on a drawing, the Contractor shall make the necessary corrections and resubmit the drawing for approval.

Manufacture of the equipment shall not commence until such time as the Contractor is in receipt of approved drawings.

Approval of the Contractor's drawings or documents shall not release the Contractor of any of his obligations under the Contract.

After the Engineer's approval of a drawing, no changes shall be made to that drawing.

10.15 Record Drawings and Maintenance Manuals

Within the period specified in the Conditions of Contract the following record drawings and manuals shall be provided in English version:

- General arrangement drawings;
- Comprehensive diagrams for the control panels and power supply and distribution, in form of schematics and diagrams of connection.
- Overall electrical/mechanical and control schematics for the Works detailing interconnections between the various items of the plant;
- Actual (not typical) section drawings, where applicable, of all items of the plant.

The above drawings shall include all modifications to the equipment which may arise as a result of the testing and commissioning of the equipment and associated plant.

The drawings shall be size DIN A1 (594 x 841 mm).

The Contractor shall provide comprehensive Operation and Maintenance Manuals in English language in "loose sheet" volumes, covering all items of plant. Four sets of manuals in each language shall be provided. They shall describe the specific installations and give details of the complete procedure for any operation likely to be carried out during the life of the plant including erection, commissioning, testing, operation and maintenance, dismantling and repair. The manuals shall include complete referenced part lists and all manufacturers' addresses to facilitate the ordering of spare parts. Any maintenance and fault finding charts shall also be supplied separately for display at the particular installations.

10.16 Protection and Packing for Despatch

The Contractor shall ensure before despatch from the manufacturer's works that all plant is adequately protected by painting or by other approved means for the whole period of transit, storage and erection, against corrosion and accidental damage. The Contractor shall be held responsible for the plant being so packed and/or protected for overseas shipment as to ensure that it reaches the Site intact and undamaged. The plant shall be packed to withstand rough handling in transit and all packages shall be suitable for storage including All items of Plant shall be clearly marked in English for identification against the packing list.

Every crate or package shall contain in English a packing list in a waterproof envelope.

10.17 Unloading, Erection and Running of Plant

The Contractor shall make due allowance for the following commitments:

- Making his own arrangements for all appropriate skilled and unskilled labour necessary to unload, move into position or storage of all items of equipment and plant supplied. The Contractor shall be responsible for any damage occasioned.

- Provide all cranage and equipment required to unload and place in storage and to load from storage and move into position and erect all items of equipment and plant detailed in his supply.
- Providing the necessary technical personnel either from the manufacturers or his own staff for the installing testing and setting to work of specialist equipment.
- Providing adequate protection for the plant and plant finish from the time it is delivered to Site, during storage and erection periods until the Take-over Certificate is issued. (In particular the Contractor shall provide and fix adequate sheeting etc. to prevent the ingress of dust and dirt both during erection and whilst building finishes are carried out after erection).
- Inspecting related structures and obtaining the Engineer's agreement to the proposed programme prior to erection of any item of equipment.
- Upon the complete erection of the whole of the Plant and auxiliary apparatus, setting the Plant to work in conjunction with the arrangements to be made with the Contractor and the Engineer.

10.18 Storage and Safe Keeping

The Contractor is to provide site storage the arrangements of which shall be approved by the Engineer and which shall comply with the following minimum requirements:

Category A	Electrical Equipment	Covered, dust-proof and vermin-proof
Category B	Rotating Mechanical Machinery, Valves	Covered
Category C	Pipes, Steelworks etc.	Shaded

The Contractor shall on commencement of the Contract confirm the space he requires under each category.

10.19 Foundations, Builders Work and Setting Out of Machinery

The Contractor, in accordance with the Civil Engineering Specifications, shall be responsible for providing and preparing all the necessary foundations and bases for the various items of plant, including the forming of holes for pipe work, steelwork, cabling rag bolts and where necessary the building in of foundation bolts and sundry items of plant equipment and other apparatus strictly in accordance with the foundation drawings which shall be supplied by the Contractor and spaces will be left between the concrete and bedplates etc., for grouting and building in later by the Main Civil Contractor. The Contractor shall be responsible for the accuracy of the particulars given on the Drawings.

When the foundations are completed and the structure is in a suitable condition as agreed by the Engineer the Contractor shall install the plant.

The Contractor shall observe the following requirements during erection:

All machinery shall be mounted on steel packings ground flat on both sides. The packing shall be selected in thickness to take up variations in the level of the concrete foundation. Only one steel packing of selected thickness shall be used on each location which shall be adjacent to each holding-down bolt. The number of shims shall not exceed two at each location and the thickness of each shim shall not exceed 3 mm.

All machinery shall be aligned levelled and pulled down by the nuts of the holding-down bolts with a spanner of normal length and no grout shall be applied until the machinery has been run and checked by the Engineer for stability and vibration.

The Contractor will clean the concrete and prepare for grouting up after the equipment pumps, motors, girders etc. have been finally fixed, jacked up and run.

The Contractor will be responsible for the grouting and final building in, of the equipment, the Contractor shall take all responsibility for the satisfactory nature of this work and shall have a representative present while the concrete is being put in.

If it is necessary to build in any item before the erection of the main machinery the Contractor shall be responsible for these to be on Site to meet the erection programme and he shall advise the Main Civil Engineering Contractor of the items required to be 'built-in' prior to the main erection.

10.20 Built-in Items

The Contractor shall inform the Supplier, at the time of placing an order, of the period during which items of equipment to be built-in shall be delivered to the Site.

10.21 Location and Alignment

Where separate items of interconnected plant, such as motors, couplings, pedestals, pumps and similar items depend upon correct alignment for satisfactory operation, each and every item shall be positively located in its correct operational position by means of dowels locating correct re-alignment can be easily achieved when re-assembling the items after removal for overhauls.

10.22 Operation and Maintenance Instructions

The Contractor shall submit to the Engineer not later than 1 month before Commissioning draft copies of the Operation and Maintenance instruction in English for the whole of the plant.

The operation instructions shall be correct and fully descriptive and prepared in such a way as to provide a step by step description of the preparation and setting to work of the whole of the plant and its shutting down.

Manuals prepared by the Contractor and manuals relating to plant supplied by any sub-contractors shall be printed (not duplicated) and shall all be bound into suitable A4 size loose leaf ring binders, with tough waterproof and greaseproof covers.

The Contractor's attention is drawn to the need to ensure that the following items are included in the Maintenance Manuals:

- Schedule of equipment supplied, giving manufacturer's name and appropriate Make/Model No. / Cat. No.;
- Schedule of routine maintenance for all equipment supplied;
- Schedule of spares supplied;
- Schedule of tools supplied;
- Sectional arrangement drawings of major items of plant, i.e. pumps, valves etc. with dismantling instruction;
- Plant layout drawings showing the erected installation;
- General arrangement and schematic diagrams of the "as-installed" control panels;
- "As-wired" diagrams of all electrical connections, between the control panel and installed loads;
- Full and comprehensive instructions for all items of equipment supplied;

- Test certificates for motors / pumps / diesel alternator / lifting equipment / transformers / electrical installation and other items, where appropriate;
- Pump performance curves as tested;
- System curves;
- Schedule of recommended lubricants and their equivalents, which must be readily obtainable.
- At the location of each type of equipment shall be supplied and mounted on the wall in a conspicuous position:

1 No.	Board mounted Schedule of Routine Maintenance to be carried out on plant.
1 No.	Board mounted set of Instructions for Operation of the Plant

The print on each board is to be of large clear type in English translation. Boards shall be of plastic and suitably protected.

10.23 Technical Records

The Contractor shall submit to the Engineer, not later than one month before commissioning, copies in English of technical data such as the following:

- Information on suppliers (address, fax, telephone, e-mail) for the whole of the plant's mechanical and electrical installations;
- Full technical documentation for the above items
- Step-by-step description of the preparation and setting to work of the whole of the above items describing their operational interrelations with the operational system of the plant
- Not later than the time at which the works are taken over, the Contractor shall provide four copies of Instruction Manuals in English to the approval of the Engineer to cover all details of daily operation of each item and requirements regarding the functional relation with the plant as a whole and of all the individual items, together with routine maintenance instructions.

11. MECHANICAL WORKS

11.1 General Requirements

This Part of the Specifications sets out the minimum standards of materials, workmanship and design to be used by the Contractor for the mechanical equipment. Reference to any specific material or equipment does not necessarily imply that such material or equipment is included in the Works.

All component parts of the Works shall, unless otherwise specified, comply with the provisions of this Chapter or be subject to the approval of the Engineer.

11.2 Standard Specification

All materials and workmanship shall comply with the current national standards of the country of manufacture provided that these standards are not less stringent than the equivalent specified British Standards, or provided that they comply with the requirements of the International Organisation for Standardisation (ISO) or the International Electro-technical Commission (ICE) as appropriate.

The Contractor may be asked to make copies of standards available to the Engineer together with their English translations. He shall provide these as requested for prior assessment and for use during inspection and testing.

11.3 Workmanship

Workmanship and the general finish of installations shall be of first-class commercial quality and in accordance with the best workshop practice, and shall be performed by persons skilled in their respective trades.

Pipe work, fittings etc., shall be fitted in a neat, straight and symmetrical manner so as to present a pleasing appearance.

Indicating gauges fitted to machine assemblies or to control panels shall generally be of similar style and grouped in a neat manner. All welds and flame cuts shall have a smooth finish by means of careful grinding. Chequer plate coverings shall be fixed squarely in their frames and with their patterns properly lined-up. Hand railings shall be free from burrs.

Particular attention shall be paid to the prevention of corrosion due to the close proximity of dissimilar metals. Where it is necessary to use dissimilar metals in contact, they shall be selected so that the bimetallic corrosion is as low as possible.

11.4 Manuals for Monitoring, Operation and Maintenance

The Contactor shall supply to the Engineer five (5) sets of Monitoring, Operation and Maintenance Manuals for each pump supplied under this contract covering all technical service of systems. The final version shall be bound in hard greaseproof covers in A4 size title in from and spins. The manuals shall be handed over to the Engineer no later than one month prior to the commissioning. A draft copy of the manuals shall be submitted to the Engineer for comments and/or approval at least two months before the Test on Completion.

Standard product manuals shall be sent to the Employer within one month of the Engineer's Order to Commence.

The Final manuals shall have texts in English and shall include the following:

a. Description of plant (general, mechanical and electrical)
b. Description of operation of plant, including start-up/close down procedures
c. Technical data, capacities.
d. List of equipment with identification numbers as labeled, manufacturer's name, equipment type, serial number and settings explained
e. Manufacturers as built drawings and diagrams for all units and parts
f. Copies of test reports.
g. Maintenance instruction including cleaning, routine and timing of preventive maintenance
h. Monitoring procedure instructions including masters for monitoring schedules-manual readings, logbook.
i. List of spare parts
j. List of tools
k. Name, Address, Telephone, fax numbers and Email address of both manufacturer or/and local agents.
l. Included in the Manuals shall be a section on trouble shooting.

11.5 Tests, Inspection and Commissioning

This section covers the requirement for testing and inspection of the pumps to be supplied and delivered under the contract.

The following publications are referred to in this section

a. BS 587 Motor starters and controllers
b. BS 599 Methods of testing pumps

c. BS 4999 General requirements for rotating electrical machine

The following submissions are required to be included in the Tender:

a. Details of method of testing.
b. Copies of certificates of tests carried out.

No pumps shall be dispatched from manufacturer's works without the written permission of the Engineer. Full details of the method of testing proposed for each item shall be submitted with the Tender.

Unless otherwise specified, all testing of goods shall be performed by the Contractor

Satisfactory proof of compliance with the specification shall be submitted as directed by the Engineer in one or more of the following ways:

a. Manufacturers Certificate of Compliance - in the case of standing labeled stock products of standard manufacture which have a record of satisfying performance in similar works over a period of not less than two (2) years. The Engineer may accept a notarized statement from the manufacturer certifying that the product conforms to the applicable specification.
b. Mill Certificates - for materials where such practice is the usual standards, the Engineer may accept the manufacturer's certified mill and laboratory certificate.
c. Testing Laboratory Certificates- the Engineer may accept a certificate from a commercial testing laboratory satisfactory to him certifying that the product has been tested within a period acceptable to the Engineer and that it conforms to the requirements of the Specification.
d. Report of Actual Laboratory Test - the Engineer may require that the Contractor makes actual tests of any product and submits a report of the specified test. Such tests shall be made by a commercial testing laboratory to the engineer.

The cost of any additional laboratory test required through the submission of samples shall be borne by the Contractor.

The furnishing of relevant certificates shall be a pre-condition for taking over by the Employer of the supplies.

11.6 Test Instruments

The Contractor shall satisfy the Engineer of the accuracy of all instruments used for the tests and if required shall produce recent calibration tests, or otherwise have them calibrated at his own expense by an independent authority.

11.7 Test Certificates

Test certificates shall be provided giving a detailed record of all electrical and mechanical tests carried out on the pumps both in the manufacture's works and at Site.

Copies of certificates shall be provided in triplicate. The certificates shall bear the description of the appropriate item of Plant together with its serial number of other identifying reference, the methods of tests, standard to which the items was tested and full results of such tests.

The certificate shall be signed by the manufacturer and where appropriate the Engineer, to certify satisfactory completion of the tests. Copies of test certificates of major items shall be included in the operating and maintenance instructions.

All pumps shall be hydraulically tested to the pressure where specified or to at least 1.5 times the maximum working pressure.

All tests will be carried out by other as directed by the Contractor and shall be carried out to the satisfaction of the Engineer. The tests shall include pumps, each set of capacity, head, power consumption, and mechanical reliability.

11.8 Commissioning

Following the successful site testing of all plant the Contactor shall provide all skilled personnel for the commissioning of the plant and shall demonstrate to the Engineer, using the operating instructions referred to in section 1.18.24 of the General Specification that the complete installation is capable of meeting the design requirements; also during the commissioning the Employers staff shall be instructed in the operation of all plant, for a period of not less than two weeks or as directed by the Engineer.

Commissioning shall not be undertaken without the final approved instructions, and the Employer will not accept any plant without full copies of the operating and maintenance instructions.

All spares, tools and all other loose item shall be checked.

11.9 Welding

In all cases where welds are liable to be highly stressed the contractor shall supply to the engineer before fabrication commences detailed drawings of all weld preparations and procedures proposed. No such welding shall be carried out before the Engineer has approved procedures. No alteration shall be made to any previously approved procedures without prior approval of the Engineer. Welders shall be qualified in accordance with the requirements of the appropriate section of BS 4872.

11.10 Painting and Protection

Paints including primers and undercoats shall be obtained from the same manufacturers and shall, except where application has to be made within a limited time of mixing, be ready mixed for use and compatible with one another. Only paint, which is delivered in sealed containers bearing the name of the manufacturers and properly labeled as to its quality and instruction, will be acceptable.

All surfaces of the Plant shall be protected against corrosion and/or erosion with the exception of stainless materials and rotating gland or bearing surfaces.

Electroplating or galvanizing, to BS 729 or 4921, will be accepted as an alternative to painting for small ferrous components.

11.11 Pressure Gauges

Pressure gauges shall comply with BS 1780.

Unless otherwise specified scales shall be calibrated in meters head of water, with zero representing atmospheric pressure. The lettering shall be in black.

When pressure gauges are mounted within or on a panel, a suitable connection for a test gauge shall be provided.

11.12 Water Flow Meter

The water flow meter shall be provided with two (2) relays, digital and analogue. In additional, it shall have the following features:

a. Backlit LCD display
b. Simple push button operation
c. Independently calibrated flow and totalizer displays
d. Two 8-digit totalizers

e. Programmable alarms
f. Scalable 4 to 30mA
g. Operating temperature = 25°C
h. Power = AAA batteries that are easily replaced yearly by the user or as per manufacturer specification

11.13 Castings

The structure of the castings shall be homogeneous and free from non-metallic inclusions and other defects. All surfaces of castings which are not machined shall be fettled to remove all foundry irregularities.

Minor defects not exceeding 10 mm in depth or 10% of total metal thickness whichever is less or which will not ultimately affect the strength and serviceability of the casting may be repaired by welding. The Engineer shall be notified of larger defects and no repair welding of such defects shall be carried out without his prior approval.

11.14 Forgings

Major stress-bearing forgings shall be made to a standard specification which shall be submitted to the Engineer for approval before work begins. They shall be subject to internal examination and non-destructive tests for the detection of flaws and shall be heat-treated for the relief of residual stress. The name of the maker and particulars of the heat treatment proposed for each major forging shall be submitted to the Engineer.

11.15 Non-Metallic Materials

Fabrics, cork, paper and similar materials which are not subsequently to be protected by impregnation shall be treated with a fungicide. Sleeving and fabrics treated with linseed oil varnish will not be permitted.

The use of organic materials shall be avoided as far as possible, but where these have to be used they shall be treated to make them fire resistant and non-flame propagating.

11.16 Engineering Hardware

Nuts and bolts for pressure fittings shall be of high quality steel machined on the shank and under the head and nut. Bolts shall be of such a length that only one to three threads shall show through the nut when in the fully tightened condition.

Fitted bolts shall be a light driving fit in the reamed holes they occupy, shall have the screwed portion of such a diameter that it will not be damaged in driving and shall be marked in a conspicuous position to ensure correct assembly at site.

Washers, locking devices and anti-vibration fittings shall be provided where necessary to ensure that no bending stress is caused in the bolt.

When there is a risk of corrosion, bolts and studs shall be designed so that the maximum stress in the bolt does not exceed half the yield stress of the material under all conditions.

All bolts, nuts and screws which are subject to frequent adjustment or removal in the course of maintenance and repair shall be made of nickel-bearing stainless steel or brass.

All bolts, nuts and screws used on submerged equipment shall be made of stainless steel.

Metal washers for general purposes shall comply with BS 4320.

11.17 Threads

All threads shall be of preferred metric sizes with the standard coarse form of medium fit to BS 3643 except for special applications for which the metric fine thread may be utilized, or other thread forms subject to the approval of the Engineer.

11.18 Guards for Moving Parts

All moving parts shall be protected by safety guards.

Guards shall be rigid, securely fixed and designed to allow normal operation, running maintenance and routine inspection to be carried out on equipment, without the need to remove the guard. Where this is impractical, guards shall be designed for easy fixing, dismantling and re-assembly.

11.19 Safeguarding the instruments

The Contractor shall ensure that all designs and equipment for which he is responsible are safe. Nothing in this Specification shall remove the Contractor's obligation of drawing the attention of the Engineer to any feature of the Works which is not consistent with safety, or to prevent him making proposals for incorporating equipment or designs which would increase the safety of the Plant.

The installation layout and plant design shall not allow any item of plant to be so positioned that danger to operating personnel could arise during normal operation and maintenance. Particular attention shall be paid to the position of hot pipes, valve hand wheels, air vents and rotating machinery.

11.20 Rating Plates, Name Plates and Labels

The Contractor shall ensure that each main and auxiliary item of Plant and equipment shall have permanently attached to it in a conspicuous position a nameplate and rating plate. Upon these shall be engraved the manufacturer's name, direction of rotation, type and serial number of plant, details of the loading and duty at which the item of Plant has been designed to operate, and such diagrams as are deemed necessary. All indicating and operating devices shall have securely attached to them or marked upon them designations as to their function and proper manner of use. Provision shall be made to incorporate descriptive numbering codes.

All valves shall have an identification plate bearing the valve number and a short description of valve function.

On major items of plant and valves, details of proposed plates, labels and inscriptions shall be provided by the Contractor for approval by the Engineer.

Such nameplates, rating plates and labels shall be of a non-flame propagating material, either non-hygroscopic or transparent plastic, with engraved lettering of a contrasting colour. Fixing shall be by means of screws. No drive rivets or adhesives shall be used.

11.21 Lubrication General

Provision shall be made for suitable lubrication to ensure smooth operation, heat removal and freedom from undue wear. Plant selected shall require minimum lubrication attendance and down time for lubricant change.

The Contractor shall supply the first fill of oil and grease from approved lubricants suppliers.

All grease nipples, oil cups and dip sticks shall be readily accessible, being piped to a point as near as practicable to the lubrication point.

11.22 Oil Lubrication

Gear boxes and oil baths shall be provided with adequately sized filling and draining plugs and suitable means of oil level indication.

Roller chain drives shall have oil bath reservoir lubrication.

All points where oil leakage may occur shall be suitably trapped to prevent oil contamination of water. Oil filling and drain points shall be arranged so as to avoid the risk of contamination of water by accidental spillage.

All oil lubricated machinery shall utilise a common grade of oil which is readily available. High temperature high performance lubricants shall be avoided as far as possible.

11.23 Grease Lubrication

Grease application shall be by steel lubrication nipples manufactured in accordance with BS 1486.

Anti-friction bearings requiring infrequent charging shall be fitted with hydraulic type nipples.

11.24 Gaskets and Joint Rings

Joint rings suitable for hot or cold water or specified hydrocarbon fluids or for drainage or sewerage applications shall be manufactured to conform with BS 2494 and shall be of chloroprene rubber or other approved synthetic material suitable for temperatures up to 80 deg. C, or greater to suit the application.

Only lubricants recommended by the manufacturer shall be used in connection with rubber rings and these lubricants shall not contain any constituent soluble in water of the quality stated in the Specification, shall be suitable for the climatic conditions at the Site and shall contain an approved bactericide. Graphite grease or similar shall be applied to the threads of bolts before joints are made.

11.25 Electroplating, Galvanising and Sherardising

Hot dip galvanising shall be carried out in accordance with BS 729 with a deposition rate of at least 460 g/m². After galvanising all parts shall be passivated to minimise discoloration.

Electroplating or galvanising will be acceptable as an alternative to painting for small ferrous components.

All fixing bolts, washers, nuts and other fixings required for erection shall be spun galvanised, or sherardised in accordance with BS 4921 unless otherwise specified.

11.26 Noise

No item of Plant intended for installation in a building shall produce a sound pressure level exceeding 80/85 dB(A) when measured at a distance of 1 m from the reference surface of that item in a horizontal direction and under environmental conditions appropriate to the test requirements of ISO 3746 "Acoustic Determination of Sound Power Levels of Noise Services - Survey Methods".

11.27 Vibration

All rotating elements shall be dynamically balanced so that the level of vibration at any point on a machine when operating at Site, either singly or with other machines, and at any speed throughout the operating range, shall be within the limits of Class IV, grade B, as defined in BS 4675, Part 1. "Machine" shall mean a pump including drive shafting, motor and bedplate, generator, compressor, etc.

Pipe work, valves and other equipment connected to the machine, or forming part of the operating system, shall be provided with adequate supports, brackets and fixtures, as necessary, to restrict any induced vibration to a minimum, under any operating condition.

Vibration measurements shall be taken on Site by the Contractor at various points on each

11.28 Corrosion and Erosion

The Plant shall be so designed, by the employment of suitable materials, by the choice of operating speeds and by the design of components and protective finishes that the effects of corrosion and erosion are kept to a practical minimum. No component part of the pump should require replacement from either cause within a period of two years from commissioning and being put to use.

Unless otherwise specified, the Contractor shall make proper provision for the prevention of corrosion and erosion in any part of his Plant. Such provision shall include the use of suitable materials, choice of operating speeds, design of components, and type of protective coatings and finishes.

11.29 Precautions against Damp

Special precautions shall be taken to prevent corrosion due to humidity, rainfall and moisture.

All wall mounted equipment shall be fitted with spacers to provide a minimum gap of 5 mm. All holes in equipment shall be effectively sealed against the ingress of water. All items exposed to the weather or water shall be free of water traps; where necessary, drain holes shall be provided to prevent the accumulation of water.

11.30 Seals General

The Contractor shall select a seal, compatible with his Plant and best suited for the worst conditions likely to be met when the Plant is in operation.

All seal materials shall be compatible with and/or resistant to the fluid or gas being handled. For potable water, seal materials shall be specifically approved.

11.31 Soft Packed Glands

Shafts shall be provided with renewable gland sleeves. Glands, subject to abrasive liquors or negative pressures, shall embody suitably positioned lantern rings and a clean water continuous flushing system, operative whenever the Plant is in motion.

Gland adjustment nuts shall be readily accessible for routine maintenance.

11.32 Mechanical Seals

Mechanical seals which are subject to abrasive liquor or gas, negative pressures or corrosive elements, shall be provided with a clean water continuous gland flushing system, operative when the item of plant is in motion or the corrosive element present.

A back-to-back sealing arrangement with a flushing/cooling system shall be accepted as satisfying the requirements of this clause.

11.33 Bearings below Water

The Contractor shall select the most appropriate type of bearing for the Plant being supplied.

Equipment with vertical shafts shall have thrust and guide bearings. All bearings shall be designed to exclude the ingress of dust and water.

11.34 Bearings above Water

Single journal plain bearings shall be phosphor bronze or synthetic lubrication impregnated bushes with carbon or stainless steel journals respectively. Synthetic bearings shall only be used where bearing condition can be inspected readily.

Plain type bearings shall be self-lubricating by grease, forced oil or impregnation.

Ball and roller type bearings shall be adequately lubricated by oil or grease and sealed to

11.35 Safety Signs

All signs providing health and safety information or instructions shall comply with BS 5378 Part 1 as specified in the Safety Signs Regulations 1980.

The signs shall be of durable quality and shall comprise a substrate of 22 gauge aluminium, pre-drilled for fixing and with radiused corners free of burrs or sharp edges. Symbols and lettering shall be screen printed.

11.36 Submersible Pumps

Submersible pumps shall be designed to pump satisfactorily solids of up to 100 mm diameter and shall be non-clogging.

Unless otherwise specified, the pumps shall be designed to have stable head/discharge characteristic so as to avoid large changes of discharge with small changes of head. They shall be capable of operating with the sump surcharged to its maximum level. Pump motors shall be rated to meet this condition.

Pumps bodies, covers, brackets, bearing housings, wearing plates, eye rings, support brackets and similar items shall be manufactured from close-grained cast iron or nickel iron.

Pump casing shall be of substantial construction to give long life under abrasive conditions and to enable them to withstand shock loads caused by solids in suspension.

Impellers shall be of best quality close-grained cast iron or nickel iron.

Shafting shall be of high tensile steel of adequate size to avoid the possibility of fatigue failure. The duty speed range shall be well below the first critical speed. At any change in diameter of the shaft the shoulder shall be generously radiused to reduce stress concentrations.

The shafts of pumps fitted with packed glands shall be made wear resistant where they pass through the stuffing box by the application of "Stellite" or similar and approved. Alternatively suitable stainless steel wearing sleeves shall be fitted.

Pumps shall be lowered into the sump on guide rails and be located to their respective discharge pipe work with an angle flange connection and self-locating clamps.

The pump motor shall be a maximum of 1500 rpm and of squirrel cage induction type, with protection class IP 68 and be continuously rated, special attention should be paid to the climatic condition.

The motor shall be protected with a moisture resistant Class "F" insulation capable of resisting temperature of up to 155°C. For monitoring moisture intrusion into the motor cavity, the pump shall be supplied with an additional and independent moisture sensor in the motor cavity.

The pump/motor shaft shall rotate on at minimum two (2) grease lubricated and adequately sized bearings with a B10 bearing life of at minimum 50,000 hours.

The pumps power and control cable entry design shall ensure that no entry of moisture into the pumps terminal board and/or motor is possible even if the cable is damaged.

11.37 Mixers

High speed or low speed motor driven mixers for chemical mixing shall have a stainless steel drive shaft and stirrer driven by a totally enclosed fan ventilated, three phase, electric motor, with rotational speed not exceeding 1000rpm.

11.38 Bedplates

Bedplates shall be provided to secure both the motor and its associated drive (pump/compressor/blower) in a rigid assembly.

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Bedplates shall be provided to secure both the motor and its associated drive (pump/compressor/blower) in a rigid assembly.

Bedplates shall be hot dipped galvanized except for the machined surfaces which shall be left as bare metal and protected by grease. Where this is impracticable, a zinc rust-inhibiting primer shall be used followed by finishing coats as specified to be applied in the manufacturers works.

11.39 Spare Parts

The Tenderer shall propose and add to the tender a list of spare parts for a maintenance and repair period equivalent to 2 years for five (5) pumps for the following products:

a. Pumps and motors
b. Compressors

11.40 Valves

All valves shall be suitable for use with water at the temperatures and pressures specified or otherwise as required for the application. Generally, the pressure designation shall not be less than PN 10.

Unless otherwise specified, valves shall have integral flanges drilled to BS 4504 Section 3.2 or BS 4772 where applicable. Flanges to other standards shall be used only if approved by the Engineer and provided that any differences do not affect mating dimensions. Back faces of flanges shall be machined.

All standard valves shall be suitable for frequent operation and for infrequent operation after long periods in the open or closed condition.

Rubber used in valves shall be ethylene propylene rubber (EPDM or EPM) or styrene butadiene rubber (SBR). It shall comply with the requirements of Appendix B of BS 5155, be suitable for making a long term flexible seal and be resistant to mechanical, chemical or bacteriological attack leading to deterioration of the flexible seal.

Unless otherwise specified or expressly approved by the Engineer, valve components shall be of materials not inferior in strength or resistance to corrosion to those listed below:

a.	Bodies, covers, cowls, grade and plungers	:	Spheroidal graphite iron to BS 2789, grade 500/7 or cast iron to BS 1452 grade 220.
b.	Pistons, sleeves, liners, guides, bushes, seats, rings and seat seals	:	Bronze to BS 1400 grade PB1 or gunmetal to BS 1400 grade LG2.
c.	Hinge bushes and pins	:	Bronze to BS 2874 grade PB 102.
d.	Valve stems, spindles other than extension spindles and pins	:	Stainless steel to BS 970: Part 1, grade 410 S21.
e.	Extension spindles (plain ends)	:	Mild steel to BS 970: Part 1 grade 220 MO7.

11.41 Gate Valves

Standard gate valves up to and including 1000 mm nominal diameter shall conform to the requirements of BS 5150 for copper alloy faced or resilient seated valves with solid or split wedge, save that gate valves up to and including 600 mm nominal diameter may alternatively conform to BS 5163.

Valve spindles shall be of the internal non-rising type. The valve seal shall be replaceable with the valve fully open and the main under pressure.

Resilient seated valves shall have straight-through bores.

Unless otherwise specified, gate valves in chambers and other similar locations shall be provided with extension spindles with intermediate guides where necessary and hand wheels. Valves which are to be buried in the ground shall be provided with extension spindles, spindle caps, spindle supports, protection tubes and surface boxes as required.

11.42 Butterfly Valves

Butterfly valves shall comply with BS 5155, except as specified herein. Valves shall be suitable for mounting in any position.

The Contractor shall provide details of the materials of manufacture and the design of butterfly valves, including the access route to repair or replace seals. He shall provide evidence to show that the proposed materials and designs for the sealing and seating arrangements have given satisfactory performance in similar conditions elsewhere.

Valve seats which extend over the face of the flanges to secure the seat in place, or which require surface grinding and/or hand fitting of the disc, or designs which require the adjoining pipe flange to retain the seat in place and resist line pressure, are not acceptable.

11.43 Air Valves

Air valves shall be provided for installation at high points or changes in gradient in pipelines and elsewhere as shown on the Drawings, to fulfil the following functions:

- To exhaust air from a pipeline automatically when it is being filled with water, the air being released at a sufficiently high rate to prevent back pressure restriction of water inflow rate;
- To ventilate a pipeline automatically when it is being emptied of water, the air inflow rate being sufficiently high to prevent the development of vacuum conditions in the pipelines;
- To release air accumulating in pipelines automatically during normal working conditions.
- Air valves shall be of one of the following types:
- Double orifice type with a large orifice for automatic ventilation or exhaust of the pipeline and a smaller orifice for automatic release of air under normal working pressure.
- Single large orifice type for automatic ventilation or exhaust of pipeline.
- Single small orifice type for automatic release of air under normal working pressure.

Air valves shall be designed so that each float seats against its orifice or causes the orifice to be closed without leakage at all pressures between 0.2 bar g. and the specified test pressure. Balls and seats shall be designed so as to minimise the risk of adhesion of the ball to the seat. They shall be of a type proven by experience to be suitable for the specified duties.

Each air valve shall be provided with an isolating valve. Air valves with a connection not exceeding 25 mm diameter to the main pipeline shall each have an integral lever-operated isolating ball valve. All other air valves shall have a separate resilient seated, double flanged, butterfly valve with lever operation.

Each small orifice or double air valve shall be fitted with a test cock in the valve body to permit easy verification that the small orifice air valve is operating properly and that its orifice is not blocked.

11.44 Check Valves

Check valves shall be designed for rapid closing without slamming no later than the moment of cessation of forward flow. The valve size and design shall be selected to give the optimum performance in this respect taking full account of the system within which the valve is to be installed, especially when the system includes surge vessels or when the system static head is high. If self-closing without slamming cannot be achieved, then external mechanisms may be employed to control the rate of closure. Details of these mechanisms shall be given by the Contractor in his tender and will be subject to approval by the Engineer.

Unless otherwise specified check valves shall conform to BS 5153 and shall be double flanged, swing type, faced with copper alloy, nickel alloy or stainless steel. Valves may be single or multi-door type for applications free of stringy materials in the flow. They shall have high speed closing characteristics with minimum shock on closing.

11.45 Penstocks, Sluice Gates

Penstocks shall be of cast iron as specified and suitable for either on-seating or off-seating as specified. Apertures may be rectangular or circular.

On-seating penstocks shall be drop tight at their operating seating pressure, unless otherwise approved.

The leakage rate for off-seating penstocks shall be stated by the Contractor and will be subject to approval.

Penstocks shall be cast iron complying with BS 1452 not less than Grade 12 and to the dimensions specified.

Extension shafts shall be provided with sockets which engage the penstock shafts. A securing bolt, locked in position, shall unite the 2 shafts.

Guide brackets shall be provided wherever necessary.

Operating hand wheels shall be big enough diameter to enable the required duty to be achieved.

Hand-operated weir penstocks shall be lockable in any position.

11.46 Spindles and Caps

Operating and extension spindles for valves operated by tee key shall be capped.

Extension spindles shall be circular in section. For valves installed in chambers, extension spindles shall be provided with split bearings rigidly held on brackets spaced no more than 1500 mm apart. For buried valves the spindle shall be supported inside a protecting tube held on a purpose-made support fixed to the top of the valve and provided with a spindle guide.

11.47 Manual Operating Mechanisms

Manual closing of valves shall be by the clockwise rotation of a tee key or hand wheel.

Tee key operated valves shall be provided with detachable cast iron spindle caps to take the key. One key shall be supplied for every five valves installed, with a minimum requirement of two keys in any one size.

Hand wheels shall be shaped to give a safe grip without sharp projections, clearly marked with the direction of closing and be fitted with integral locking devices. A padlock and chain will not be an acceptable device.

All manually-operated valves shall be capable of being opened and closed by one person only, when the specified maximum unbalanced pressure is applied to the valve in use. Under this condition the total force required at the rim of the hand wheel or at the tee key to open the valve from the closed position shall not exceed 30 kg (15 kg each hand; hand wheels diameter not less than 300 mm). Where necessary, gearing and bearings shall be provided and the hand wheel sized to fulfil this requirement.

11.48 Marking and Packing

Each valve shall be indelibly marked with the diameter and pressure rating and shall, in addition, carry a unique reference number to enable each item to be clearly identified with works fabrication records, works test certificates, delivery notes and the like. Wherever possible, the identification marks shall be painted on the outside of the item but where there is insufficient smooth surface area to accommodate the identification marks they shall be put on rust-proofed metal tags secured to the item with galvanised wire or chain (not through flange holes).

Valves shall be packed in the 'closed' position except that uncrated resilient seat gate valves for transport to tropical areas shall be in the 'open' position.

11.49 Handling

The Contractor shall supply equipment as necessary to handle and install valves and associated equipment without damage to exterior or interior coatings. The equipment shall include lifting beans, reinforced canvas slings, protective padding, cradles and the like. Wire rope or chain slings shall not be used for handling these items.

Temporary packing, coverings or crates provided for protection in transit shall not be removed (except for inspection purposes after which they shall be replaced) until immediately before installation.

11.50 Installation

Valves shall be installed and commissioned in accordance with manufacturer's instructions. After installation, valves shall be cleaned, gates, discs, seats and other moving parts closely inspected, foreign matter removed and the valves checked for ease of operation. Moving parts shall be lightly greased or otherwise treated in accordance with the manufacturer's recommendations.

Except when otherwise specified or directed by the Engineer, butterfly valves shall be enclosed in chambers and fixed with the disc spindle horizontal and supported as detailed on the Drawings, and installed so that when the valve is opening the lower portion of the disc moves in the direction of the main or normal flow. Except where shown otherwise on the Drawings, gate valves shall be fixed with their spindles vertical.

Gate valves without external gearing, and not otherwise required to be in a chamber, may be buried. The buried part of the valve shall be protected as specified. Except where shown otherwise on the Drawings the valve shall be backfilled to just below the top of the valve or spindle shroud, and a surface box shall be provided.

Jointing, sleeving, external wrapping, anchor and thrust blocks, valve chambers, valve marker posts and the cleaning and disinfection of valves shall be executed as specified for the associated pipeline.

11.51 Pipe work layout

Flexible joints shall be provided on pressure pipes where necessary to facilitate removal of plant or/and to allow for differential settlement. Wherever practical, flexible joints shall be provided with tie bolts or other means in order to transfer longitudinal thrust along the pipe work as a whole.

The pipe work shall be laid out and designed so as to facilitate the erection, painting in situ and dismantling of any section for maintenance and give a constant and uniform flow of working fluid with a minimum of head loss. Where steel pipe work is used the number of flanges is to be kept to a minimum and the size of each unit of pipe work determined by the ease of handling, installation and general appearance of the completed pipe system. Positions of flanges shall take into account any necessary concrete pipe supports or thrust blocks.

11.52 Pipes, Fittings and Tubes

Steel pipes and specials for use in booster pump stations shall either be seamless or of welded construction complying to BS 3600, BS 3601 and BS534 or other approved specifications.

All piping fittings shall be near and entirely fabricated and corrosion protected at the makers works by an internal lining and entirely coated with an epoxy resin finish. Standard fittings shall be used wherever possible in preference to fabricated special fittings.

Ductile iron pressure pipes and fittings shall comply with BS 4772 and shall have flexible spigot and socket joints.

Polyethylene Pipes shall comply with BS 1973 or BS 6437 as appropriate it should be capable of handling lime.

Rubber hosing shall conform to BS 5119 type2. It shall be capable of handling lime and activated silica.

11.53 Flanged Joints

All flanged joints shall comply with BS 4504. The nominal pressure rating for particular flanges shall be at least equal to the highest pressure rating of the pipes of fittings to which they are attached, but with a minimum nominal pressure of PN 16 except where otherwise specified. All flanges shall be provided with all necessary nuts bolts, washers and gaskets as specified herein.

Flanges connection to Plant shall be compatible with the Plant supplied. Slip-on welded flanges shall be of the hub type with a thickened section at a welded joint.

11.54 Pipe work within Structures - General

The term 'pipe work' shall include pipe of any description and associated flanges, adaptors, couplings, jointing material, fittings, fixings, supports, drain valves, thrust blocks traps and the like, which are necessary to complete installation pipe work systems associated with Plant.

Pipe work shall conform to the requirements of the relevant British Standards. All recommended tests shall be carried out and certified in writing.

Adequate provisions shall be made to anchor, support, drain, vent, pressure test, dismantle and clean all pipe work. Valves, meters, strainers and the like shall be supported independently of the pipes to which they connect.

Pipe work systems shall be designed to withstand the maximum internal and external forces which could occur in service and under hydraulic test pressure. The configuration and method of support shall minimise bending stresses.

Flexible joints shall be provided where necessary to facilitate removal of Plant and/or to allow for differential settlement of building structure. Wherever practical, flexible joints shall be provided with tie bolts or other means to transfer longitudinal thrust along the pipe work as a whole.

The pip work layout within water treatment work shall have the approval of the Engineer.

Valves, strainers and other devices mounted in the pipe work shall be supported independently of the pipes to which they connect.

Flanges shall conform to BS 4504 and shall be drilled in accordance with the appropriate pressure rating.

11.55 Steel Pipe work

Pipes shall be specified by nominal diameters in accordance with BS 3600 Table I.

Welding shall be carried out in accordance with BS 2633. All welders shall be tested by an independent inspection authority and shall satisfy the requirements of BS 4871 Part I. Welder test certificates shall be provided by the Contractor for examination by the Engineer.

All fabrication and corrosion protection shall be carried out the manufacturer's works. Linings and coatings shall comply with this Specification.

11.56 uPVC Pipe work

uPVC pipe work for water service shall be the 'hi-impact' type to BS 3505 class E with solvent welded joints and fittings complying with the relevant parts of BS 4346.

Screwed connections to metal components shall be made with proprietary iron to uPVC adaptor fittings.

Where flanged joints are required, full face uPVC flanges and galvanised mild steel backing rings shall be used.

Where uPVC pipe work systems connect to steel mains, the off-take points shall be isolated by means of gate valves to BS 5150 or BS 5163. Valves in uPVC pipe work systems shall be as specified under this Section or as specifically approved by the Engineer with regard to function, location and operating conditions. Pipe work shall be supported in accordance with manufacturer's recommendations and adequate provisions shall be made for thermal expansion and contraction.

11.57 Testing of Pumps, Valves, Pipe work, Cranes and General Purpose Machinery

Tests to be carried out during manufacture on particular items of mechanical plant shall include Pumps:

- Each pump shall be tested individually in accordance with Part 2 of BS 5316. Site conditions shall be simulated as near as possible, including the minimum, site NPSH condition and suction pipe work configuration.
- Each pump shall be tested with its own motor. It shall be tested at the guaranteed duty point and over its full working range from its closed valve condition to 30% in excess of the quantity of the minimum head duty point. Head/quantity curves, power/quantity and overall efficiency/quantity curves shall be plotted to demonstrate that the plant will be capable of meeting the full range of operating conditions at Site. Efficiency of both pump and pump set as a whole shall be established on test.

- Pump casings shall be subject to a pressure test at least 1.5 times the maximum pressure obtained with the delivery valve closed. The positive suction head shall be taken into account in determining this pressure.
- Pumps shall be dismantled after test and a witnessed inspection carried out to confirm the satisfactory condition of all parts prior to dispatch to Site.

11.58 Pump sets

The results of the above tests on pumps and motors will be used by the Engineer to determine whether each pump set has achieved the performance guaranteed by the Contractor. If a pump set fails to achieve the guaranteed performance, the Contractor shall carry out such further work as he considers necessary and shall arranged for the tests to be repeated. This procedure shall be continued until the Engineer is satisfied that the pump set performs as guaranteed, or the plant is rejected.

Each pump set shall be checked for alignment between pump and motor. The alignment shall be the best that can be achieved by good working practice and with in the limits required by the coupling design. An alignment certificate shall be issued and incorporated in the O&M manuals.

Tests in accordance with Part 1 of BS 5316 to demonstrate that each pumpset is reliable in operation and is able to cover the whole working range. Each pump shall be tested at the minimum, guaranteed and maximum duty points. The values obtained will be compared with the values obtained during the tests on the manufacturer's premises and any discrepancies shall be rectified by the Contractor.

11.59 Valves

All valve bodies shall be hydraulically tested closed ended to 1.5 times the rated pressure. All isolating valve seats shall be tested to the maximum working pressure, at which pressure they shall be drop tight. Each valve shall be tested for functional operation with its own actuator. All valves on completion of erection shall be fully functionally tested in association with their actuators and controls. Each installation shall be checked for water tightness and the valves for leakage. Valves shall be subject to the system test pressure and shall be demonstrated to function satisfactorily under maximum site differential head conditions. Where appropriate, valves shall be internally inspected after functional tests to verify seals remain in a satisfactory condition.

11.60 Castings

Castings subject to hydraulic pressure shall be pressure tested to at least 1.5 times the maximum working pressure.

11. 61 Pipe work

The inspections and witness testing of all pipe work shall be carried out in accordance with the appropriate manufacturing standard approved by the Engineer. This shall include dimensional inspection, welding NDT examinations and corrosion examination.

At the first opportunity following completion of installation, all station pipe work shall be water tested for leakage at appropriate test pressures. In the case of delivery pipe work, and such other pipe work on the suction side as may be vulnerable to full delivery pressure, the test pressure shall be the same as the Site test pressure for the associated delivery pipeline(s). Where bursting disks are installed, one disk shall be tested to demonstrate satisfactory operation.

11.62 Ancillary equipment

Demonstration of satisfactory operation of the plant and associated control equipment shall be undertaken.

12. ELECTRICAL, Instrumentation, Control and Automation Equipment

12.1 General Requirement

In this section, general requirements for various equipments, materials and workmanship, forming part of the Electrical Contractor are defined and shall be applicable except where specified otherwise.

The standards and codes of practice listed here shall be considered as a guideline only and shall not relieve the Contractor from his contractual obligations to provide all equipment, components, Works and services in accordance with the laws, by laws and rules:

- 16th edition of I. E. E wiring Regulations in Building – BS7671: 1992;
- IEC Standards;
- British Standards and Code of Practice;
- Tanzania Standards as published by the Tanzania Bureau of Standard;
- Any other Code and Standard and Approved by the Consulting Engineer.

Where the equipment or part of it complies with other internationally recognized standards which are less stringent than the above-mentioned standards, the differences are to be stated in writing and must accompany the tender submission.

The equipment, components and installation Works shall comply with all relevant statutory instruments and regulations current at the date of tender and in particular the following:

- Regulations under the Electricity Ordinance Cap 131 Sup 57.
- Factories Ordinance 1965.
- Any regulations issued by the Local Electricity Authority.

The equipment and all components shall be suitable for operation in ambient conditions of 20°C to 40°C and up to 98% relative humidity either in an unheated ventilated building or in open air.

All ratings of equipment and components shall be interpreted as site rating and NOT sea level or other ratings.

This Part of the Specifications sets out the minimum standards of materials, workmanship and design to be used by the Contractor for the electrical, instrumentation, control and automation equipment. Reference to any specific material or equipment does not necessarily imply that such material or equipment is included in the Works.

All component parts of the Works shall, unless otherwise specified, comply with the provisions of this Chapter or be subject to the approval of the Engineer.

12.2 Record, Drawings and Instructions

During the execution of the Works on Site the Contractor shall, in a manner Approved by the Engineer record on working or other drawings at Site all information necessary for preparing Records of the installed Contract Works.

Marked-up working or other drawings and other documents shall be made available to the Engineer as he may require for inspection and checking.

Record drawings may, subject to Approval of the Engineer, include Approved Drawings as necessary and certified by the Contractor as a correct record of the installation of the Contract Works.

The Record Drawings shall include, but not restricted to the following:

- Working Drawings amended as necessary but titled "Record Drawings" and certified as a true record of the "as installed" Sub-Contract Work. Subject to the Approval of the Engineer any inappropriate working drawings may be omitted from incorporating into "as installed" record Drawings.
- Schematic Diagrams of the individual plant, apparatus and switch and control boards to include those particular plant or apparatus and also where applicable those applicable to system operation as a whole
- The Contractor shall supply for fixing in Substation switch-room, generating set houses, plant rooms, pump houses, the office of the maintenance Engineer and other such places, suitable instruction charts, schematic diagrams of instrumentation and of electrical reticulation as may be requested by the Engineer provided that the charts, diagrams etc., relate to installations forming part of he Contract Works.
- Marked-up drawings of the installation of the contract Works shall be kept up to date and completed by the date of Practical or Section Completion.
- Three copies of the Record drawings of the Contract Works and three sets of the installation charts and schematic diagrams in stiff backing shall be provided not later than one month after practical completion.
- Record Drawings shall be on Approved plastic materials.
- All charts and diagrams shall be of suitable non-fading plastic material on a stiff backing and must be approved by the Engineer before final printing.
- If the Contractor fails to produce to the Engineer's Approval:
- The Marked-up Drawing during the execution of the Contract Works, the Record Drawings etc., within one month of Sectional or Practical Completion the Employer shall be at liberty to have these drawings produced by others.
- The cost of obtaining the necessary information and preparing such drawings shall be deducted from the outstanding payments due to the Contractor.

12.3 Standard Specification

All materials and workmanship shall comply with the current national standards of the country of manufacture provided that these standards are not less stringent than the equivalent specified British Standards, or provided that they comply with the requirements of the International Organisation for Standardisation (ISO) or the International Electro-technical Commission (ICE) as appropriate.

The Contractor may be asked to make copies of standards available to the Engineer together with their English translations. He shall provide these as requested for prior assessment and for use during inspection and testing.

Alarm devices shall be of the visual and/or sounder type complying with BS 5839.

Manual call points shall comply with BS 5639.

Control and indicating equipment shall comply with BS 5839. A system test facility and a power supply failure indication shall be provided. Other optional manual controls shall be as specified.

Bonds to structural steelwork, reinforcing bars and pipes shall be made using proprietary clamps. The drilling of metallic building fabric to secure bonds shall not be carried out without the approval of the Engineer.

Unless otherwise specified all material including equipment, fittings, cables etc. shall be new. Defective equipment or that damaged in the course of installation or test shall be replaced or repaired to the Approval of the Consulting Engineer. In the course of rectifying the defects, the Contractor shall bear the substitution of all associated builder's work and making good finishes.

All the Contractor's proposals and working drawings for and in connection with the Works shall be submitted early in the Contract period to facilitate co-ordination with Contractors and Contractors of other trades.

All plant, apparatus, equipment, distribution boards, distribution cases, terminals and cables shall be securely and properly labelled, clearly showing the identification of the item and if applicable it's control function and the part of the system controlled. Labels shall be of trifoliate sheet or equivalent, fixed with screws or rivets.

12.4 Diesel Engine for Diesel Generator

The engine type shall have been in commercial operation for a period of not less than 3 years.

The engine shall be of the 4-stroke, air or water-cooled direct-injection compression-ignition type with an in-line or vee-cylinder configuration. The engine may be naturally aspirated or turbo-charged. The nominal speed shall not exceed 1500rpm for 50Hz operation.

The engine shall be rated in accordance with ISO 3046-1:2002 and shall be capable of continuous operation at rated output plus a 10% overload for 1 hour in any 12 consecutive hours running.

Unless otherwise specified, fuel oil shall be Class A2 to BS 2869:1998.

All chain and gear drives shall be located in oil-tight cases and shall be pressure-lubricated.

The engine and generator shall be mounted on a common fabricated steel bedplate with anti-vibration mountings of the multiple neoprene type impervious to water and oil.

Tensional vibrations of the complete rotating system shall be within the limits specified in Lloyd's Register of Shipping Rules and Regulations over a range □5% to +10% of the rated speed.

When engines are specified to be suitable for uninterrupted running over a prolonged period, the following features shall be provided:

- dual in-line lubricating oil filters;
- dual in-line fuel filters;
- heavy-duty air filter;
- auxiliary lubricating oil tank for installation adjacent to the engine and fitted with a sight-level gauge;
- an oil circulation system

The maximum allowed period of uninterrupted running shall be stated by the contractor and shall not be less than the specified period.

Protection devices shall be fitted and arranged to provide visual alarm indication and automatic engine shutdown under the following conditions:

- oil pressure low;
- oil temperature high;
- coolant temperature high;
- over-speed;
- fuel low.

All pipe flanges shall comply with BS 4504-3.3:1989 and screwed connections with BS 21:1985.

Oil and water heaters to facilitate cold starting shall be of the thermostatically-controlled type. The heating surface loading of oil heaters shall not exceed 7.5kW/m².

- Instruments as follows shall be provided:
- lubricating oil pressure gauge;
- lubricating oil temperature gauge;
- cooling water temperature gauge;
- turbo-charger air pressure gauge (if applicable);
- running hours indicator;
- tachometer;
- battery charge ammeter for electric start engines;
- engine stop push-button;
- other instruments as considered necessary by the engine manufacturer.

Where the exhaust pipe passes through a wall, a wall sleeve and plates shall be fitted. The annular space between the pipe and sleeve shall not be less than 25mm. The space between the pipe and sleeve shall be filled with heat-resistant material.

Exhaust terminations shall not be located in close proximity to air inlet grills or opening windows were exhaust gas can re-circulate into the building. The exhaust outlet shall be arranged to prevent the ingress of water.

Exhaust silencers and pipes, flanges, clips and fixings shall be sprayed with metallic aluminium paint in accordance with BS 2569-2:1965 Process 'D'.

Where it is not practical to lag any part of the internal section of the exhaust system with which personnel can come into contact, guards shall be fitted.

12.5 Diesel Engine starting systems

Engine starting shall be electric or air systems as specified and shall comply with the following for electric:

- The starting battery shall be of the nickel-cadmium or lead-acid type and unless otherwise specified, installed on an engine bed plate mounted non-corrodible tray or rack and shall have a cover of insulating material. The battery shall have sufficient capacity for three consecutive start attempts each of 10 seconds duration. In addition, the battery shall have sufficient capacity after the three start attempts to supply the maximum demand of the control panel for a minimum period of 24 hours.

- The battery charger shall be of the solid-state design and shall incorporate 'float' and 'boost' charging facilities. In the 'float' charge mode, the charger shall automatically maintain the battery in a fully-charged condition whilst supplying standing loads. In the 'boost' charge mode, the charger shall be capable of fully charging the battery from a fully-discharged condition in a period not exceeding 7 hours.
- The charging characteristics for the nickel-cadmium vented type battery shall minimise electrolyte gassing.

The charger shall be complete with:

- incoming supply on/off switch;
- supply on indication;
- output voltmeter;
- output ammeter;
- float/boost charge selector switch;
- charger failed relay with voltage-free changeover set of contacts wired to terminals;
- charger failed indication.

Air - Where applicable, the air starting system shall comprise an air receiver, electric motor-driven compressor, hand-start diesel-driven standby compressor, all necessary isolating and pressure-relief valves, interconnecting pipe work, gauges, water traps and drain facilities.

The capacity of the air receiver shall be sufficient for three consecutive start attempts each of 10 seconds duration.

The air receiver shall be of the vertically-mounted type complying with BS 5169:1992 and having a corrosion allowance not less than 2mm. Fittings shall include:

- pressure gauge;
- pressure relief valve;
- manhole;
- isolating and non-return valves;
- automatic and manual drain valves;
- pressure switch for the initiation of a low pressure alarm.

The capacity and operating pressure of the air receiver shall be determined by the Contractor.

The air compressors shall be of the air-cooled type suitably rated to deliver the required quantity of air to recharge the air receiver from minimum start to operating pressure in a period not exceeding 60 minutes.

Air piping shall be of the seamless type complying with BS EN 10217-3:2002.

12.6 Diesel Engine Fuel System

The fuel system shall comprise an engine-driven feed pump with duplex filters, daily service tank with supporting structure and drip tray and all interconnecting pipe work including flexible engine connection pipe.

The fuel supply system comprising bulk storage facilities, fuel transfer system and engine day service tanks shall be as specified.

When specified, daily service tanks shall be fitted with the following:

- high, intermediate and low-level float switches for the control of a fuel oil transfer pump and/or alarm initiation;
- a jettison connection fitted with fire valve, the connection being sized to drain the contents of the tank in a period not exceeding 5 minutes.

Unless otherwise specified, the capacity of daily service tanks shall be sufficient for eight hours full-load operation of its associated generating set.

Fire valves shall be activated from the generator set fire-detection system as specified elsewhere.

12.7 Standby Diesel Generator Set

The standby diesel alternator set specified below shall be provided, installed and commissioned.
The Contractor shall install and commission a standby skid mounted aluminum clad package type electrical power set driven by diesel engine with underground bulk fuel oil storage tank at pumping station sites.
Starting of the diesel generator sets shall be fully automatic on failure of the main incoming electrical supply from the substation.
The diesel generators at the pumping station sites shall be adequately sized to supply power to all the pumping station services, including lighting and small power
Pumps including starting of subsequent duty pumps and tripping equipment.
Details of derating for the specified climatic and altitude conditions shall also be provided.
Before placing orders for these sets, it will be necessary to check sizes and the Contractor shall provide full details of the type, power rating, full load current, power factors and starting characteristics of all motors.
General Electrical Specification requirements shall apply to this Section. All necessary switchgears and auxiliary equipment shall be included to provide, in conjunction with the panels detailed in this document, a complete functioning system.
The diesel engine, alternator and control panel shall be housed within a suitably ventilated, totally enclosed, weatherproof housing having hinged and lockable doors giving full and unrestricted access to the set. The set shall be capable of running with all doors fully closed under any climatic conditions.
The engine and alternator shall be mounted on sub-frame which shall be resiliently mounted on a skid type base frame suitable for locating adjacent to the Pumping Station.
The diesel generator unit shall operate during periods when the 'Mains Supply' has failed or been interrupted for any reason. The unit will not be required nor must it be allowed to operate in parallel with the Supply Authority's incoming mains.

Diesel generator equipment shall include the following:

1 No.	Skid Mounted Packaged Diesel Generator Set including Batteries and all other Ancillaries
1 No.	Day Fuel Tank and Fuel Transfer System
1 No.	Residential Type Exhaust System
1 No.	Engine and Alternator Control Panel
1 No.	Bulk Storage Tank.

Each engine shall be multi-cylinder, four cycle direct injection, vertical cold start industrial diesel engine, capable of developing at least 20% above the alternator maximum power requirement when operating under the specific altitude and climatic conditions.

- The engine speed shall not exceed 1,500 rpm.
- The engine shall incorporate the following accessories and components:
- Heavy type, flywheel, so that there will be a minimum of cyclic irregularity throughout the working range of the engine. Cyclic irregularity shall meet the limits laid down in the relevant DIN Standards;
- The crankshaft shall be of solid forged steel statically and dynamically balanced to very close limits. Distortion or vibration and oscillation of the crankshaft shall be obviated under all normal working conditions;
- Bedplate mounted tropical rated radiator and cooling fan of sufficient size to maintain normal working temperature under continuous operation, complete with pressurised water system thermostatically controlled with centrifugal water circulating pump and pipework;
- Water cooled exhaust manifold;
- Totally enclosed, fully automatic forced feed lubrication system by gear type oil pump with suction strainer in sump;
- Full flow lubricating oil filter with impregnated paper elements of the replaceable type and incorporating release valve and by pass to the filter head;
- Oil drip tray complete with plugged outlet drain;
- Full flow fuel oil filters with impregnated paper elements of the replaceable type;
- Viscous type torsional vibration camper on free and of crankshaft;
- Fuel injection pump complete with mechanical variable speed governor. Capable of maintaining a constant speed under all conditions of load;
- 24 Volt heavy duty axial starter motor which disengages when engine fires;
- 24 Volt alternator and regulator;
- 24 Volt fuel shut down solenoid (energised to stop) and manually operated stop lever;
- Mechanical fuel lift pump;
- Heavy duty air intake filter suitable for sand-laden conditions.

Immersion heaters and thermostat control operating from 240 Volt supply shall be incorporated in the engine sump and connections shall be taken to bedplate mounted terminal box 240 Volt AC and 24 Volt DC connection shall be to separate boxes.
Automatic shut-down equipment shall be provided to protect the engine from the following conditions:

- Low oil pressure;
- High water temperature;
- Over speed switch with three separate speed actuated switches.

- Engine mounted instrument panel incorporating:
- Combined tachometer and service hour recorder with cable drive;
- Oil temperature gauge;
- Water temperature gauge;
- Ammeter.

The cooling system shall be engine mounted with coolant level sensor.
Each alternator shall be continuously rated for the specified loads at a power factor of 0.8 lagging and generate at a pressure of 415 Volt 3 phase 50 Hz neutral point earthed, at maximum site temperature and climatic conditions.
The alternator shall be of the self-exciting, self-regulating type, to a degree of protection not less than IP 54 with ball and roller bearing. Voltage regulations shall be plus or minus 2.5 % at all loads and at any power factor from unity to 0.8 lagging.

12.8 Diesel Generator Set

The generator shall be of the salient pole brushless type complying with BS 5000-3:1980. The generator shall be flange and foot mounted or foot mounted with open coupling, with single or twin end-shield bearings. A single-bearing machine shall be directly coupled to the engine crankshaft. A two-bearing machine shall be coupled through an intermediate flexible coupling.

The generator shall be capable of continuous operation at rated output plus 10% overload for 1 hour in any period of 12 hours without exceeding the temperature rise limits of the insulation system.

Automatic voltage regulators shall be of the solid-state three-phase sensing type with in-built protection against sustained over excitation. Unless otherwise specified, the voltage regulation shall be not less than Grade VR2.21 to BS 4999-140:1987.

With the application of the maximum power system step load specified elsewhere at any power factor between 0.2 and 0.8 lagging, the initial voltage shall not drop below 85% of the nominal value, recovering to 94% within 1.5 seconds.

Provision shall be made for remote adjustment.

12.9 Control System for Diesel Generator

The controls shall be designed to provide the following facilities:

- automatic starting and stopping of the engine if specified;
- manual starting and stopping of the engine;
- Simulated mains failure for testing the automatic starting and stopping of the engine.

Subject to the approval of the Engineer, the facilities specified below may be modified to suit the manufacturer's standard control unit conditional on compliance with the overall operating concept.

Indicating Instrument are:

- Phase ammeters or ammeter with phase selector switch;
- Voltmeter with phase selector switch;
- Wattmeter;
- kWh meter;
- Frequency meter

Control Switches includes:

- Hand / auto / off;
- Auto-return on / off;
- Key-operated simulate mains failure / off;
- Engine heater(s) supply on / off;
- Generator anti-condensation heater supply on / off

Push-Buttons includes:

- Engine start / stop;
- Engine emergency stop.

Hand Regulating Controls includes:

- Engine speed;
- Generator voltage.

Indicator Lights includes:

12.10 Switchgear and Control gear for Diesel Generator

Enclosures shall be fabricated from sheet steel of not less than 2.0 mm thick or other approved material. Enclosures shall form a robust and rigid structure. Exterior edges and corners shall be rounded to give a smooth overall appearance and assembly bolts, screws or rivets shall not be visible on the front face.

Low voltage switch and control boards for use at rated voltages up to and including 1000 V, shall be designed and constructed in compliance with BS 5486: Part 1.

Low voltage switch and control boards and individual enclosures for location in purpose designed switch-rooms shall have a minimum degree of protection of IP31 to BS EN 60529. The protection classification for switchboards located in other indoor areas shall be IP54. For outdoor location the degree of protection shall not be less than IPW55.

12.11 Safety of Electrical Equipment

lectrical equipment shall be designed and constructed to provide a maximum standard of safety for operational and maintenance personnel.

Mechanical interlocking shall be provided to prevent access to live equipment and to protect the equipment and the operator from mal-operation.

Where access to low voltage enclosures is necessary with equipment energised from an external source, all such equipment and terminals shall be shrouded to prevent accidental contact and warning labels shall be fitted. Shrouds shall have a minimum. degree of protection IP5O.

12.12 Earthing

When fitting and accessories require earthing, an earth continuity conductor shall be run throughout the conduit. The earth continuity conductor shall be PVC insulated copper wire of

minimum size 1.5mm² and shall be continuous between terminals. All metal boxes shall be equipped with an earth terminal.

Each final sub-circuit that is required to be earthed shall be provided with its own individual earth continuity conductor which shall be run from a terminal on the earth bar in the distribution board or consumer's control unit protecting the particular final sub-circuit.

Earth terminal bolts or studs shall be brass and shall not be less than 8 mm diameter.

12.13 Busbars and Busbar Connections

Busbars and busbar connections shall be of hard drawn high conductivity copper and shall be suitable for the specified rated voltage, rated and short-time current, frequency and insulation level.

Low voltage switch and control board busbars and busbar connections shall comply with the performance criteria given in BS 5486: Part 1.

High voltage switchgear busbars and busbar connections shall comply with BS 159. Busbars shall be of the non-segregated phase metal-enclosed and air insulated type. Busbars and busbar connections shall be insulated with shrunk-on plastic sleeving or epoxy resin. Joints shall be shrouded by PVC or resin mouldings

Busbar supports shall be resin monoblock mouldings.

12.14 Wiring and Wiring Connections

Wiring other than interconnections between electronic equipment shall be carried out using PVC insulated cable complying with BS 6231. With the exception of current transformer circuits, the cable conductor size shall be not be less than 1.0 mm². For current transformer circuits, the cable conductor size shall be not be less than 2.5 mm². For interconnections between electronic equipment the appropriate cable shall be used.

Wiring shall be installed in a neat and systematic manner and shall be securely fixed. Wiring shall be arranged so that access to any equipment or connection point is not impeded. Wiring installed in trunking shall have a cable to free space factor not exceeding 50 percent.

Each cable shall be fitted with a full ring interlocking type identification ferrule at each end. The numbering shall read from the terminal outwards. The wiring identification shall correspond with the wiring diagram.

Unless otherwise indicated or approved, wiring shall be coloured as follows:

(a)	Phases	:	red, yellow, blue
(b)	Neutral	:	black
(c)	Control	:	A.C. black. D.C. grey
(d)	Earth	:	green and yellow

12.15 Low Voltage Switchboards and Switchgear

Under normal service conditions the volt-drop at the terminals of fixed current-using equipment shall not be greater than 4 % of the nominal voltage of the supply except where a lower value is necessary for the satisfactory operation of the equipment and compliance with the volt-drop criteria for motors during the starting period.
During motor starting periods under minimum supply voltage conditions specified the voltage at the motor terminals shall not be lower than 85 % of the motor rated voltage and the volt-drop at the point of supply shall not be greater than 10 % of the rated voltage.

The power supply will be 400 Volts, 50 Hz., three phase, 4 wire system or 230 Volts, 50Hz., 2 wire system as shall be specified in particular specifications. The switchgear shall be capable of withstanding the system fault level at the place of installation.
The switchgear shall be designed throughout to secure safety during operation, inspection, cleaning and maintenance and shall be so arranged as to minimize the risk of fire arising and spreading.

12.16 Cable Boxes, Gland Plates and Terminations

Cable boxes, gland plates and terminations shall be arranged to facilitate easy installation and connection of cables.

Cable gland plates shall be manufactured from sheet steel for multi-core cables and non-ferrous material for single core cables. Gland plates shall be mounted not less than 300 mm above the base of the enclosure.

Space for cabling within terminal enclosures shall be in accordance with BS 5372. Adequate space shall be provided for the termination of oversize cable conductors.

Enclosures shall be subjected to a comprehensive system of preparation, protective coating and stoved finish painting. The finish coat of paint shall be applied by the electrostatic process. The finish colour shall be as specified or as approved by the Engineer.

The preparation and painting system shall be suitable for the environment in which the enclosures will be installed.

12.17 Low Voltage Switches, Disconnectors, Switch-Disconnectors and Fuse-Combination Units

Switches, disconnectors, switch-disconnectors and fuse-combination units shall comply with BS EN 60947: Part 3 and shall be suitable for uninterrupted duty.

Switching devices shall be suitable for isolation and shall be to Over-voltage Category IV to BS EN 60947: Part 1 Table H1.

Unless otherwise specified, the Utilisation Category for switching devices shall be AC-23A for alternating current and DC-23A for direct current.

Operating mechanisms shall be of the independent manual type with provision for locking in the OFF position and shall be interlocked with the access door.

Fuse links for use in fuse-switch devices shall comply with BS 5419.

The voltage protection devices shall be capable of coordination so that on the occurrence of a fault only the affected section is disconnected from the system.

The Contractor shall carry out a comprehensive protection coordination design study for the different types of faults occurring at different points in the system under maximum and minimum fault conditions. The proposed relay characteristics shall be shown on a grading diagram. The design study shall be submitted to the Engineer for approval.

12.17 Low Voltage Circuit-Breaker

Circuit-breakers shall comply with BS EN 60947: Part 2, shall be of the air-break type, and shall be moulded case or open construction design.

Circuit-breakers shall be Utilisation Category B and shall have a ultimate short-circuit capacity not less than the prospective short-circuit current at the point of installation.

Circuit-breakers for incoming supplies shall have a service short-circuit breaking capacity equal to the ultimate short-circuit capacity.

Feeder circuit-breakers shall have a service short-circuit breaking capacity not less than 50 percent of the ultimate short-circuit capacity.

Circuit-breakers shall be suitable for isolation and shall be to Over-Voltage Category IV to BS EN 60947: Part 1 Table H1.

12.19 Residual Current-Operated Circuit-Breakers

Residual current-operated circuit-breakers shall comply with BS 4293. They shall be double pole for single phase and four pole for three phase and neutral circuits. The rated current shall be as specified.

Unless otherwise specified, the trip settings shall be as follows:

Rated current up to and including 40A: 30mA

Rated current above 40A and up to l00A: 100mA

Rated current above l00A: 300mA

No intentional time-delay shall be fitted unless specified.

12.20 Low Voltage A.C. Motor Starters

Motor starters shall be combination type as defined in and complying with BS EN 60947: Part 4.

Motor starters shall be of the electromagnetic type.

Utilisation Category shall be selected to suit the application of the motor starter, but shall be not less than AC-3.

Unless otherwise specified, motor starters shall be suitable for uninterrupted duty.

Motor starters shall have Type 2 short-circuit co-ordination. The protective device, contactor and overload relay combination shall have undergone and passed all the tests specified for full Type 2 co-ordination.

Where control and interlock circuits are broken via plugs and sockets on withdrawable type starters, one interconnecting lead shall be provided for each size and type to facilitate testing in the withdrawn position.

12.21 Low Voltage Fuse Links and Carriers

Low voltage fuse links shall be of the enclosed type complying with BS 3871. Unless otherwise specified fuse links shall be Class G.

Fuse link carriers and bases shall be made of moulded plastic insulating material. Ceramic material will not be accepted. Accessible live connections with the carrier removed shall be effectively shrouded and it shall be possible to change fuse links with the circuit live without danger of contact with live metal.

Earthing and neutral links in main supply circuits shall be of the solid copper bolted pattern.

12.22 Push-Buttons

Push-buttons shall comply with BS EN 60947: Part 5.

Unless otherwise specified, colours of the buttons shall comply with BS EN 60073.

Emergency stop push-buttons shall be of the latched type and shall have a mushroom type button. Emergency stop push-buttons shall be connected in control circuits so they are effective under all plant operating conditions. Resetting of the push-button shall not automatically re-energise the isolated plant.

Terminals shall be shrouded.

12.23 Indicator Lights

Indicator lights shall comply with BS EN 60947: Part 5. Lens colours shall comply with BS EN 60073 unless otherwise specified.

The lamps shall operate at not greater than 90 percent of their rated voltage.

Lenses and lamps shall be easily removable without the use of a tool.

Light emitting diode type indicator lights shall not be used except where they form part of proprietary equipment.

Terminals shall be shrouded.

Indicator lights shall be provided with individual or group lamp test facility.

12.24 Indicating Instruments and Integrating Meters

Indicating instruments and meters shall be flush mounting and, where practical shall be of the same pattern and appearance throughout.

Analogue indicating instruments shall comply with BS 89 and electronic indicating instruments with a digital display shall comply with BS 7194.

Induction type integrating meters shall comply with BS 5685 and shall be fitted with a cyclometer type register. A maximum demand indicator shall be provided when specified. Alternating current static watt-hour meters shall comply with BS 7400.

Portable instruments shall be of sub-standard accuracy.

12.25 Control Switches

Control switches shall be of the rotary type complying with BS EN 60947: Part 5.

Control switches for ON/OFF and START/STOP application shall be of the three position type with a spring return action to a central neutral position.

Control switches for circuit breaker ON/OFF operation shall be of the pistol grip type and shall be lockable in the neutral position. Consecutive ON operations shall not be possible, the switch having to be first moved to the OFF position.

Control switches other than for circuit breaker ON/OFF operation, shall have spade, tee or other approved handles.

Terminals shall be shrouded.

12.26 Protection Relays

Protection relays shall comply with BS 142 and shall be front of panel mounted in flush drawout pattern cases with strong and durable clear front covers.

The protection classification for case and cover combination shall be not less than IP52 to BS EN 60529. Cases shall be finished in phenolic black unless otherwise approved.

Unless otherwise specified, relays shall be fitted with hand reset operation indicators. The reset mechanism shall be externally operated.

Relays shall be provided with facilities for testing in the withdrawn position.

Relay types shall be as specified.

12.27 Local Control Panels

Local control panels for maintenance purposes shall be provided.

The panels shall include the following facilities:

Isolating switch

On/Off push-buttons

Local/Remote key switch

Stop/Run/Fault indicator lights

Lamp test push-button

12.28 Coating System for Electrical Equipment Enclosures

The enclosure shall be given its protective coating at the place of manufacture and before installation of its internal electrical fittings.

Electrical panels, including switchboards, control panels and instrument panels, installed within buildings shall be prepared as follows:

Thoroughly clean surfaces to remove rust, scale, dirt, loose paint etc. and degrease by the use of solvents which are compatible with the paint finish to be applied. If rust proof steel has not been used in the construction, the surfaces shall be treated with a passivating agent such as phosphoric acid.

Internal surfaces shall have a minimum of three coats of paint of which the first shall be an approved priming coat. The final coat shall be opaque gloss white enamel.

External surfaces shall have a minimum of five coats of paint of which the first shall be an approved priming coat, the second and third a suitable undercoat, all of which shall be rubbed smooth when dry before application of the next coat. The colour of undercoat paints shall be different from priming and finishing coats.

Final coats shall be of stove enamel paint to a specified finish and colour. The dry film thickness shall be not less than 100 microns.

Electrical equipment enclosures which are to be installed in exposed positions or in damp conditions shall receive a surface preparation containing zinc prior to application of the primer undercoat and finishing coats.

A 500 ml tin of matching touch-up paint shall be supplied with each panel.

12.29 Functional Design Specification

The Contractor shall submit a complete functional design specification (FDS) for approval by the Engineer. The purpose of this document is to convey to the Engineer that the Contractor possesses an accurate understanding of the system and its control requirements. The Contractor is encouraged to obtain clarifications and to suggest refinements to the control systems contained in the Specification.

The FDS shall comprise an overall description of the Plant, its functioning and control, and a detailed description of each section of the control system covering modes of operation, manual overrides, setpoint and parameter selection and adjustment. The detailed description shall include a step by step control description which defines the function of each piece of equipment and each control action and interlock, including details of the program in each programmable item. The format of the program may be chosen by the Contractor. However, it is suggested that this format be chosen to satisfy the requirements of the software design documentation, if applicable, as described elsewhere.

The FDS shall describe the "fail safe" features incorporated into the design in the event of failure of a plant item or system, or loss of an input signal affecting a control loop or process sequence.

The FDS shall describe control actions taken and monitoring functions which remain available during a power failure, and any automatic controls or sequencing which takes place during system startup and shutdown.

The FDS shall be presented in a clear and precise manner and shall include figures or drawings where appropriate.

The Contractor shall submit and obtain the approval of the Engineer to the FDS before starting the detailed control system design. The Contractor shall take note of the importance of this requirement.

12.30 Instrument and Control Panels

Unless otherwise specified, all instrument panels, instrument cubicles, control panels, consoles, desks and the like shall be free-standing floor mounted units, all referred to herein as panels.

Any enclosure required for indoor location shall be manufactured from prime quality, cold rolled and annealed mild steel or zinc-coated mild steel sheet, suitably braced and stiffened as necessary with flat bar or angle to form a rigid structure. The minimum degree of protection shall be IP31 in purpose designed control rooms and IP54 for other indoor locations to BS EN 60529.

Panel fronts shall be flat and free from bow or ripple. Exterior corners and edges shall be rounded or welded and ground to give a smooth overall appearance. Flanged edges shall be straight and smooth.

Sheet thicknesses shall be chosen with due regard to the enclosure size, number of cut-outs, instrument weight, centre of gravity and method of fabrication subject to the following minimum values:

- Instrument bearing surfaces: 3 mm
- Gland plates: 3 mm
- Pneumatic distribution plates : 3 mm
- Internal mounting plates: 3 mm
- Doors, covers, filler panels: 2 mm

A first class method of construction shall be employed and no design involving the use of externally-visible assembly or fixing bolts and screws or any design resulting in dust or water-collecting crevices will be accepted.

Stiffeners and supporting frameworks shall be provided where necessary inside panels. Framework shall be hinged or fixed, suitable for the installation of instruments, components and internal equipment for which it is provided and located to give easy access to adjacent equipment.

If the enclosure is constructed in sections, they shall be designed for ease of assembly and necessary nuts, bolts and washers shall be supplied in the same shipment.

Where required for equipment to be installed at a future date, space shall be allocated and cutouts with removable masking plates, brackets, supports, wiring, piping etc. as necessary, shall be provided.

Panels shall be subjected to a comprehensive system of preparation, protective coating and stoved finish painting at the place of manufacture before commencing the installation of apparatus and other fittings. The external and internal colour finish shall be as specified elsewhere or as approved by the Engineer.

12.31 Housings for Instrument and Control Panels

Instrument and control panels and other instrumentation equipment required to be located outdoors shall be installed in a glass reinforced plastic (GRP) housing,

Housings greater than 0.5 m3 volume for large panels or for multiple items of equipment shall be manufactured from double-skin, resin-bonded fibreglass with a totally encapsulated infill of rigid weatherproof and boil proof plywood to BS 1203. The housing shall be rigid and secure and shall have a minimum degree of protection of IP65 to BS 5490.

Housings shall be mounted on a concrete base with provision for cable access. A concrete or concrete slab hard standing of minimum width 600 mm shall be provided in front of the housing

For any application in a non-temperate climate or where so specified elsewhere the roof section shall be sloping and have a totally encapsulated infill of end-grain balsa instead of plywood.

The laminate material shall have flame retardant characteristics in compliance with BS 476 Part 7 Class 2, and shall retain stability integrity and insulation for 30 mins when tested to BS 476 Part 8.

The height of panels above finished-floor level shall not exceed for Control consoles and desks - 1.400 mm and for Other panels - 2.130 mm

Enclosures shall be symmetrically arranged so far as possible with projections kept to a minimum.

Front of panel equipment shall be mounted so that their centres fall within the following limits of height from the floor:

	Minimum	Maximum
Indicators	900 mm	1.800 mm
Recorders and process controllers	900 mm	1.400 mm
Alarms and signal lamps	750 mm	2.000 mm
Manual controls	750 mm	1.500 mm

Controls, switches and pushbuttons shall be positioned below or adjacent to any associated reading instrument.

The arrangement of equipment within panels shall permit easy access for installation and maintenance.

Panels shall have hinged access doors fitted with recessed lockable handles. Hinges of lift-off doors shall be designed so that one shank engages before the other for ease of fitting. Wherever necessary, removable access covers secured by quick release fasteners shall be provided to ensure ease of access to all installed apparatus.

All doors in one panel shall use the same key and lock combination which shall be numbered. Three keys shall be supplied for each combination.

Panels shall be subjected to a comprehensive system of preparation, protective coating and stoved finish painting. The finish coat of paint shall be applied by the electrostatic process and shall be to the colours specified or as approved to by the Engineer.

Each instrument requiring a power supply shall be individually wired and protected so that in the event of a failure in one circuit the remainder are unaffected. Power supply circuits shall be of sufficient rating that any protective device may operate without reducing the voltage at the terminals of any other component to an unacceptable level. Remote alarms shall be operated on failure of the electrical supply to a panel or to any internal sub-circuit.

Panel circuits shall be segregated into category Group 1 Power, control and very high level signal wiring (above 50 V)

- A.C. power supplies,
- D.C. power supplies,
- A.C. current signals above 50 mA (e.g. current transformer circuits),
- A.C.. voltage and control signals above 50 V.

Group 2 High level signal wiring (6 to 50 V dc)

- signals from conventional electronic transmitters and controllers (e.g. 4-20 mA),
- circuits to alarm annunciators and other solid state devices (excluding those in Group 3),
- digital signals,
- emergency shut-down and tripping circuits,
- on/off control circuits,
- intrinsically safe circuits,
- speech-frequency circuits.

(e)

Group 3 Low level signal wiring (5V D.C. and below)

- signals from thermocouples,
- signals from resistance thermometers and retransmitting slide-wires,
- signals from analytical equipment and strain gauges.

All wiring shall be neatly and securely fixed by insulated cleats, bunched and secured by approved plastic strapping or run in approved insulated wiring trunking or non-corrodible flexible tubing. Not more than 75% of the capacity or trunking, ducts, looming, or tubing shall be used. Insulated earth wiring shall be so arranged that access to any equipment or connection point or the removal of any item of equipment is unimpeded. Wiring for future equipment shall be secured and terminated on terminal blocks. Lacing for wiring looms shall be of rot-proof cord or plastic strips. Inter-section wiring in multi-section cabinets shall be via a terminal block in each section.

12.32 Panel Wiring Identification and Termination

Identification ferrules shall be fitted at both ends of each wire. The numbers or letters used shall correspond with the appropriate wiring diagram. The ferrules shall be of plastic insulating material with permanent black characters on a gloss white or yellow background unaffected by oil or water. They shall be so arranged that they can be read logically from left to right when viewed normally.

The system of wire identification shall be such that wires in the same circuit on opposite sides of a terminal shall have the same reference, and this system shall be continued through all external cabling.

Terminal ferrules (spade, tongue, crimped connections) shall be provided on each conductor connected to a device whose integral terminals are not of the clamp type specified in the section "Panel Terminal Blocks" below.

12.33 Instrumentation

Pressure gauges shall comply with BS 1780. Pressure gauges shall have over range protection up to 1.5 times the maximum line pressure, and shall be capable of withstanding full line pressure on any side with the other side vented to atmosphere without damage or effect on the calibration. No plastic material shall be used in their construction. Internal parts shall be of stainless steel, bronze or approved corrosion-resistant material.

Where necessary, a special diaphragm shall be used to segregate to gauge tube from corrosive fluid media.

The minimum diameter for any pressure gauge shall be 150 mm unless specified otherwise or where the gauge forms part of a standard item of equipment.

All fixing material shall be made of stainless steel.

12.34 Cabling

Cable routes indicated on the drawings are for tender purposes only. The exact final routes shall be subject to Approval by the Consulting Engineer.

The Contractor shall include for the supply and installation of all jointing materials, cable supports, steel racking and making all the necessary cable joints. The cable shall be installed and tested in strict accordance with the appropriate clauses of the 16th Edition of the IEE Regulations – BS 7671:1992, the Factories Acts and BS 6346 – Insulated PVC Cables.

Cables shall at all times be handled with care and every effort made to avoid damage. Unloading, rolling to position and mounting of cable drums shall be carried out efficiently and carefully in the recognized manner and the cables shall be pulled from the top of the drums and twisting shall be completely avoided.

During cable laying sharp metal tools shall not be used in the trench or placed in such a position that they may fall in to the trench.

Cables shall only cross other cables at junctions at which joint clearances between the cables shall be maintained.

Unless otherwise specified or approved by the Engineer, power, control and instrumentation cables in ducts shall not be installed in the same duct.

Cables in ducts shall, where necessary, be lubricated to facilitate drawing in. The lubricant used shall have no deleterious effect on the cables. Where cables leave duct ends to enter a trench a permanent support shall be provided to reduce the possibility of damage to cables due to ground settlement.

12.35 Cable Systems

Conduit systems shall be of the steel or plastic type as specified.

Steel conduit and fittings shall comply with BS 4562: Parts 1 and 2, shall be screwed and hot-dip zinc coated inside and outside. The nominal size of conduit shall be not less than 20 mm.

The ends of conduits which are liable to be left open for any length of time during building work shall be plugged to prevent the ingress of dirt and covers shall be fitted on all boxes.

No holes shall be drilled through any structure without prior approval.

Three phase cable systems comprising two or more single core cables per phase shall be arranged in three phase, that is red, yellow and blue, groups. This is to equalise, as far as practicable, mutual inductance. The three phase groups may be in trefoil or flat formation as dictated by the cable system design. Cables shall not be arranged in groups comprising the same phase.

Unless otherwise specified, the minimum cable spacing between cables shall be as follows:

- High voltage: 50 mm
- Low voltage : Touching unless current rating considerations dictate otherwise
- High and low voltage: 300 mm
- High voltage and control: 300 mm
- Low voltage and control: 150 mm
- High voltage and instrumentation: 300 mm
- High voltage and telephone: 300 mm
- Low voltage and instrumentation: 150 mm
- Low voltage and telephone: 300 mm
- Control: nil

Where cables are installed in close proximity to or cross those of authorities such as telecommunication, electricity supply and railway, spacing shall comply with the regulations of those authorities.

12.36 Excavation of Cable Trenches

The exact route of each trench shall be approved by the Engineer before excavation starts. Trenches shall be kept as straight as possible and shall be excavated in accordance with BS 6031.

Excavated trenches shall be kept free of water and protected against damage or collapse. All necessary sheeting, timbering, strutting and shoring shall be supplied, erected and subsequently removed to ensure the safety of persons and the protection of structures, buildings, roads, sewers and other services from damage.

The bottom of all trenches shall be graded evenly and cleared of loose stones.

12.37 Installation of Conduit and Cable Ducts

Surface conduit shall be run in square symmetrical lines and shall be fixed by means of spacer bar saddles spaced at not more than 1000mm for 20 to 25mm diameter conduit and 1200mm for larger sizes, of steel conduit and 500mm for all PVC surface conduits. Surface conduit shall also be fixed on both sides of all boxes at a distance not greater than 300mm, the box itself being securely fixed. Where such an arrangement of boxes and saddles would prove to be both unsightly and unnecessary, short lengths of conduit not exceeding 500mm in length between boxes need not be secured further than by connection to the adjacent boxes.

Concealed conduit run in chases in walls shall be fixed by means of mild steel pipe hooks or non-metallic saddles spaced not more than 1000mm. Where conduit is concealed behind plaster it shall be chased to a depth of either 15mm below finished plaster level or installed flush with the structural wall level before application of plaster, whichever is the lesser depth.

Conduit cast in situ shall be frequently secured to the steel reinforcement work, with heavy binding wire to prevent movement of the conduit and conduit boxes during the pouring and vibrating of the concrete.

When, in the course of the Works, obstructions are encountered which necessitate diversion of existing service installations, other underground works, alterations to buildings or foundations or when conditions require the adoption of a special form of trench or duct system, the Contractor shall immediately notify the Engineer, who will instruct the Contractor in writing of the action to be taken.

12.38 Cable Termination, Joints, Sleeves and Tape

The Contractor shall employ personnel who are fully qualified and competent for the types of joints and terminations to be made. Proof of competence for all personnel shall be submitted to the Engineer before any jointing or termination work commences.

The Contractor shall provide evidence to the Engineer that the materials or kits to be used for jointing and termination are suitable for the type of cable to be jointed or terminated.

Full details of jointing and terminating arrangements supported by manufacturers' literature shall be submitted by the Contractor to the Engineer prior to commencement of cable installation.

Cables shall not be cut or uncapped until the jointing of termination is ready to start. Cable ends shall be free from moisture.

Insulating tape used in joints and terminations shall be compatible with, and have a temperature rating and insulating property not less than, the cable insulation, and shall comply with approved standards. Pressure sensitive adhesive tapes shall comply with BS 3924. All tapes shall be stored in sealed containers until required.

12.39 Buildings Distribution Fuse Boards

Distribution fuse boards and miniature circuit breaker boards, herein referred to as distribution boards, shall comply with BS 5486.

Distribution board enclosures shall be fabricated from heavy gauge sheet steel with an all-welded construction. Exterior edges and corners shall be rounded to give a smooth overall appearance. Assembly bolts, screws or rivets shall not be visible from the front. Doors shall be lockable.

Distribution boards shall have a minimum degree of protection IP31 to BS 5490 when located in clean and dry rooms. The protection classification for distribution boards located in other indoor locations shall be IP54. For outdoor location the degree of protection shall be not less than IPW55.

Distribution boards shall be fitted with an identification label manufactured from white-black-white laminated plastic or rear engraved perspex as specified. The label shall lay flat to the surface and shall be secured by non-rusting screws.

Danger and warning labels shall comply with BS 5378 Part 1.

12.40 Luminaries

Luminaries shall be of the fluorescent, tungsten or gas discharge type as specified, and shall comply with BS 4533.

General purpose fluorescent luminaries shall be manufactured from zinc-coated sheet steel of minimum thickness 0.7 mm with white epoxy polyester powder or equivalent finish. Luminaries shall be fitted with a trough reflector or prismatic diffuser as specified.

Where luminaries are supported from the structure other than by the conduit or trunking system, they shall be fixed by approved purpose-made clamps, bolts, washers and nuts, expanding anchors or proprietary wall plugs and non-ferrous screws as appropriate

Luminaries mounted on or recessed into suspended ceilings shall be independently supported.

12.41 Socket-Outlets, Couplers and switches

Commercial type socket-outlets shall comply with BS 1363. Industrial pattern socket-outlets and couplers shall comply with BS 4343.

Industrial type switched socket-outlets shall be mechanically withdrawn interlocked to prevent the plug being inserted or withdraw unless the switch is in the "Off" position. It shall not be possible for the switch to be moved to the "On" position unless the plug is completely inserted.

Residual current circuit breakers fitted to socket-outlets shall comply with BS 4293 and shall have a tripping sensitivity of 30 mA with an operating time not exceeding 30 ms.

Enclosure construction shall be as specified for distribution boards.

12.42 Testing and Commissioning

Tests at Manufacturer's Works shall be carried out to demonstrate compliance with the Reference Standards and the specified functional and performance criteria.

Unless otherwise specified, the tests shall be Routine Tests in accordance with the Reference Standards and the following additional tests as appropriate to demonstrate:

- The inter-changeability of withdrawable equipment.
- The correct operation of electrical and mechanical interlocks.
- The correct functioning of current and voltage operated protection relays by primary and secondary current injection and voltage application.
- The correct polarity between current and voltage elements of power operated protective devices, instruments and metering.
- Meters do not creep with the removal of either the current or voltage supply.
- The correct operation of control circuits, indications and alarms.
- Where necessary a suitable test panel shall be provided for simulation of external controls and signals during such tests.
- The calibration of ammeters at 0.25, 0.5 and full scale deflection by secondary current injection.
- The calibration of voltmeters.

The following tests at site shall be carried out as appropriate:

- Insulation resistance of main connections and secondary wiring shall be tested using an approved insulation tester. The test shall be carried out between phases and phase to earth. All circuit-breakers, switches and contactors shall be in circuit and closed.
- The correct operation of electrical and mechanical interlocks shall be demonstrated.
- The correct operation of current and voltage operated protection relays shall be demonstrated by primary and secondary current injection and voltage application.
- The stability of unit protection systems shall be demonstrated by primary current injection.
- The correct operation of control circuits, indications and alarms shall be demonstrated.
- The continuity of all protective conductors shall be checked.
- The correct operation of inter-tripping circuits shall be demonstrated.
- Any tests required by the electricity supply company.

Motors shall be inspected and tested to show that they are fully compliant with the specification and approved drawings.

Tests shall be carried out in accordance with BS 4999: Part 143. For low voltage standard production motors for general use the tests shall be routine check. For high voltage and low voltage motors for main drive application, the tests shall be duplicate.

If the test to determine the locked rotor current of cage induction motors is carried out at reduced voltage, allowance shall be made for the effect of saturation when adjusting for rated voltage. The estimated value of locked rotor current at rated voltage shall be stated on the test certificate.

In the event of the guaranteed performance not being reached on the first or any subsequent such modifications the Purchaser reserves the right to reject the plant.

12.43 Access Steelwork and Hand railing

- Any small areas of chequer plating or similar covering that are necessary to cover gaps between items of Plant and the surrounding structure, and any access ladders platforms and handrails that must be attached to items of Plant to facilitate operation, inspection or maintenance, shall be supplied and erected by the Contractor.
- The Contractor shall provide adequate access to all hand wheels, sight glasses, gauges, lubrication points and any other items to which access is necessary for routine maintenance.
- Handrails shall consist of double ball forged steel standards with tubular rails, hot dip galvanised in accordance with BS 729. Chequer plating shall be of 'Durbar' or other non-slip pattern not less than 4.5 mm thick (exclusive of pattern) and hot dipped galvanised after fabrication in accordance with BS 729.
- Diamond type pattern chequer plate shall not be used. Open type or solid type chequer plate flooring shall be used as appropriate for the location, taking into account ease of cleaning, precautions against slipping and areas below walkways.
- Hand railing shall be double rail 1 100 mm high and 900 mm high on stairs measured vertically from the nose of the tread.
- Standards shall be 38 mm diameter solid forged steel to BS 4360 Grade 43A with 60 mm diameter solid forged steel balls at handrail locating points drilled to give 1.5 mm clearance to handrails. Each ball shall incorporate a concealed grub-screw with Allen-type head to secure the rail. Standards shall have a minimum base width of 65 mm, drilled for M 15 fixing bolts and be set at maximum 1 800 mm centres.
- Handrails shall be 33.7 mm OD x 3.2 mm thick tubular steel to BS 6323. Joints shall be arranged to coincide with the spacing of standards where possible, otherwise they shall have butt joints with a tubular steel ferrule, plug welded or fixed with a 5 mm diameter countersunk head pin.
- Removable sections of handrail shall have half-lap joints secured with a countersunk head pin.
- Chains across openings shall be 10 mm x 3 links per 100 mm galvanised mild steel. The hooks and retaining eyes shall be securely fixed to the balls of the standards.
- All components for hand railing shall be hot dip galvanised after manufacture in accordance with BS 729.

12.44 Coating System for Electrical Equipment Enclosures

1. The enclosure shall be given its protective coating at the place of manufacture and before installation of its internal electrical fittings.
2. Electrical panels, including switchboards, control panels and instrument panels, installed within buildings shall be prepared as follows:-

a. Thoroughly clean surfaces to remove rust, scale, dirt, loose paint etc. and degrease by the use of solvents which are compatible with the paint finish to be applied. If rust proof steel has not been used in the construction, the surfaces shall be treated with a passivating agent such as phosphoric acid.

b. Internal surfaces shall have a minimum of three coats of paint of which the first shall be an approved priming cost. The final coat shall be opaque gloss white enamel.

c. External surfaces shall have a minimum of five coats of paint of which the first shall be an approved priming cost the second and third a suitable undercoat all of which shall be rubbed smooth when dry before application of :the next coat. The colour of undercoat paints shall be different from priming and finishing coats.

d. Final coats shall be of stove enamel paint to a finish and colour as specified in Table C. The dry film thickness shall be not less than 100 microns.

e. Electrical equipment enclosures which are to be installed in exposed positions or in damp conditions shall receive a surface preparation containing zinc prior to application of the primer undercoat and finishing coats.

f. A 500 ml tin of matching touch-up paint shall be supplied with each panel.

12.45 Preparation and Painting of Plant

Applicable to surfaces at the following locations:

'A'	Surfaces above process liquid level and not liable to splashing thereby, in non aggressive atmospheres;
'B'	Surfaces in contact with untreated or treated water for potable use;
'C'	Surfaces below process liquid level or liable to splashing thereby in non-aggressive solutions and /or atmospheres;
'D'	Surfaces in contact with aggressive solution and/or atmospheres.

Works Preparation and Initial Protection of Steel Work in Locations 'A', 'B' and 'C'

Works Preparation shall be carried out when all machining has been completed and all traces of grease removed.

All steel, other than stainless steel, (except that which subsequently will be totally encased in concrete or that which may be pieced sufficiently small to hot dip galvanized to DIN 50975 and DIN 50976) shall be grit blast cleaned in such a way that the depth of surface from valleys to peaks shall not exceed 75 µm ± 25%.

Initial Protection shall be applied within 4 hours of grit blast cleaning in a 'clean condition' area of the workshop.

All surfaces shall be completely freed of loose abrasive and given a priming coat of an approved POLYAMIDE CURED:

ZINC PHOSPHATE EPOXY CORROSION RESISTANT PRIMER - TWO PACK

or*

a. ZINC CHROMATE EPOXY CORROSION RESISTANT PRIMER - TWO PACK

*This alternative shall not apply to surfaces in Location 'B'.

An approved airless spray process shall be used to apply a dry film thickness above peaks of not less than 50 µm.

Painted identification markings shall be reproduced on the priming coat.

Steelworks fabricated at Works shall only receive the above preparation and initial protection after all machining and fabrication has been completed and when such fabrication is by means of continuous welded runs with all exposed surface accessible for subsequent treatment. All slag and spatter shall be removed from the area of welds by chipping hammer prior to grit blast cleaning.

The inside surfaces of box members and similar non-fabricated sections where grit blast cleaning is impracticable shall be cleaned.

The first finishing paint system shall be applied within 48 hours of the initial primer

Surfaces of steelworks to be fabricated at Site shall receive Works Preparation as above and initial protection with a PREFABRICATION PRIMER of an approved:

- ZINC PHOSPHATE EPOXY - TWO PACK

or*

- ZINC CHROMATE EPOXY - TWO PACK

*This alternative shall not apply to surfaces in Location 'B'

An approved airless spray process shall be used to apply a dry film thickness above peaks of not less than 50 µm.

Paint identification markings shall be reproduced on the priming coat.

Steelworks shall be protected in covered storage at Works until fabrication is ready to commence at Site where the first finishing coat shall be applied after fabrication have been satisfactorily complied with.

Works Preparation and Initial Protection of Steelworks in Location 'D'

Works Preparation shall be carried out when all machining has been completed and all traces of grease removed. All steel, other than stainless steel, shall be: PREPARED AND HOT DIPPED GALVANISED TO DIN 50976

Initial Protection shall be applied at Works only when exposure to aggressive solutions and atmospheres is expected within three months and/or before an adequate protective patina has formed.

Initial Protection when required to hot dip galvanized surface shall comprise:

a. Thoroughly clean and degrease all surfaces followed by etching with T-wash as described in DIN 50976.
b. (In the event of any surface failing to turn black the cleaning, degreasing and etching process shall be repeated).

c. All surfaces shall then be thoroughly washed with clean water, completely dried and given a priming coat of an approved: POLYAMIDE CURED ZINC PHOSPHATE EPOXY CORROSION RESISTANT PRIMER - TWO PACK

d. An approved airless spray process shall be used to apply a dry film thickness of not less than 50 µm.

Electric Motors, Starters, Panels, Enclosures and Mild Steel Conduits

The surfaces of motors and individual starters shall be to manufacturer's recommended finish according to location and shall be given one coat at Site approved URETHANE ALKID UNDERCOAT and final coat of approved URETHANE ALKID ENAMEL

Panels and other similar enclosures shall be cleaned, degreased, primed and enameled to a high standard of finish and stove dried. The proposed process shall be submitted for approval.

Mild steel conduits shall be hot dip galvanized to DIN 50976.

All preparation and painting at Works shall be carried out under cover at ambient temperature controlled between approximately 18 °C and 28 °C and relative humidity below 85 %.

Unpainted Galvanized Surfaces in Locations 'B' and 'C'

Surfaces shall not be immersed within three months of hot dip galvanized and/or before an adequate protective patina has formed.

All paint shall be obtained from an approved manufacturer and shall be applied strictly in accordance with this Specification. The Contractor shall issue a copy of this Specification to any Sub-Contractor involved and also to the manufacturer of the paint.

The paint manufacturer shall spot check the preparation and painting and shall submit to the Contractor a written report of his observations for forwarding to the Engineer.

SECTION VI B: PARTICULAR SPECIFICATIONS

13. WATER RETAINING STRUCTURES

13.1 Contractors Obligation

All work intended to exclude, convey or retain water shall be made watertight. This applies to new structure constructed under this contract.
The Contractor shall Examine the Bid Documents to satisfy himself that he can achieve water tightness with the materials and labor enumerated therein, for he new structures, should he consider them insufficient to achieve water tightness, the he shall include in his relates for such additional materials and labor as he considers necessary. All leaks which may appear in new structures on test or may develop during the defects liability period through whatever cause arising shall be made good by the Contractor at his own expense and to the satisfaction of the Engineer.

13.2 Materials and Construction

- Concrete shall be grade 25 of characteristic cube strength of 25N/mm2 at 28 days age with minimum cement content of 300kg/m3
- Cement to be ordinary Portland cement to BS 12 specifications.

- Aggregates shall be of granilic stone origin, clean, inert, hard, no-porous and free from excessive quantities of dust, laminated particles and splinters and to comply to BS 882.
- Concreting water to be clean and free from silt & sodium chloride salt and comply to requirement of BS 3148: Methods of testing water for concreting.
- Water cement ratio to be 0.45 unless approved otherwise by supervisor.
- Bathing of materials to be by weight only.
- Reinforcement shall be deformed steel of characteristic yield strength fy = 425 N/mm2 complying to BS 4449.
- All reinforcing bars to be provided with hooks and bends according to the bar bending schedule or schedule made by the Contractor and approved by the Engineer.
- Cover to all reinforcement in tank floor, walls (internally) & columns to be 50mm and 40mm in walls (externally) and roof slab. All binding wires to be fastened and bent inwards to ensure this cover is maintained.
- Staggering of lap positions of reinforcing bars as shown on detail drawings shall be strictly adhered to.
- No change of arrangement of reinforcement will be done by Contractor without consent of the Engineer.
- Contractor to note all construction and sliding joints and price for water stop bars and joint materials as stated or equivalent.
- The construction sequence of tank floor to be as shown on drawing.
- All tank wall (inside face) and columns to receive 30mm (cement and sand 1:3) plaster in layers.
- Tank floor to receive screed (cement and sand 1:3) to slop average 150mm hick.
- Roof slab top o receive screed (cement and sand 1:3) to slope average 75mm thick.

13.3 Forced Ventilation

The Contractor shall provide, operate and maintain such cowls, fans, or other devices necessary to force a steady flow of air through covered tanks and reservoirs after the roofs have been completed so the joints may be thoroughly dried before priming and all fumes, arising from the making of the joints, are removed from the tanks to he satisfaction of the Engineer.

13.4 Temporary Lighting

The Contractor shall provide and maintain at the Site a supply of electricity to enable work to be carried out and inspection made in tanks, reservoirs and sumps which have been roofed over.

13.5 Cleaning

On completion of the construction of all reservoirs, tanks, sumps and channels, and before testing, the Contractor shall clear away from them all internal rubbish and shall brush over first dry and then with water, all concrete surfaces. Sufficient water shall be used so that all matter collected in the washout and drainage channels is carried o the outfall without silting the drains. The Contractor shall provide all necessary apparatus for cleaning purposes and shall ensure that he joint seals are not damaged during cleaning operations.

13.6 Testing of Water Retaining Structures

All concrete structures designed to retain water or other liquids shall be tested by the Contractor for water tightness after completion. Such testing shall not begin until the structure has been fully completed and all concrete has reached its specified strength.

The test of a structure shall be made before carrying out the backfilling and before the construction of any internal benching or the like

The tests shall not be commenced before the concrete has hardened for 21 days or has reached its specified strength, whichever is the later. The Contractor shall include this period in his time schedule.

The Contractor shall make his own arrangements for the provision of water for sterilizing and the cost shall be included in his rates.

The safe disposal of the heavily chlorinated water shall be included in the rates for sterilization.

13.7 Testing of Roofs

- The roofs of reservoirs and tanks shall be watertight. Prior to the addition of any roof screed the roof shall be tested for water tightness by covering it with clean potable water to a minimum depth of 25mm for a period of 3 days.
- Where this, in the opinion of the Engineer, is impractical because of roof falls or otherwise, the roof shall be thoroughly wetted by continuous hosing for a period of six hours. On completion of the wetting the roof shall be inspected and regarded as satisfactory if no leaks or damp patches show in the soffit.
- Where required, an item is included in the Bill of Quantities to cover all costs including the supply and disposal of the test water, associated with carrying out this test to the satisfaction of the Engineer. Payment will be made for the successful test only.

13.8 Pump House

- Foundations for the pumps shall be constructed according to pump manufacturer's specifications.
- All walls and ceiling shall receive 15 mm plastering of cement: sand mix 1:4.
- The floor in the ump room except pump foundations shall receive a terrazzo finish minimum thickness 25 mm.
- The construction joint between pump foundations and the pump house floor shall be made water tight using approved sealing compound/material. The Contractor shall submit a proposal for this with his bid

14. PIPE WORK

14.1 Rehabilitation/Replacement of Non-functioning Valves

- These specifications shall be read in conjunction with the General Specifications. The Contractor shall bring to the attention of the Engineer any apparent contradiction or ambiguity in the specifications and shall obtain his decision as to the meaning or intention of the specific point before proceeding.
- The Contractor shall seek and obtain permission from the Engineer to proceed with rehabilitation or replacement of valves which may interfere with the supply of water to consumers. A declaration of intent to proceed with such rehabilitation work shall be made to the Engineer at least 2 weeks prior to start of work. Such an application shall only be necessary for valves causing total interference or closure of the system.
- The Contractor shall be required to make proposals for isolating the valve to be replaced so that minimum disruption is caused o the system.
- The Contractor shall examine the Gate valves upon dismantling, together with the Engineer and the Municipal Water Engineer, to determine whether parts or the whole valve should be replaced.
- Thrust blocks damaged during removal of valves shall be re-cast to standards stipulated in the civil works specification.

14.2 Disconnection and Relocations of Pipes

- Disconnection of pipes shall be made at the connecting fitting. The connection point shall be appropriately sealed by a blank flange or other appropriate fitting approved by the Engineer. The Contractor shall be required to remove the pipes and fittings which are not going to be in use and which may cause interference with the rehabilitated system.
- Pipes to be relocated shall be disconnected and moved from the existing position with care and without causing damage to the pipes to be reused.
- Appropriate fittings shall be used to position the pipe in the new location. Pipe support and anchor blocks shall be constructed as necessary for relocated pipes laid on ground level.
- Pipe supports shall be constructed in accordance with the standard drawings.
- Exposed pipelines shall be properly anchored and proper backfilling made between pipe supports

14.3 Installation of New Valves

- Decision on location of new valves shall be made by the Engineer. The Contractor may be required or instructed by the Engineer to excavate, and make good thereafter, proposed locations to reveal existing fitting or valves.
- Valve chambers shall be constructed on new valves according to drawings and specifications.
- Pressure reducing valves shall be installed in lines and supply areas where he residual pressures are higher than the allowable pressure in the system.
- Fire hydrants shall be installed on locations to be specified by the Engineer.

15. ELECTRICAL SPECIFICATIONS

15.1 Execution of the Works

The works must be carried out strictly in accordance with the following documents. The current edition of the " IEE Wiring Regulations, for Electrical Installations" issued by the Institution of Electrical Engineers, Great Britain.

- By-laws of the Local Authority
- Relevant British standards and Codes of Practice.
- The Contract Specification
- The working Drawings, produced by the Contractor and approved by the Engineer and /or the Contract Drawings, to the extent these are released for use as Working Drawings.
- The Engineer's instructions.

In the event of discrepancies between the General and the particular specification later herein, the wording or intent of the particular specification shall rule over the General Specification.

15.2 Scope of Work

The works include supply, installation, connecting, testing energizing, commissioning, delivering in serviceable condition and maintenance against faulty workmanship, the electrical installations shown on the drawings and specified in this Specification, including all necessary elements, such as:

- HV Switchgear, and Transformers
- Switchboard

- Distribution boards,
- Work in connection with metering
- Cable tray for electrical cable installations
- Power and lighting circuits
- Supply and installation of area lighting.
- Final circuit switches.
- Supply of bulbs and fluorescent tubes for all light fittings supplied under this contract.
- Power and socket outlets.
- All earthing requirements.
- Electrical services for Mechanical plant
- Testing prior to and connection only of materials supplied by others, such as pumps
- Making arrangements with TANESCO for testing and connecting.
- Prepare application to TANESCO for connection of mains supply and all necessary liaison with TANESCO to proceed with their installation

The works must include all labour, materials, tools, instruments etc. necessary to execute the Works in a first – class manner, even such labour or materials which are not specifically mentioned in the project, but are necessary for a satisfactory completion of the Works. The works must be delivered up clean complete and in fully working order.

The Contractor shall be responsible for the carrying out and completion of the installation to the entire satisfaction of the Engineer as regards workmanship, materials, execution, and maintenance, and shall be responsible for compliance with all tests required by the Power Supply Company and Engineer.
All Electrical Services shown and not designated "by others" are included in this Contract.

15.3 Electricity Supply

- A complete New HV installation shall be supplied and installed.
- The new transformer shall be installed outdoor. The new HV switchgear shall be installed indoor.
- The Contractor shall supply, install and connect the complete HV switchgears, and transformers. TANESCO will provide the underground 11 KV cables and connect them to the HV switchgear and transformer. A provisional sum shall be included for payment of the charges to TANESCO.
- The Contractor, after the necessary soil resistance tests, is o include for an earthing system in the form of a network of either earth rods or earth plates. The ground excavation and back-filing will be carried out by others. The earth tape is to be brought into the Switchboard room where it is to be germinated onto a suitably sized test bar from where an earth bonding should emanate.
- All metal work in the Switchboard room, HV Switchgears as well as at the transformers are to be solidly bolted using copper tape to this earthing system.
- The transformers and HV Switchgears shall be manufacture to TANESCO specification. The TANESCO meter shall be included in the HV Switchgears.
- Switch board earthing arrangement shall be type TN-S.
- The new Switchboard shall be complete with all necessary auxiliary equipment such as glands, sealing chambers, cable clamps and /or busbar links.

15.4 Main Distribution

- The Contractor is to make all necessary connections in the main distribution for the supply and distribution.

- A step-down transformer, 240 V V AC/24 V DC, shall be provided for each installation for use with the level switches for control, indication or alarms

15.10 Telemetric System

- The communicating equipment shall comply with the local rules and TTCL, specification.
- Only standard equipment will be accepted
- The equipment shall be operated at 230V + 20%, 50 Hz.
- Ringer Equivalence Number of the modern shall be one to allow a transmitter, a receiver and a telephone to be connected simultaneously to one telephone line.
- Transmitter shall consist of:

- At least 2 digital self supplied input
- Pulse dialling Facilities
- Present number with redialling by engaged.

- The Receiver shall consist of at least 2 voltage free contact suitable for 230 V AC, 50 Hz, 1A and 24 V DC, 3A
- Cable trays shall be of not less than 1.5 mm sheet steel and shal be galvanized.

16. Fencing

16.1 Materials

16.1.1 Straining posts, stays, standards and droppers

- Straining posts, stay, standard and droppers shall be of the type and size indicated on the drawings. Steel sections shall comply with the requirements of CKS 82 and timber posts with the requirements of SABS 457. Timber posts shall be treated with a preservative.
- Straining posts and stays shall be rolled steel posts as specified on the drawings. Standards shall be 2.50 kg/m Y-sections.
- Droppers shall be 0.56 kg/m ridgeback-pattern droppers.
- Tubular straining posts and stays shall be galvanised in accordance with SABS 763 for class B1 articles, or shall be painted as specified or as may be required on the drawings. Unless otherwise shown on the drawings, all tubular posts shall be provided with a 230 mm x 230 mm footplate and a pressed-steel or cast-iron cap. Tubular posts shall have a nominal bore of at least 60 mm.
- Rolled steel sections shall be provided with a protection coating of tar or other approved material.

16.1.2 Bolts for Stays

Bolts shall be galvanised steel bolts of the required length and a diameter which shall not be less than 12 mm. All the necessary bolts, nuts and washers, shall be supplied with each post.

16.2 Wire

16.2.1 Barbed wire

Barbed wire shall comply with the requirements of SABS 675 and shall be one or more of the following types:

- High-tensile-grade single-strand 3.15 mm x 2.50 mm oval-shaped wire, with a 2.81 mm equivalent diameter and fully galvanised.
- High-tensile-grade single-strand fully galvanised (first-class coating). 2.80 mm x 1.90 mm in diameter, oval-shaped wire, with a 2.31 mm equivalent diameter. This wire shall not be used less than 500 mm above ground where there is danger of veld fibre.
- Mild-steel-grade double-strand uni-directional-twist wire, each strand 2.50 mm in diameter, for use at any height above ground. The wire shall be fully galvanised
- Barbs shall be manufactured from 2.0 mm galvanised wire and shall be spaced at not more than 152 mm.

16.2.2 Smooth wire

Smooth wire shall comply with the requirements of SABS 675 and shall be of the types specified below:

- Straining wire shall be 4.00 mm in diameter and fully galvanised.
- Fencing wire shall be high-tensile-grade 2.24 mm diameter wire fully galvanised. Tying wire shall be 2.50 mm diameter mild-steel galvanised wire for tying fencing wire to standards and droppers and 1.6 mm mild-steel galvanised wire for tying netting and mesh wire to the fencing wire.

16.2.3. Diamond mesh

Diamond mesh (chain-link fencing material) shall comply with the requirements of SABS 1373.

The width shall be shown on the drawings and the edge finish shall be both sides clinched or barbed. The nominal diameter of the wire shall be 2.5 mm and the mesh size is 64 mm x 64 mm. The wire shall be fully galvanised.

16.2.4. Wire netting

- Wire netting shall be fully galvanised mild-steel wire with a minimum diameter for 1.8 mm, with 75 mm hexagonal mesh.
- The width shall be as shown on the drawings.
- Barbed-tape concertina wire.
- Barbed-tape concertina wire shall comply with the requirements of CKS 592 type A. The high-tensile steel wire shall be heavily galvanised (class A), and the barbed tape and concertina clamps shall also be heavily galvanised (class Z600). The diameter of the rail shall be 950 mm or 700 mm according to requirements.

16.3 Gates

- Gates shall be manufactured to the dimensions shown on the drawings.
- Gates shall be complete in every respect, including hinges, washers, bolts and locking chains attached to the gate.

16.4 Timber posts for wire mats

Timber posts for holding down wire mats where fences cross streams shall comply with the requirements of SABS 457 and shall be in accordance with the requirements of sub-clause 5402(bi).

16.5 Manufacturing tolerances for wire

- The actual diameter of wire supplied shall nowhere be less than the specified diameter minus the following tolerances:

Specified diameter	Tolerance
1.0 - 1.8 mm	0.05 mm
2.0 - 2.8 mm	0.08 mm
3.15 - 4.0 mm.....	0.10 mm

16.6 Type of Fencing

The following types of fences shall be erected as directed by the Engineer:

a. Stock-proof fences

b. Pedestrian fences

c. Security fences

Where existing fences have to be dismantled and re-erected, they shall be erected either to the same design as the original, but with such modifications as may be required by the Engineer, or they shall be erected up to one of the standards specified above, all as ordered by the Engineer.

16.7 Clearing the Fence Line

The fence line shall be cleared over a width of at least 2 m (1 m inside the fence centre line and 1 m beyond). Surface irregularities shall be graded so that the fence will follow the general contour of the ground. Clearing the line shall include the removal of all trees, scrubs, stumps, isolated boulders or stones and other obstructions which will interfere with the construction of the fence. Stumps within the cleared space shall be grubbed as described in SABS 1200 C. The bottom of the fence shall be located at a uniform distance above the ground line in accordance with the requirements shown on the drawings. All material removed shall be burnt or disposed of in disused borrow pits.

Any areas outside the road reserve where clearing is not permitted by the owner or is impracticable shall not be cleared if so directed by the Engineer.

16.8 Erecting Straining Posts and Standards

Straining posts shall be erected at all terminal points, corners and bends in the fencing, at all junctions with other fences, and at low points (as required). Straining posts shall not be spaced further apart than shown on the drawings. The length of posts above ground shall be such that the correct clearance between the lowest wire and the ground can be obtained.

Straining posts shall be accurately set in holes and shall be provided with concrete bases to the dimensions shown on the drawings.

Holes shall be dug to the full specified depth. Where, on account of the presence of rock, the holes cannot be excavated by hand of by pneumatic tools and the Contractor has to resort to the use of explosives, he will be paid separately for the drilling and blasting operations required.

16.9 Erecting Fence Wires

All fence wire shall be tied to the sides of standards or posts to prevent the wires from being displaced or becoming loose. The wire shall be carefully tensioned without sagging, and true to line, care being exercised not to tension the wire to such an extent that it will break, or that end, corner, straining or gate posts will be pulled out, or that it will be easily damaged during veld fires.

Each strand of fencing wire shall be securely tied in the correct position hard up to each standard with soft galvanised tying wire. The tying wire for each strand shall pass through a hole or notch in the standard, while the ends of the tying wire shall be wound at least four times around the fencing wire to prevent it from slipping in a vertical direction.

At end, corner, straining and gate posts the fencing wire shall be securely wrapped twice around the post and secured against slipping by tying the end tightly around the wire by means of at least six snug tight twists.

16.10 Erecting Diamond Mesh or Wire Netting

Where vermin-proof, pedestrian or security fences are erected, or where instructed by the Engineer, wire netting or diamond mesh shall be stretched against the fence and properly tied to the fencing wire as shown on the drawings. The diamond mesh or wire netting shall be secured by soft tying wire at 1.2 m centres along the top and bottom wires and at 3m centres along each of the other fencing wires, unless otherwise shown on the drawing.

In the case of vermin-proof fencing, vermin shall be prevented from creeping under the fence by either one of the two methods described below as ordered by the Engineer

By folding back bottom 130 mm of the wire netting so that it lies flat on the ground and by tightly packing stones (having a minimum dimension of 200 mm) end on this flap to secure it in position.

By embedding the lower 130 mm of the wire netting in the ground and thoroughly compacting the earth around it on both sides, to secure the netting.

16.11 Closing Opening under Fences

At ditches, streams, drainage channels or other depressions where the fence cannot be erected so as to follow the general ground contour, the Contractor shall close the opening under the fence with horizontal barbed wires at 150 mm intervals, stretched between additional posts or straining posts as shown on the drawings or directed by the Engineer. In case of pedestrian, vermin-proof and security fences the opening shall be covered with strips of wire netting or diamond mesh 1000m wide, fixed to the barbed wires.

In the case of larger streams where damming of debris against the fence would constitute a hazard, t he opening below the bottom fencing wire shall be closed with loose-hanging wire nets. For this purpose, additional straining posts shall be planted on both sides of the stream with a cable consisting of at least five strands of smooth fencing wire stretched between them. Onto this cable vertical strips of diamond mesh shall be tied to each other so that the entire mat will be raised by water flowing underneath to leave a free stream area. These mats at streams shall be erected only on instruction from the Engineer. If it should be necessary to keep the bottoms of the mats on the ground, the Engineer may order that timber posts or pipes be fixed horizontally to the bottom ends of the diamond-mesh strips.

16.12 Erecting Gates

Gates shall be erected at the positions indicated by the Engineer. The gate shall be hung on gate fittings in accordance with the requirements shown on the drawings. Gates shall be so erected as to swing in a horizontal plane at right angles to the gate posts, clear of the ground

in all positions. In pedestrian and security fences the double swing gates shall leave a gap not exceeding 25 mm between them when closed and other gates shall not be further than 25 mm from the gate post when closed.

Gates shall be stock-proof to the same extent as the adjoining fence. The clearance below the gates shall not exceed 75 mm with the gates closed

SECTION XII: SPECIAL SPECIFICATIONS

Clause numbers in the Special Specification correspond to those in the Technical Standard Specifications.

Clause Signboard **1.45**Add the following "The contractor shall erect publicity signboard"

Clause Setting out and survey Equipment **1.40**Add the following "The Contractor shall allow in his rates the cost of the necessary qualified and experienced staff to set out the works.

The contractor shall further allow in his rates for allowing the use of his survey equipments, and staff by the Engineer for checking the setting out and any other survey works"

Clause 1.21 Office of the Engineer Add the following "The contractor shall supply and maintain an Office of approved construction for the Engineers.

The contractor shall be liable and responsible for the security of all the papers and equipment contained in the office and shall supply the following new equipment and furniture" However this list is not exhaustive as it shall be read in conjunction with other facilities provided in schedule of particulars of this contract.

The office of the Engineer shall be fully completed before the commencement of permanent works in a particular division.

The contractors rates for the Engineers office shall include acquisition and preparation of the site, access roads, car parks, fences, gates, drains, culverts, provision and erection of the buildings, furniture and equipment, provision and maintenance of a VIP latrine, water, dismantling and removal of buildings erected by the contractor and leaving the site neat and tidy.

A provision sum shall be entered in the Bills of Quantities to cater for the housing needs of the Engineer's staff. This sum shall be paid to the contractor as a reimbursement of renting approved accommodation. The contractor shall further furnish the accommodation as scheduled below with new furniture. However this list is not exhaustive as it shall be read in conjunction with other facilities provided in schedule of particulars of this contract.

For the duration the rented houses are required by the contract the contractor shall ensure that the landlord attends to any maintenance problems regularly. The furniture shall be maintained by the contractor.

For the rented accommodation, the contractor shall keep the premises, well maintained, clean and fully habitable condition 24 hours per day until the expiry of the period of maintenance.

The contractor shall provide constant supply of clean water and gas for lighting and cooking.

The above furniture and equipment shall revert to the Contractor

Clause 1.21 Housing for Engineer's staff

Clause 3.18 Compaction of fill

Add the following: "Conventional compaction plant, namely smooth wheeled rollers, sheep foot rollers, and vibratory rollers compaction plant will not be required for the compaction of the earthworks in this contract.

Instead the contractor shall move his earthmoving equipment round the works requiring compaction judicially to ensure that the earthworks are compacted to the approval of the Engineers.

Clause 1.15 Progress Photographs

Add the following "Progress Photographs at least 50 nos. showing the progress of the works shall be taken every month by the Contractor from positions to be selected by the Engineer or otherwise.

Miscellaneous Account

The Contractor shall be instructed by the Engineer to purchase and supply to the Engineer or pay for miscellaneous items including but not limited to stationery, stores, equipment, office consumables etc.

The Contractor shall submit a miscellaneous account including receipts of all such items purchased or paid for.

Preamble to the Bill of Quantities

a. The area to be measured for clearance shall be all the area under embankments and excavations and exclude any clearance that the Contractor may carry out for his working space and other preliminary works.
b. Only the area excavated for the tank and the area under embankment excavated shall be paid for. Any other areas excavated by the Contractor save for the collection trench measured as below shall be at Contractors expense.
c. The collection trench is measured in meters and the rate shall include for formation of the embankment on the side of trench, general clearance, and top soil removed

APPENDICIESS

SECTION IX : BIDDER ELIGIBILITY

KISULULU GENERAL SUPPLIES AND GENERAL WORKS
P.O.BOX 63
Tel: 0784826222
KIOMBOI.

REF. KSLL /KMB/B/MKL2022/03 *12/01/2022.*

MANAGER
NMB KIOMBOI BRANCH
P.O.BOX 44
KIOMBOI/IRAMBA

REF: **CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7**

SUB: AUTHORITY TO SEEK REFERENCES FROM THE TENDERER'S BANKER'S.

Our company has submitted Bid Document as mentioned above to **THE SECRETARY, CONCIL TENDER BOARD** for considerations.

We hereby authorize you to disclose information on our account No 5066600071 as may request by **THE SECRETARY**

CONCIL TENDER BOARD
P.O.BOX 1007,
MKALAMA- SINGIDA.

Yours truly,

.....

-KASIM KINGU
Managing Director

KISULULU GENERAL SUPPLIES AND GENERAL WORKS P.O.BOX 63 Tel: 0784826222 KIOMBOI.

REF. KSLL /KMB/B/MKL2022/04 *12/01/2022.*

THE SECRETARY
CONCIL TENDER BOARD
P.O.BOX 1007,
MKALAMA- SINGIDA

REF: CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7

SUB: STATEMENT OF COMPLIANCE.

Please, the heading above.
We M/s KISILULU GENERAL SUPPLIES AND GENERAL WORKS confirmed that we are not associated or has been associated in the past directly or indirectly with the consultants or any other entity that has prepared the designs, specifications and other documents for the project or being proposed as Project for the Project.

Signed by the said M/s KISULULU GENERAL SUPPLIES AND GENERAL WORKS.

Signature.....
Title.....MANAGING DIRECTOR
Company Stamp.....

Signed and delivered in my presence this .....13.....day of JANUARY, 2022.

.....

Commissioner of Oaths

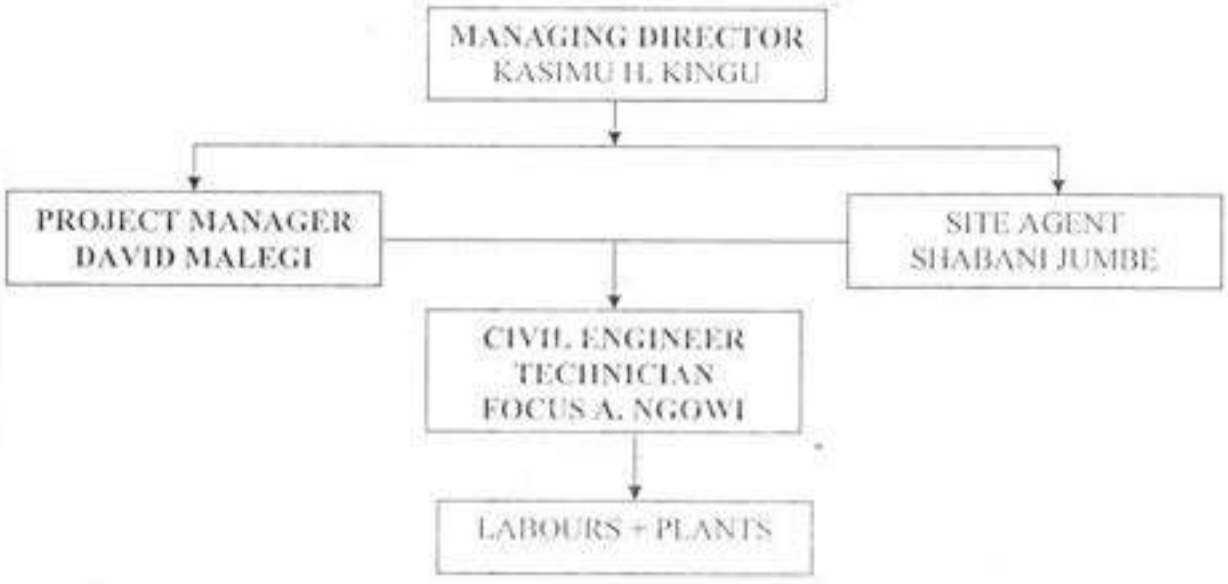
KISULULU GENERAL SUPPLIES AND GENERAL WORKS
P.O.BOX 63
Tel: 0784826222
KIOMBOI.

REF. KSLL /KMB/B/MKL2022/06 *12/01/2022.*

THE SECRETARY
CONCIL TENDER BOARD
P.O.BOX 1007,
MKALAMA- SINGIDA

REF: CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7

SUBJECT: PROPOSED PROJECT ORGANIZATION CHART.



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AND
GENERAL WORKS
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Tel: 0784826222
KIOMBOI.

REF. KSLL /KMB/B/MKL2022/06 *12/01/2022.*

THE SECRETARY
CONCIL TENDER BOARD
P.O.BOX 1007,
MKALAMA- SINGIDA

REF: CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7

Qualification and experience of key personnel proposed			
Position	Name	Years of experience	Years of experience in proposed position.
Managing Director	Kassim H. Kingu	15	15
Project Manager	David Malegi	15	11
Site Agent	Shabani Jumbe	9	9
Civil Engineer Technician	Focus A.Ngowi	21	15

KISULULU GENERAL SUPPLIES
AND
GENERAL WORKS

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· Tel: 0784826222
KIOMBOI.

REF. KSLL /KMB/B/MKL2022/06 *12/01/2022.*

THE SECRETARY
CONCIL TENDER BOARD
P.O.BOX 1007,
MKALAMA- SINGIDA

REF: CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7

Major items of contractor's Equipment proposed.

Item of equipment	Description make, and age (years)	Condition (new good, poor) and number available			Owned, leased (from who?) or to be purchased (from whom?)		
	Make	Years	Condition	Number	If owned registration number	Owned registration number	Present location
Tipper ton 7	ISUZU	1982/1985	GOOD	2	OWNED	T41AMG/ T242ADF	KIOMBOI
Water Bowzer 1000lts	ISUZU	1989	GOOD	1	OWNED	SM1554	KIOMBOI
Supervision vehicle	Land rover 109	1985	GOOD	1	OWNED	T743AMG	KIOMBOI
Concrete Mixer	-	-	GOOD	1	OWNED	-	KIOMBOI
Blocks Making Machines	-	-	GOOD	3	OWNED	-	KIOMBOI
Wheel barrows	-	-	GOOD	4	OWNED	-	KIOMBOI
Block names	-	-	GOOD	1	OWNED	-	KIOMBOI
Pickaxes	-	-	GOOD	5	OWNED	-	KIOMBOI

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TANZANIA REVENUE AUTHORITY

00832541 3

MOTOR VEHICLE REGISTRATION CARD

NO: 654173

Vehicle Control Number: 247758

Registration Number: T743AMG

Owner Details:

ID Number:	101400565
Category:	Sole Proprietor
Name:	KASIM HUSEIN KINGU
Postal Address:	PO BOX 9999
	KIOMBOI

Certified true Copy

67 Engineering

Title Holder Details:

ID Number:	101400565
Category:	Sole Proprietor
Name:	KASIM HUSEIN KINGU
Postal Address:	PO BOX 9952
	KIOMBOI

Vehicle Details:

Make:	Landrover
Model:	109
Model Number:	109
Body Type:	Pick-up
Colour:	Cream
Class:	Light passenger vehicle (Less than 12 persons)
Year of Manufacture:	1985
Chassis No:	91399237C
Engine No:	919749A
Engine Capacity:	2286
Fuel used:	Petrol
Number of Axles:	2
Axle Distance:	
Seating Capacity:	2
Tare Weight:	
Gross Weight:	2500
Imported from:	

Number of Previous Owners: 0

Vehicle Usage: Private or Normal

Previous Registration Number: ARR447

NOTIFICATION OF CHANGE OF OWNERSHIP OR TITLE HOLDER ☐

(Tick here, fill in owner particulars and sign Declaration below)

NB! Current owner must declare his/her Stamp Duty Status)

NOTIFICATION OF TRANSFER OF TITLE TO CURRENT OWNER ☐

(Tick here and sign Declaration below)

New Owner Category		Current Owner's Stamp Duty Status
☐ Citizen of Tanzania	☐ Financial Institution	VAT or Stamp Duty Composition Number:
☐ Parastatal	☐ Local Government	
☐ Company	☐ Other government Organization	Stamp Duty Receipt Number:
☐ Expatriate	☐ Diplomat/Foreign Mission	
☐ Other Agencies/Associations/Clubs	☐ International Organisation	
☐ Partnership	☐ Cooperative Society	
☐ Sole Proprietor	☐ Religious Organisation	☐ Not Applicable
Tin No or other No:		

Reason for Change of Ownership : ☐ Sold ☐ Repossessed ☐ Deceased estate ☐ Within company or family ☐ Other

USE BLOCK LETTERS

New Owner's Name:

New Owner's Postal Address: Town/Place:

REASON FOR CHANGE OF PARTICULARS & USE: ☐ Roadworthiness ☐ Stolen ☐ Scrapped ☐ Repossessed ☐ Reconstructed

New: ☐ Body Type: ☐ Engine No: ☐ Engine Capacity:
☐ Propelled by: ☐ Fuel Type: ☐ Tare Weight:
☐ Gross Weight: ☑ Colour: ☐ Seating Capacity:

New use: ☐ Private ☐ Taxi
☐ Commercial ☐ Emergency
☐ Donor Funded

Please enclose Police Inspection Report

DECLARATION

I, the Title Holder, sign and declare that the Title has been transferred to the owner or to a new Title Holder

I, the owner, sign and declare that the changes reported by me are true and correct

We, the owner and the new owner, sign and declare that the vehicle was disposed to the new owner on the ____ day of 20__

at the Sales Price Tsh: Owner: New Owner:

RECEIPT

TANZANIA REVENUE AUTHORITY

Received from: KASIM HUSEIN KINGU

Payment Type:

Amount:
Tsh 32,000.00
Tsh 0.00
Tsh 0.00

Registration No: T743AMG

Reason: TAKE ON

Mode of Payment: Credit Card
951485

Receipt No: 403846 Date: 06/03/05

Issuing Officer: C. BISANDA

Issuing Office: DODOMA

Total Amount: Tsh 32,000.00

00832541 3

00832541 3

0333469-5

TANZANIA REVENUE AUTHORITY

0333469-5 MV 50

MOTOR VEHICLE REGISTRATION CARD

NO. 3519542

Vehicle Control Number: 836056

Registration Number: T592RPY

Owner Details:
- ID Number: 11899258
- Category: Sole Proprietor
- Name: ZAKIA RAHAMANI KINGI
- Postal Address: PO BOX 63
- KIOMBOI

Vehicle Details:
- Make: Isuzu
- Model: TXD95YTN
- Model Number: TXD95TYN
- Body Type: Truck
- Colour: Maroon Blue
- Class: Heavy load veh (GVM > 3500kg)

Tax Holder Details:
- ID Number: 11899258
- Category: Sole Proprietor
- Name: ZAKIA RAHAMANI KINGI
- Postal Address: PO BOX 63
- KIOMBOI

- Year of Manufacture: 1984
- Chassis No: 2201699
- Engine No: 188331
- Engine Capacity: 5785
- Fuel used: Diesel
- Number of Axles: 2
- Axle Distance:
- Seating Capacity: 3
- Tare Weight: 8000
- Gross Weight: 7000
- Imported from:

Number of Previous Owners: 0

Vehicle Usage: Commercial

Previous Registration Number: SM1554

NOTIFICATION OF CHANGE OF OWNERSHIP OR TITLE HOLDER

(Tick here, fill in owner particulars and sign Declaration below)

NB: Current owner must declare his/her Stamp Duty Status

NOTIFICATION OF TRANSFER OF TITLE TO CURRENT OWNER

(Tick here and sign Declaration below)

New Owner Category		Current Owner's Stamp Duty Status
Citizen of Tanzania	Financial Institution	VAT or Stamp Duty Composition Number:
Parastatal	Local Government	
Company	Other government Organisation	
Expatriate	Diplomat/Foreign Mission	Stamp Duty Receipt Number:
Other (Agency, Association, Clubs)	International Organisation	
Partnership	Cooperative Society	
Sole Proprietor	Religious Organisation	
Tax No. (if other than Sole Proprietor)		Not Applicable

Reason for Change of Ownership: Sold | Repossessed | Deceased estate | Within company or family | Other

NEW OWNER'S LETTER:

New Owner's Name: Tel:

New Owner's Postal Address: Town/Place:

REASON FOR CHANGE OF PARTICULARS & USE: Road worthiness | Stolen | Scrapped | Repossessed | Reconstructed

New: Body Type | Engine No | Engine Capacity | New use: Private | Hire

Propelled by | Fuel Type | Tare Weight | Commercial | Driving School

Gross Weight | Colour | Seating Capacity | Diplomat/Foreign

Please enclose Police Inspection Report

DECLARATION

I, the Title Holder, sign and declare that the Title has been transferred to the owner or his/her Title Holder.

I, the owner, sign and declare that the changes reported by me are true and correct.

I, the Title Holder and the new owner, sign and declare that the vehicle was disposed to the new owner on the day of 20

Motor Vehicle Sales Price Tsh: Owner: New Owner:

RECEIPT

TANZANIA REVENUE AUTHORITY

Received from: ZAKIA RAHAMANI KINGI

Reason: TAKE ON

Registration No: T592RPY

Mode of Payment: Credit Card 0422663

Receipt No: 2687137 Date: 08/02/11

Issuing Officer: D. GACHI

Issuing Office: SINGIDA

Tsh 250,000.00

0333469-5

543-0 | 00832543450

First Registration: [illegible] Vehicle Control Number: 247756

Registration Number: T741ABG

Owner Details:

ID Number:	101400565
Category:	Sole Proprietor
Name:	KASIM HUSEIN KINGU
Postal Address:	PO BOX 9999 KIOMBOI

Title Holder Details:

ID Number:	101400565
Category:	Sole Proprietor
Name:	KASIM HUSEIN KINGU
Postal Address:	PO BOX 9999 KIOMBOI

Number of Previous Owners: 0

Vehicle Usage: Commercial

Previous Registration Number: ARL338

Vehicle Details:

Make:	Isuzu
Model:	TXD
Model Number:	TXD 80
Body Type:	Tipper
Colour:	Blue
Class:	Heavy load veh (GVM > 3500Kg)
Year of Manufacture:	1978
Chassis No:	163786
Engine No:	23607
Engine Capacity:	6126
Fuel used:	Diesel
Number of Axles:	2
Axle Distance:	
Seating Capacity:	3
Tare Weight:	5180
Gross Weight:	7000
Imported from:	

NOTIFICATION OF CHANGE OF OWNERSHIP OR TITLE HOLDER

NOTIFICATION OF TRANSFER OF TITLE TO CURRENT OWNER

New Owner Category

- Citizen of Tanzania
- Parastatal
- Company
- Expatriate
- Other Agencies/Associations/Clubs
- Partnership
- Sole Proprietor
- Financial institution
- Local Goverment
- Other government Organisation
- Diplomat/Foreign Mission
- International Organisation
- Cooperative Society
- Religious Organisation

TIN No. or Other No:

Current Owner's Stamp Duty Status

VAT or Stamp Duty Composition Number:

Stamp Duty Receipt Number:

Not Applicable

New Owner's Name:

New Owner's Postal Address:

Taxi | Commercial | Emergency

day of

00832543-0

SPECIAL POWER OF ATTORNEY

We **KASSIMU H. KINGU and SHAABAN JUMBE** of **P.O.BOX 63, KIOMBOI,** Directors of **Kisululu General Supplies and General Works** do hereby appoint **KASSIM H. KINGU** the Managing Director of firm's, a firms attorney in fact and in firm's name and on the behalf of the firm to make follow up and be signatory of **CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7**

This power of attorney will remain valid until revoked by us.

Signed and delivered by said,

SHAABAN JUMBE and on behalf of
KISULULU GENERAL SUPPLIES
AND GENERAL WORKS who is
Known to me personally/identified to me
By KASSIM H. KINGU, the letter being known
To me personally at KIOMBOI this 12 day of
01 2022.

.....

KISULULU GENERAL SUPPLIES
AND GENERAL WORKS
P. O. Box 63
KIOMBOI-MANYARA-SINGIDA

Signature ..... JESCA P. OLOTU .....
Address 61 - KIOMBOI
Qualification COMMISSIONER OF OATH

Signed and delivered by said,

KASSIM H. KINGU and on behalf of
KISULULU GENERAL SUPPLIES
AND GENERAL WORKS who is
Known to me personally/identified to me
By SHAABAN JUMBE, the letter being known
To me personally at KIOMBOI this 12 day of
01 2022.

.....

KISULULU GENERAL SUPPLIES
AND GENERAL WORKS
P. O. Box 63
KIOMBOI-MANYARA-SINGIDA

Signature ..... JESCA P. OLOTU .....
Address 61 - KIOMBOI
Qualification COMMISSIONER OF OATH

Tender – Securing Declaration

Date: **12/01/2022** (Insert date (as day, month and year)

Bid No: **LGA/147/2021/2022/W/IMF/07** (Insert number of tendering process)

Alternative No .....

(Insert identification No. if this as a Bid for an alternative)

THE SECRETARY,
COUNCIL TENDER BOARD,
P.O.BOX 1007
MKALAMA-SINGIDA.

We Kisululu General Supplies and General Works, the undersigned, declare that:

We understand that, according to you conditions, tenders must be supported by a Tender – Securing Declaration.

We accept that will automatically be suspended from being eligible for tendering in any contract with the PE for the period of time of determined by the Authority, if we are in breach of our obligation(s) under the tender conditions, because we:

(a) have withdrawn our tender during the period of tender validity specified in the Form of tender;
(b) Disagree to arithmetical correction made to the tender price: or
(c) have been notified of the acceptance of our tender by the PE during the period of tender validity, (i) fail or refuse to execute the Contract, if required by PE to do so, or (ii) fail or refuse to furnish the performance Security or to comply with any other condition precedent to signing the contract specified in the tendering documents, in accordance with the ITB. We understand this Tender Securing Declaration shall expire if we are not the successful tender, upon the earlier of (i) our receipt of your notification to us of the name of the successful tender, or (ii) twenty-eight days after the expiration of our tender.

Signed: ..... (Insert signature of person whose name and capacity are shown) in the capacity of **MANAGING DIRECTOR** (Insert legal capacity of person signing the Tender Securing Declaration)

Name **KASIM HUSEIN KINGU** (Insert complete name of person signing the Tender securing Declaration)

Dully authorized to sign the bid for and on behalf of: **KISULULU GENERAL SUPPLIES AND GENERAL WORKS** (Insert complete name of tenderer)
Dated on ..12 day of ...JANUARY **2022** (insert date of signing)

KISULULU GENERAL SUPPLIES
AND
GENERAL WORKS

Work performed prime Contractor on work of a similar nature and volume

Project name and Country	Name of client and contact person	Contractors Participation	Type of works performed and year completion	Value of contract
Rehabilitation of DCS House at IRAMBA/KIOMBOI	DAS-IRAMBA	100%	-CONSTRUCTION OF KITCHEN,COMPAUND	5,163,000.
Rehabilitation of CWT Office at KIOMBOI	CHAMA CHA WAALIMU - IRAMBA	100%	- TILES WORKS - CEILLING BOARD WORKS - WALLS ,DACORATION - DOORS AND WINDORS - ELECTRICAL WORKS, - FURNITURES. (2009,JUNE)	23,060,000.
Construction of one House at Lulumba Secondary School	Head Master LULUMBA S.S	100%	- TILES WORKS - CEILLING BOARD WORKS - WALLS ,DACORATION - DOORS AND WINDORS - ELECTRICAL WORKS (2009,AUGAST)	14,800,450.
Rehabilitation of Sukamahela Settlement at Manyoni District.	Permanent Secretary- Ministry of Health	100%	- WALLS ,DACORATION - DOORS AND WINDORS - FLOOR,PLASTER, CONSTRUCTION OF KITCHEN,LATRINE AND BATH - FURNITURES. (2010,FEB)	55,736,300.
Rehabilitation of DCS and DAS houses at IRAMBA DISTRICT	REGIONAL ADMINISTRATIVE SECRETARY(RAS) -SINGIDA	100%	- TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING	

			-DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS - FURNITURES. (2010,AUGAST)	40,553,100.
Completion of staff house at kiomboi urban	DED-IRAMBA	100%	- TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS (2013,FEBRUARY)	28,998,063.
Completion of two in one Dispensary staff house at Mlandala village	VILLAGE COMMUTEE – MLANDALA	100%	- TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS (2010,AUGAST)	36,978,000.
Construction of Misigiri Market	VILLAGE COMMUTTE MISIGIRI	100%	TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS - FURNITURES. (2013,OCTOBER)	62,324,000.
Completion of two in one Dispensary staff house at Ujungu village	VILLAGE COMMUTTE UJUNGU	100%	TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -DECORATION	42,388,250.

			- ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS - FURNITURES. (2013.OCTOBER	
Completion of two in one Dispensary Building at Kisimba Village	VILLAGE COMMUTTE KISIMBA	100%	(2013.OCTOBER	40,736,750.
Supplying manufactured furniture for multipurpose hall at Kizaga Secondary School	HEADMASTER KIZAGA SECONDARY, P.O.BOX 12, KIOMBOI	100%	MANUFACTURE: - CHAIRS AND - TABLES (NOVEMBER 2013)	45,600,000.
Renovation of National Health Insurances Fund beneficiaries word at Kiomboi District Hospital	DED-IRAMBA	100%	-TILES WORKS - CEILLING BOARD WORKS - ROOFING WORKS AND -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS - PLUMBING WORKS (2014.MAY	51,340,191.
Construction of Kinambeu Dispensary at Kinambeu Village	VILLAGE COMMUTTE KINAMBEU	100%	-TILES WORKS -CONCREATE WORKS - CEILLING BOARD WORKS - -WALLS AND ROOFING -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS - FURNITURES. (2015.OCTOBER	137,097,000.
Construction of jengo la fishe at Kiomboi Council	DED- IRAMBA	100%	-TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING	12,990,000.

Hospital			-CONCREATE WORKS -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS (Jan 2021)	
Constructio of staff house at Mkalama Council	DED-MKALAMA	100%	-TILES WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -CONCREATE WORKS -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS (May 2021)	10,500,000.
Construction of Health Centre OPD at Kisiriri Ward	DED- IRAMBA	100%	-TILES WORKS -CONCREATE WORKS - CEILLING BOARD WORKS - WALLS AND ROOFING -DECORATION - ALUMINIUM WORKS -DOORS AND WINDORS - ELECTRICAL WORKS (Nov 2021)	28,924,114.
			TOTAL	**638,189,218**

M/S KISULULU GENERAL SUPPLIES AND GENERAL WORKS

P.O.BOX 63, KIOMBOI.

WORK PROGRAMME FOR CONSTRUCTION OF THREE IN ONE STAFF HOUSE AT DISTRICT HOSPITAL; TENDER NO: LGA/147/2021/2022/W/IMF/7

S/NO	DESCRIPTION /ACTIVITY NAME	DURATION IN WEEKS							
		MONTHS							
		FEBRUARY 2022				MARCH 2022			
		W1	W2	W3	W4	W1	W2	W3	W4
1.0	MOBILIZATION								
2.0	SUBSTRUCTURE								
3.0	WALLS AND GENERAL WORKS								
4.0	ROOFING								
5.0	CEILING,FLOOR, SOAK AWAY PIT								
6.0	TILES WORKS								
7.0	DOORS AND WINDORS GRILL								
8.0	DECORETION AND PAINTS								
9.0	SUPPLY AND FIX ANODISED ALUMINIUM FRAME								
10.0	HADING OVER AND DEMOBILIZATION								

UNIVERSITY OF DAR ES SALAAM

THIS IS TO CERTIFY THAT

Kingu Husein Seleman Kasim

has satisfied the requirements for the
award of

DIPLOMA IN
ENVIRONMENTAL HEALTH SCIENCE

Vice-Chancellor

5 December 1993

Chief Academic Officer

UNIVERSITY OF DAR ES SALAAM

THIS IS TO CERTIFY THAT

David Mafeo

having satisfied the requirements for the

award of the

DEGREE OF
BACHELOR OF SCIENCE IN ENGINEERING

WITH HONOURS Second Class Lower Division

was admitted to the degree at a Congregation

held in DAR ES SALAAM, on the

twenty-fifth day of November,

in the year two thousand

Chief Academic Officer

UNITED REPUBLIC OF TANZANIA

ENGINEERS REGISTRATION BOARD

Certificate of Registration

(Under the Engineers Registration Act, 1997)

It is hereby certified that

David Malegi.

having satisfied the requirements for registration as

PROFESSIONAL ENGINEER

under the provisions of the Engineers Registration Act, 1997, was registered as such on the 18th day of December 2015

in the discipline of Civil engineering

and was given registration number 4280

Sealed and given under our hands at Dar es Salaam

this 10th day of March 2016

Eng. S. D. M. Mate
Registrar

Eng. Prof. L. M. [illegible]
Chairman

Eng. Nuhu F. J. Nyange
Board Member

"Not valid without Hologram Sticker, photograph of the bearer and practicing Licence"

DETAILED CURRICULUM VITAE

1. PERSONAL INFORMATION

➢ Name	:	David D Malegi
➢ Sex	:	Male
➢ Date of Birth	:	25-11-1974
➢ Marital Status	:	Married
➢ Nationality	:	Tanzanian
➢ Contacts: Address	:	P.O. Box 2410, Dodoma - Tanzania
Mobile	:	+255 625917776
Email Address	:	[illegible]

2. ACADEMIC AND PROFESSIONAL QUALIFICATIONS

- ➢ Professional Engineer **Reg. No. 4280** with Engineers Registration Board Tanzania
- ➢ Bachelor of Science in Civil Engineering, September 1996 – **June 2000**, University of Dar es Salaam – Tanzania
- ➢ Advanced Level Certificate of Secondary Education (PCM), **July 1993 – June 1995**, Ilboru Secondary School – Arusha, Tanzania
- ➢ Ordinary Level Certificate of Secondary Education, **January 1989 – November 1992**, Tambaza Secondary School – Dar Es Salaam, Tanzania

3. PROFESSIONAL EXPERIENCE

Period 2013 – To date
Employer **M/S BEK ENTERPRISES LTD, P.O BOX, 1463 DODOMA.**

Period November 2012 – June 2013
Position Site Agent
Project Routine/Reccurent Maintenance of Nyuka-Mvumi-Kikombo-Buigiri Road

TZS 300,248,780.00

Period May 2012 – September 2012
Position Site Agent
Project Construction of [illegible] Bridge [illegible] Mpwapwa District Council for TANROADS – Dodoma **TZS 379,000,000.00**

Period Jan 2012 – December 2012
Position Site Agent
Project Construction of Church Building for the Bishop Kondoa Roman Catholic Diocese-Kondoa **TZS 700,000,000.00**

Period November 2011 – April 2012
Position Site Agent
Project Construction of five storey building for Mr Kundael Mosha at Mji Mpya Dodoma Municipality **TZS 493,000,000.00**

CV Mwaipopo

Period	March 2011 - December 2011
Position	Site Agent
Project	Construction of two storey building for M/s Fiora Msanii at Kisasa-Dodoma Municipality TZS 332,413,388.00
Period	Oct 2011 - Feb 2011
Position	Site Agent.
Project	Construction of Chamwino Bridge for Municipal Council-Dodoma TZS 289,238,750.00
Period	2007- 2011
Employer	**M/S MI SONS ENGINEERS**
Position	**Site Engineer/Site Agent**
Projects	Various Civil Works and Building construction works
Period	**2005- 2006**
Employer	**M/S ROSEKA ENTERPRISES**
Period	2005- 2006
Position	Site Engineer
Project	1.0. Spot improvement of Mpiji-Makutupora section along Dodoma-Bereko Trunk Road L005(8km)
	2.0. Periodic Maintenance and routine/recurrent maintenance of Zamahero-Kwamtoro-Kinyamshindo Regional Road, R463(125.54KM)
Period	**NOVEMBER 2003-NOVEMBER 2004**
Employer	**NYAKI CONSTRUCTIONS LTD, SINGIDA**
Period	**AUGUST 2014-NOVEMBER 2004**
Position	Site Engineer
Project	**Routine and Spot Improvement Works along Ulemo-Gumanga - Sibiti Regional Roads.**
Period	**NOVEMBER 2003-JANUARY 2004**
Position	Site Engineer/Site Agent
Project	**Periodic Maintenance Works along Singida - Tabora Boarder Trunk Road**
Period	**JUNE 2002 -JANUARY 2003**
Employer	**KASHEKE ENTERPRISES LTD, MWANZA**
Period	**SEPTEMBER 2002 -JANUARY 2003**
Position	Site Engineer
Project	Spot Improvement Works of Victoria-Mpiji Magese (10km) TACICA Demonstration Site No4 With An Addendum
Period	**JUNE 2002-AUGUST 2002**
Position	Site Engineer
Project	Emergency Repair of Mkalalo, Mzakwe/Zuka,Mayamaya and Zamahero Road Sections along the Dodoma Bereko Trunk Roads

Period JANUARY 2001-APRIL 2002
Employer CHINA CIVIL ENGINEERING CONSTRUCTIONS CO OPERATIONS (CCECC)

Period OCTOBER 2001-APRIL 2002
Position Site Engineer
Project Proposed Wafanyakazi wa Posta na Simu Saccos Headquarter at Lindi Street Kariakoo Area (8 Storey Building)

Period JANUAARY 2001-SEPTEMBER 2001
Position Site Engineer
Project National Social Security Fund (NSSF) and University of Dar Es Salaam (UDSM) Mabibo Hostel Project

MAIN DUTIES

- Implementation of works strategies, standards and marketing level
- Preparation of Tender Documents and work plans
- All Managerial duties

4. CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this bio data correctly describe myself, my qualification and experience the information contained herein is true and correct.

Name: Eng David D. Makey

Signature: ....

Date:... 26/11/2007 ....

NTA Level 6 No: 0000808

ARUSHA TECHNICAL COLLEGE

This is to certify that

Shabani H. Jumbo

Registration No: A0100073
Having satisfied the requirements for the award of the

Ordinary Diploma in

Civil Engineering

with Lower Second Class

Was conferred at a congregation held in Arusha
on the seventeenth of January in the year two thousand and fifteen

Board Chairperson

Rector

ARUSHA TECHNICAL COLLEGE

TECHNICIAN CERTIFICATE IN CIVIL ENGINEERING

ACADEMIC RESULTS SLIP

This is to certify that: Shabani H. Jumbe With Admission Number of A0100073 has successfully completed NTA Level 5 in Civil Engineering and has has scored as detailed below

2011/2012 Examination Results Details

Semester I Results

ID	ModuleCode	ModuleName	Module Credits	Grade
	CET 05102	Engineering Drawing II	6	B
	CET 05103	Soil Mechanics II	6	C
	CET 05104	Civil Engineering Materials-III	3	A
	CET 05107	Building Construction-III	6	B
	CET 05108	Structural Mechanics II	6	B
	CET 05109	Road Design and Construction	6	C
	CET 05112	Civil Engineering Materials-IV	9	B
	GST 05101	Advanced Math-III	3	B
	GST 05102	Physical Science III	3	B
	GST 05103	Communication Skills III	2	B
	GST 05104	Entreprenuership III	2	B
2	GST 05105	Computer Applications III	2	C

Semster+ I 2011/2012 Avarage GPA = 2.7 / 4.0

Semester II Results

ID	ModuleCode	ModuleName	Module Credits	Grade
	CET 05201	Land Surveying II	9	C
	CET 05210	Road maintenance II	3	B
	CET 05211	Building Construction-IV	3	B
	CET 05213	Reinforced Cement Concrete Design I	6	C
	CET 05214	Workshop Practice	8	A
	CET 05215	Quantity Surveying	6	B
	CET 05216	Construction Management I	6	B
	CET 05224	Water Supply and Sanitation I	3	B
	GST 05201	Advanced Mathematics IV	3	C
	GST 05202	Physical Science IV	3	C
	GST 05203	Communication Skills IV	2	C
	GST 05204	Entreprenuership IV	2	C
	GST 05205	Computer Applications IV	2	C
	IPT,05	Industrial Practical Training II	10	C

Semster+ II 2011/2012 Avarage GPA = 2.5 / 4.0

Overall NTA Level IV - 2011/2012 Academic Year GPA = 2.6 / 4.0

HOD Name D.P. MTAWANGA Signature

Date and Stamp 31-04-2013

Registrar Name FABIAN J Signature

Date and Stamp 02/05/2013

The National Examinations Council of Tanzania

National Technical Examinations
Full Technician Certificate

FOR INDUSTRIAL AND CIVIL BUILDINGS

This is to certify that FOCUS A. NGOWI

INDEX No. 0009I-0050

of MBEYA TECHNICAL COLLEGE

sat for the above Examination which was held in MAY 1991

and was awarded this certificate

after attaining the following performance:-

Subject	Grade
MATHEMATICS	C (PASS)
PHYSICS	C (PASS)
CHEMISTRY	D (PASS)
TECHNICAL DRAWING	D (PASS)
STRUCTURE DESIGN AND DETAILING	B (PASS)
SOIL MECHANICS AND FOUNDATION	B (PASS)
LAND SURVEYING	C (PASS)
QUANTITY SURVEY	C (PASS)

Chairperson

Executive Secretary

ETC No 0003878

CURRICULUM VITAE (CV)

• PERSONAL PARTICULARS

Sir Name	Ngowi
First Name	Focus
Middle Name	Augustine
Date of birth	1968
Sex	Male
Marital Status	Marriage with Four Children
Language	Kiswahili / English
Contact Address	P.O. Box 323 Moshi
Nationality	Tanzania
Years of experience	16 Years
Position	Site Manager

ACADEMIC ACHIEVEMENTS

1983 – 1985	Majengo Secondary School (Ordinary Level)
1987 – 1991	Moeya Technical College

COURSES ATTENDED

(1) **July 1993 – Nov. 1993 Labour based contractor training course for road Maintenance and rehabilitation conducted at Kilimanjaro training centre.**

The course Notes on

- Basic Mathematics
- Road construction activities
- Technical Aspect of labour based technology
- Organization and management of labour
- Practical Site training

The course was conducted by National construction council (NCC) in collaboration with International Labour Organization (I.L.O)

(2) **Sept 1993 – Oct 1993 Structural Training/Drainage System or Moshi Technical School.**

It covered the following topics:

- Masonry in storm water, W/Walls, Retaining walls, pitching & Riprap
- Concrete work man ship

(3) **13th Feb – March 2nd 2007 at RC Social Hall Singida (Construction Planning, Organization and Control (Sc 150/mc250)**

The course notes on

- Construction planning organization and control
- The course was conducted by contractors registration board (CRB)

The course covers the following topics

- ... Management functions planning organizing and controlling
- ... of construction planning
- Construction planning and monitoring
- Site layout, supervision and mobilization
- Method statement and Activity duration Estimating
- Preparation of Interim and final certificates
- Site recording and Control
- Occupational Health and Safety on construction Planning
- How to deal with site Problems
- Application of Information Technology in Construction planning, organization and control

PROFESSIONAL EXPERIENCES

(a) January - Sept 1994: Site Manager/ M/S SICO BUILDING CONTRACTOR LTD
:Rehabilitation of Weruweru-
Lyamungu Road (NCC.M.O.W Moshi)
: Renovation of N.B.C Hai branch Kilimanjaro
: Construction of concrete slab ramp for DAHACO Kilimanjaro

(b) January – Sept 1995 : Site Manager/ M/S SICO BUILDING CONRTACTORS LTD
: Rehabilitation of Kikuwa dai N'gombe Ngulo Road
(NCC/M.o.w Moshi)
: Repair of Kawawa sokoni nduoni road (M.o.w)Moshi
: Maintenance of Uuwo turn off
Uuwo Road (M.o.w)Moshi

(c) March - July 1997: Site Manager/ M/S SICO BUILDING CONTRACTOR LTD
:Maintenance of kifaru kivisini road
M.o.w Moshi
:Patching with premix crack silling
Bomang'ombe – Sanyajuu Road
(M.o.w)Moshi

(d) Aug – Nov. 1997 : Site Manager/ M/S OLIN ENTERPRISES(MOSHI)
:Spot improvement and Routine
Maintenance works on Mwenga
Kikwani – Kifula Road (M.w.o) Moshi

(e) Dec. 1998- F... 2000 : Site Manager/ M/S SICO BUILDING CONTRACTORS LTD
:Repair and maintenance of kititimo
Kimyamsiado Road (M.o.w)Singida
:Rehabilitation of Shelui Mtoo road DED Iramba
:Construction of S. c.m.p. Culverts
(M.o.w) Singida

(f) August 2000 – April 2001: Site Manager/ M/S SICO BUILDING CONTRACTORS LTD
:Construction of Mandela Bridge(13×5.3)m DED
Moshi.

(g) May – Ju... 2001 Site Manager/ M/S ... BUILDING CONTRACTORS ...
:Construction of ... office block
Rombo phase II (RAS KLM)
:Repair of office Building ...

Moshi (M.a.w) Building ...

(h) August – Sept 2001:Site Manager/ M/s MALMO CONSTRUCTION (MOSHI)
:Construction of concrete poles and
Chain link fencing and lighting at
Weigh Bridge – Himo Moshi – (TANROADS) Moshi

(i) June – Decemb er 2002: Site Manager/ M/s SICO BUILDING CONTRACTORS LTD
:Maintenance of Iongerc- Ngamu
Road (TANROADS) Singida
:Maintenance of Mtinko- Mpambaa
Road (DED) Singida
:Rehabilitation of Central Road
Rombo (DED) Rombo.

(j) Feb. 2003 – April 2004: Site Manager/ M/S SICO BUILDING CONTRACTORS LTD
: Routine maintenance works on
Gumanga, Ibaga Road Section
(TANROADS) Singida
:Roofing of NIC Regional office
Building Singida.
:Maintenance of Heka- Sanza
Road (TANROADS.) Singida

(k) Sept 2004 March 2005: Site Manager/ M/S SICO BUILDING CONTRACTORS LTD.
:Rehabilitation of Usa –
Ngare nanyuki Road
(NCC/ TANROADS. AR)

(L) May – Dec 2005 : Site Manager/ M/S SICO BUILDING CONTRACTORS LTD
:Rehabilitation of Majengo
Unyamikumbi Road 10km
(M.D) Singida

(N) Feb. – Dec. 2006 / Jul – Jun ... — periodic Maintenance of Singida- Mungumaji Road 5.0 km (M.D Singida)
Rehabilitation of Mudida – Makuro Dragwa Road phase I (0+00-18+000KM) (DED Singida)

Aug- Dec ...

(O)Feb 2007- April 2007 — Rehabilitation of Mudida- Makuro Dragwa Road phase II
Construction of Cross Drainage structures (DED Singida)

(P) NOV. 200... – Jan 2008 M/S SICO LTD: Periodic maintenance Along Singida- Mwankoko Road.
14km long. (MD- SINGIDA)

(Q Ag il July 2009 - Site Agent M/S Gwilah Investment Traders
Routine Spot and Structure works package
: IV. (DED) IRAMBA.

(R Au gu 2008 – Feb. 2009 - Site Agent M/S Sico Building Contractors Ltd
Construction of MANDAKA – MNONO Bridge.
(DED. MOSHI).

(S M rc i – Sept. 2009 - Site Agent/MS peace Construction.
Spot Improvement and Routine /Recurrent
maintenance works on Mwanga Vuchama and
Kiweni – Lomwe Roads. (TANROADS –
KILIMANJARO).

(T J n. 009 – April 2010 - Site Tech/Ms Rimoy Construction Co. Ltd
Construction of vented drift along Makanya – Suji
road (DED SAME)

(Y J ne – August 2010 - Site Agent/MS Kisululu General Supplies and
General Works.
Routine maintenance Along Aghondi
- Kamenyanga – Mkwese, Manyoni – Masigati –
Hiki and Kitopeni – Ipande Roads.
(DED – MANYONI).

(V S pt – Dec. 2010 - Site Agent /MS Rimoy Construction Co. Ltd
Rehabilitation of MUO canal .e. it involves
construction of intake, provision of intake gate
strainer, Sluice valve, Installation of PVC pipe &
construction of 2 Nos Break pressure.

(C 1 o i January 2011 - Site Agent /MS Ravji Construction
Pkg 1 – upgrading to paved standard 0.5 km of Rau
Mlimani Road [km 4+400 – 4+900]
Pkg 2 – Rehabilitation of Kiborlioni – Mbolomo
Road.

REFERE ES:-

1 E g. Da d Jalungo
I E – IR M IA
(El.+ 15 787313250

2 E g. Ma w
TANROADS KILIMANJARO
(E. + 5 782709521

3 E g. Mp d
MOSHI DISTRICT
(E.L. + 15 754865369

4. E g. Ma g
TANROADS – SINGIDA
(E. + 15 54460482

I the und rsigned C rtified that the best of my know edge and belief these bio data correctly described my qualif cation, my experience and my particulars.

Sign ture

30/03/2011
Date

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS

TANZANIA BUILDINGS AGENCY (TBA)

Telegrams: "TBA" SINGIDA
Telephone: 026-250-2825
Fax: 026-250-3065
Email: tba.singida@yahoo.com

CONTRACT NO .....

CERTIFICATE

Date: 07TH JUNE 2011

Final certificate

Contract: **Proposed Rehabilitation of Sukamahela Settlement in Manyoni District**
Contractor Name and Address: **M/S Kisalulu General Supplies and General works Po Box 63 Kiomboi**

Contract Value: Tsh **55,736,300.00**
Date of commencement: **10/11/2009**
Date of completion **9/02/2010**

DESCRIPTION	TSH	CTS	TSH	CTS
			55,736,300	00
Value of works executed (as per contract)	41,160,887	50		
Less: Previous payment by Certificate no. ONE	10,242,687	50		
Less: Previous payment by Certificate no. TWO			51,403,575	00
Sub-total	51,403,575	00		
Hence Payment due to Contractor (**Tanzanian Shillings Four Million Three Thirty Two Thousand Seven hundred Twenty Five only**)			**4,332,725**	**00**

Signature of Contractor ..... Date 16/06/2011 KISALULU GENERAL SUPPLI AND GENERAL WORKS P. O. BOX 63 KIOMBOI IRAMBA

Prepared by: Ngosi K.M ..... Date 10th June 2011

Approval for payments (RM TBA) A/g K.M.Kato, MRM ..... Date .....

DISTRIBUTION

- Original
- Copy to Contractor

IRAMBA DISTRICT COUNCIL

CERTIFICATE OF SUBSTANTIAL COMPLETION

CONTRACT NAME: RENOVATION OF NHIF BENEFICIARIES WARD AT KIOMBOI DISTRICT HOSPITAL	CONTRACT NO:**KDH/NHIF/2012/2013/01**
Contractor's Name: M/ KISULULU GENERAL SUPPLIES AND GENERAL WORKS *P.O. Box 63,* ***KIOMBOI.***	**JOINT INSPECTORS:** **Contractor:-** Mr. Kassim Kingu – **Managing Director** **Employer:** Salum Hussein – **Site Inspector** Mathiasi Kisuka – **Site Inspector** Emmanuel Mwendo – **Tech IDC**

CERTIFICATION:-

In accordance with clause **20** of General conditions contract and pursuant to joint inspection made on the 30th day of May, 2014. It is hereby certified that the works on the above mentioned contract are substantially completed with effect from 27th May, 2014 subject to the rectification of the defect enumerated but not limited to the snag list. Maintenance period will be from 30th May, 2014, to 30th November, 2014.

Engineer's Signature Signature ..... Name DAVID D. MALECA	***Contractor's signature*** Signature ..... Name Kassim H. Kingu
Designation	Designation Managing Director

HALIMASHAURI YA WILAYA YA IRAMBA

HATI YA UKAMILISHAJI KAZI

MKATABA: UJENZI WA SOKO MISIGIRI	NAMBA YA MKATABA:LGA/118/IDADPS/SOKO/MSGR/W/11/12/01
JINA LA MKANDARASI: KISULULU GENERAL SUPPLIES AND GENERAL WORKS P.OBOX 63 KIOMBOL	**WAKAGUZI:** **MKANDARASI** KASSIMU HUSSEIN KINGU **MWAJIRI:** H.Ndwata – Kaimu mhandisi wa wilaya E.Mwendo - Fundi sanifu

UHAKIKI:-

Kutokana na masharti ya jumla ya mkataba kifungu cha 20 cha umalizaji kazi, ukaguzi umefanyika tarehe 08/01/2014 na kuridhia kwamba kazi imekamilika vizuri na kuruhusu jengo kuingia kwenye matumizi halisi.

Saini ya mhandisi Saini Jina Hassim Ndumba	*Saini ya mkandarasi* Saini Jina Kassim H. Kingu
Cheo Ag DE MHANDISI WA WILAYA IRAMBA	Cheo Managing Director KISULULU GENERAL SUPPLIES AND GENERAL WORKS P. O. Box 63 KIOMBOI-IRAMBA DISTRICT

HALIMASHAURI YA WILAYA YA IRAMBA

HATI YA UKAMILISHAJI KAZI

MKATABA: UKAMILISHAJI UJENZI WA ZAHANATI YA KISIMBA	**NAMBA YA MKATABA**:LGA/118/KSB/ZHT/W/12/13/01
JINA LA MKANDARASI: KISULULU GENERAL SUPPLIES AND GENERAL WORKS P.OBOX 63 KIOMBOI	**WAKAGUZI:** **MKANDARASI** KASSIMU HUSSEIN KINGU **MWAJIRI**: D.D.Malegi – Kaimu mhandisi wa wilaya H.Ndwata - Fundi sanifu

UHAKIKI:-

Kutokana na mashariti ya jumla ya mkataba kifungu cha 20 cha umalizaji kazi, ukaguzi umefanyika tarehe 22/08/2014 na kuridhia kwamba kazi imekamilika vizuri na kuruhusu jengo kuingia kwenye matumizi halisi.

Saini ya mhandisi Saini ..... Jina HASHIM NDWATA	***Saini ya mkandarasi*** Saini ..... Jina
Cheo Ag DE MHANDISI WA WILAYA UJENZI-IRAMBA	Cheo MKURUGENZI KISULULU GENERAL SUPPLIES AND GENERAL WORKS P. O. Box 63 KIOMBOI-IRAMBA-SINGIDA

HALIMASHAURI YA WILAYA YA IRAMBA

HATI YA UKAMILISHAJI KAZI

MKATABA: UKAMILISHAJI WA NYUMBA YA MTUMISHI ZAHANATI YA KIJIJI CHA UJUNGU	NAMBA YA MKATABA:LGA/118/UJG/NYB/MLNDL/W/12/13/01
JINA LA MKANDARASI: KISULULU GENERAL SUPPLIES AND GENERAL WORKS P.OBOX 63 KIOMBOI.	**WAKAGUZI;** **MKANDARASI** KASSIMU HUSSEIN KINGU- MKURUGENZI SHABANI JUMBE- FUNDI SANIFU **MWAJIRI:** D.D.Malegi – Kaimu mhandisi wa wilaya H.Ndwata - Fundi sanifu

UHAKIKI:-

Kutokana na mashariti ya jumla ya mkataba kifungu cha 20 cha umalizaji kazi, ukaguzi umefanyika tarehe 22/01/2014 na kuridhia kwamba kazi imekamilika vizuri na kuruhusu jengo kuingia kwenye matumizi halisi.

Saini ya mhandisi Saini ..... Jina Hassan Ndwata	***Saini ya mkandarasi*** Saini ..... Jina Kassim Hussein Kingu
Cheo Ag DE MHANDISI WA WILAYA UJENZI-IRAMBA	Cheo MKURUGENZI KISULULU GENERAL SUPPLIES AND GENERAL WORKS P. O. Box 63 KIOMBOI-IRAMBA-SINGIDA

HALIMASHAURI YA WILAYA YA IRAMBA

HATI YA UKAMILISHAJI KAZI

MKATABA: UKAMILISHAJI WA NYUMBA YA MTUMISHI ZAHANATI YA KIJIJI CHA MLANDALA	NAMBA YA MKATABA:LGA/118/2011/2012/MLNDL/NYMB/ZHNT/W/01
JINA LA MKANDARASI: KISULULU GENERAL SUPPLIES AND GENERAL WORKS P.OBOX 63 KIOMBOI.	**WAKAGUZI:** **MKANDARASI** KASSIMU HUSSEIN KINGU **MWAJIRI:** D.D.Malegi – Kaimu mhandisi wa wilaya H.Ndwata - Fundi sanifu

UHAKIKI:-

Kutokana na masharti ya jumla ya mkataba kifungu cha 20 cha umalizaji kazi, ukaguzi umefanyika tarehe 18/06/2014na kuridhia kwamba kazi imekamilika vizuri na kuruhusu jengo kuingia kwenye matumizi halisi.

Saini ya mhandisi Saini ..... Jina Hashim Ndwata	***Saini ya mkandarasi*** Saini ..... Jina Kassim Hussein Kingu
Cheo Ag DE MHANDISI WA WILAYA IRAMBA	Cheo MKURUGENZI KISULULU GENERAL SUPPLIES AND GENERAL WORKS P. O. Box 63 KIOMBOI-IRAMBA

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA IRAMBA

Unapojibu tafadhalitaja:

Kumb. Na DED/IRA/F.10/66/68 04 September, 2020

Ndugu,

KASIM HUSSEIN KINGU
P.O.Box 63
KIOMBOI – IRAMBA

YAH: KUKUBALIWA KUFANYA KAZI KWA AJILI YA UJENZI WA JENGO LA LISHE KATIKA HOSPITALI YA WILAYA IRAMBA.

Tafadhali rejea mwaliko wa mkutu ya bei iliyotolewa tarehe 17/8/2020 na Ofisi ya Mkurugenzi Mtendaji Wilaya ya Iramba.

2. Napenda kukufahamisha kuwa umbi lako la kufanya kazi ya ujenzi wa jengo la lishe katika hospitali ya Wilaya Iramba limekubaliwa kwa gharama ya T.Shs 12,990,000. Kwa muda wa siku sitini (60) tangu tarehe ya kusaini mkataba.

3. Hivyo ninakutaarifu uje kusaini mkataba tarehe 08.09.2020 na uanze kazi hiyo ya ujenzi kwa wakati na kukamilika kwa wakati.

4. Nakutakia kazi njema

Lanno Paul Mwageni
MKURUGENZI MTENDAJI WILAYA
IRAMBA

MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA IRAMBA

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA IRAMBA

MKATABA NA: LGA/118/2020/2021/W/02 LOT 2

UJENZI WA JENGO LA LISHE LA HOSPITALI YA WILAYA YA IRAMBA

KATI YA

Mwajiri
HALMASHAURI YA WILAYA-
IRAMBA,
S.L.P 155,
Kiomboi-- Iramba.

NA

Mwajiriwa (Fundi)
KASIM HUSEIN KINGU
S.L.P 63,
Kiomboi – Iramba.
Singida.

SEPT, 2020

HALMASHAURI YA WILAYA YA IRAMBA

MKATABA NA: LGA/118/2020/2021/W/02 LOT2

UJENZI WA JENGO LA LISHE KATIKA HOSPITALI YA WILAYA YA IRAMBA

MKATABA

ataba huu umesainiwa leo tarehe ..... Mwezi ..... Mwaka 2020 kati ya **Kurugenzi Mtendaji wa Halmashauri ya wilaya ya Iramba,** ambaye katika mkataba huu tajulikana kama "**Mwajiri**" kwa upande mmoja

Na

Kasim Husein Kingu Ambaye katika mkataba huu atajulikana kama "**Mwajiriwa/Fundi**" kwa upande mwingine.

KWA KUWA; Mwajiri kwa hiari yake anayo nia thabiti ya kujenga jengo la lishe la Halmashauri wilaya ya Iramba ,na bila kulazimishwa na mtu yeyote amempa fundi kazi hiyo ya ujenzi wa jengo la lishe.

NA KWA KUWA: Fundi/Mwajiriwa bila kulazimishwa na mtu yeyote amekubali na amchiari kufanya kazi ya kujenga jengo la lishe.

Hivyo basi; pande zote mbili zinakubaliana kama ifuatavyo:-

KUSUDI CHA MKATABA:

1. Kiini cha mkataba huu ni kujenga jengo la lishe la wilaya ya Iramba.

MAJUKUMU WA MWAJIRI:

2. **Kwamba;** Mwajiri atakua na jukumu la kutoa vifaa vya ujenzi vitakavyotumika katika shughuli zote za ujenzi. Fundi atakua na jukumu la kutoa zana zitakazotumika katika ujenzi, kufanya usafi na kusimamia usafi katika eneo la ujenzi, atahakikisha vibarua na mafundi wanavaa vifaa vya usalama kazini kama vile mabuti, reflector na kofia.
3. **Kwamba,** Mwajiri atakuwa na wajibu wa kulipa gharama za ufundi kama zilivyoainishwa katika mkataba huu na kwa utaratibu/awamu kama ilivyoainishwa katika mkataba huu.
4. **Kwamba,** Mwajiri atakua na wajibu wa kuteua kamati itakayosimamia ujenzi huo, kamati hiyo itaundwa na mwajiri.
5. **Kwamba,** Mwajiri atamteua Mhandisi wa Ujenzi wa halmashauri ambaye atakua ndiye Meneja wa Mradi.
6. **Kwamba,** Mwajiri atamlipa Mwajiriwa/Fundi malipo yake yote kwa namna/mfumo wa malipo ya serikali, kulingana na kazi atakayokuwa ameifanya ambayo itathibitishwa na Mhandisi wa Ujenzi wa Halmashauri ya Wilaya ya Iramba.
7. **Kwamba,** Mwajiri anakubali kulipa Jumla ya **T.SHS 12,990,000 /= kama**

i. Awamu ya kwanza asilimia arobaini (40%) hii italipwa mara baada ya fundi kusaini mkataba na kuanza kazi akiwa kwenye hatua ya kukamilisha ujenzi wa Msingi.

ii. Awamu ya pili asilimia ishirini (20%) hii italipwa katikati ya kazi na mara baada ya kazi kuwa imefikia robo ya tatu ya ujenzi wa Ofisi.

iii. Awamu ya tatu asilimia thelathini na tano (35%) hii italipwa mara baada ya kazi kufanyika na kukamilika huku ikisubiri ukaguzi na uangalizi wa Mhandisi kulingana na muda wa uangalizi uliowekwa.

iv. Awamu ya nne asilimia tano (5%) hii italipwa mara baada ya kazi kukamilika na muda wa uangalizi wa kazi kumalizika na kupewa hati maalumu ya kumaliza kazi.

v. Muda wa matazamio ya kazi ni siku (60) baada ya kazi kumalizika.

8. **Kwamba,** nyaraka ifuatazo zitakua sehemu ya mkataba huu,

i. Michoro ya jengo

ii. Fomu ya nukuu ya bei

iii. Barua ya kukubaliwa (letter of acceptance)

iv. Mutasari wa majadiliano

WAJIBU WA MWAJIRIWA/FUNDI

1. **Kwamba;** kazi hii ya kujenga jengo la lishe la Hospitali ya wilaya itasimamiwa na Kamati ya ujenzi ambayo imeundwa na mwajiri na kupitishwa na vikao halali na Mhandisi wa Ujenzi wa Halmashauri ya Wilaya ya Iramba.

2. **Kwamba;** Mwajiriwa/fundi atakaye saini mkataba huu atatakiwa kufanya kazi ya Ujenzi wa jengo la lishe na sio kuwa nisimamizi.

3. **Kwamba;** Mkataba huu utadumu kwa muda wa siku sitini (60) tu tangu tarehe ya kusainiwa kwa mkataba huu.

4. **Kwamba; Mwajiriwa/Fundi** ataanza kazi ndani ya siku moja (1) mara baada ya kusaini mkataba huu.

5. **Kwamba;** Mwajiriwa/Fundi anaahidi kufanya kazi Kwa kuzingatia vipimo vilivyoelekezwa na maelezo yatakayotolewa na Msimamizi wa Ujenzi. Pia mwajiriwa/Fundi anaahidi kukamilisha kazi ya ujenzi wa jengo la lishe la Halmashauri ya Wilaya ya Iramba kulingana na muda uliotajwa hapo juu.

6. **Kwamba;** Mwajiriwa/fundi atakamilisha kazi kwa muda aliokubaliana na mwajiri katika mkataba huu.

7. **Kwamba;** Mwajiriwa /fundi atapewa na kufuata maelekezo atakayopewa na wasimamizi na wakaguzi wa kazi husika walioteuliwa na Mwajiri. Maelekezo yanayotolewa na Mhandisi yatakuwa kwa maandishi. Ikiwa kwa sababu nyingine yoyote ile maelekezo ambayo hayapo katika mkataba yakatolewa kwa mdomo, Fundi atafuata maelekezo hayo. Katika kipindi cha **siku moja (1)** maelekezo hayo ya mdomo yatathibitishwa kwa maandishi.

8. **Kwamba;** Mkataba huu utatafsiriwa kwa mujibu wa sheria za Jamhuri ya Muungano wa Tanzania.

9. **Kwamba;** Endapo mgogoro baina ya pande mbili za mkataba huu utatokea, utafanyika kwa njia ya majadiliano na endapo itashindikana basi utatatuliwa na mahakama.

7. Kwamba; Upande wowote unaweza kusitisha mkataba huu kwa kutoa notisi ya siku saba (7) kwa kutoa sababu zinazopelekea kusitisha mkataba huu.

MARA BAADA YA KUKABIDHIWA ENEO LA UJENZI MWAJIRIWA/FUNDI ATAFANYA KAZI ZIFUATAZO:-

i. MSINGI WA JENGO (SUB STRUCTURE)
- Kusafisha eneo.
- Kuseti jengo
- Uchimbaji wa msingi pamoja na 'columns base'
- Kufukia,
- .Usukaji wa nondo,"base columns,nguzo za msingi, ground beams
- Kufunga mbao,pembezoni mwa jamvi,pembezoni mwa nguzo na pembeni mwa base columns na hatimaye kuondoa mbao.
- Kumwaga zege chini msingi,chini kwenye msingi wa nguzo,katika nguzo ya awali,kwenye jamvi pamoja na beams na ujenzi wa tofali za msingi.
- Mawe, upangaji wa mawe na utandazaji wa DPM pamoja na umwagiliaji wa maji

i. KUNYANYUA JENGO(SUPER STRUCTURE)
- Ujenzi wa tofali za kuta na uwekaji DPC
- Kufunga mbao katika nguzo mlalo na nguzo wima
- Kusuka nondo katika nguzo mlalo na nguzo wima
- Kumwaga zege katika nguzo mlalo na nguzo wima na umwagiliaji wa maji
- Jengo litunguliwe kabla ya kupiga bati.

i. KUEZEKA(ROOF STRUCTURE AND COVERING)
- Kuezeka na kupaua

. MILANGO
- Kufitisha fremu za milango,kufitisha shata za milango pamoja na vitasa,upakaji wa vanishi katika milango na fremu zake pamoja na uwekaji wa vioo katika venti za milango

v. MADIRISHA
- Kufitisha dirisha za aluminiamo, kufitisha grili za madirisha pamoja na milango.

vi. UMALIZIAJI(FINISHING)
- Upigaji wa lipu pamoja na kutengeneza koplo nje na ndani ya jengo.
- Sakafu +Wall tiles, uwekaji wa sakafu ya kupokea vigae(beds),uwekaji wa vigae pamoja na grauti katika sakafu(floor tiles),uwekaji wa vigae katika kuta na upakaji grauti
- Dari ufungaji wa mbao za dari(branderine), uwekaji wa dari na mikanda ya aymsum

vii. RANGI NA MAPAMBO(PAINTING AND DECORATION)

- Kupaka rangi mikono mitatu pamoja na skimming katika kuta za ndani, kuta za nje na dari, kupaka rangi mikono mitatu katika msingi wa nyumba, fishabodi na roof vents.

viii. UMEME(ELECTRICAL INSTALLATION)

- Usukaji wa umeme awamu ya kwanza- conduit na box, usukaji wa umeme awamu ya pili(second fix)fittings na ufungaji wa ceiling fan

ix. MFUMO WA MAJI SAFI NA TAKA(WATER SUPPLY AND SEWAGE SYSTEM)

- Ufungaji bomba awamu ya kwanza(kuchimba bomba),ufungaji bomba awamu ya pili(second fix)fittings, ufungaji wa mfumo wa maji kutoka katika tanks hadi ndani na kuunganisha bomba za maji taka katika mashimo na chemba.

x. SEPTIC TANKS,SOAKWAYPITS AND MANHOLES

- Uchimbaji na ujenzi wa mashimo ya maji taka pamoja na manholes.

xi. MNARA WA MAJI +BASE

- Ujenzi wa mnara wa maji+base pamoja na uwekaji wa tanks za maji.

:WA UTHIBITISHO WA MAKUBALIANO HAYA YA PANDE ZOTE MBILI 'AMETIWA SAINI MBELE YA MASHAHIDI KAMA IFUATAVYO;

IWAJIRI	MWAJIRIWA/FUNDI
aini:.....	Saini.....
na: LINNO P. MWAGENI	Jina: KASIM HUSEIN KINGU
heo: Mkurugenzi Mtendaji wa Halmashauri ya Wilaya ya Iramba	Cheo: Fundi
nuani : S.L.P 155, KIOMBOI	Anuani: S.L.P 128
IOMBOI	
uhuri :	Muhuri :
arehe: 2/09/2020	Tarehe: 2/09/2020

AHIDI WA MWAJIRI

ni.....

: CAMILIUS RUHINDA

ıeo: Mwanasheria wa Halmashauri

ani: S.L.P 155, KIOMBOI

uhuri :

Tehe: 08/09/2020

SHAHIDI WA FUNDI

Saini.....

Jina:.....

Cheo:.....

Anuani:.....

Tarehe: 09/09/2020

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA MKALAMA

MKATABA WA UJENZI WA NYUMBA MOJA YA MKUU WA IDARA

ZABUNI NAMBA : LGA/147/2020/2021/06

MWAJIRI
DED – MKALAMA
S.L.P 1007
MKALAMA –SINGIDA

MWAJIRIWA
MR KASIMU H KINGU
S.L.P
IRAMBA

MSIMAMIZI WA MRADI
MHANDISI WA UJENZI
S.L.P 1007,
MKALAMA – SINGIDA.

IMETOLEWA NA
MKURUGENZI MTENDAJI (W),
S.L.P 1007,
MKALAMA

MAY 2021

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA MKALAMA

Kumb Na MDC/PMU /A.10/194

10/05/2021

Ndugu, Kasimu H Kingu
Fundi Ujenzi

YAH : KUTUNUKU ZABUNI YA UJENZI WA NYUMBA MOJA YA MKUU IDARA

Kichwa cha habari hapo juu chahusika

Halmashauri ya Wilaya ya Mkalama ilitangaza zabuni namba LGA/142/2020/2021/LOT 06, Ujenzi wa nyumba moja ya Mkuu wa Idara tarehe 26/4/2021, na ukomo wa zabuni katika mbao za matangazo ilikua tarehe 03/5/2021 saa 4:00 na ufunguzi utafanyika siku hiyo hiyo.

Katika Kikao cha Bodi ya zabuni kilichoketi tarehe 7/5/2021 ,agenda namba 6 imekupitisha kuwa Fundi wa Ujenzi wa nyumba moja ya mkuu wa Idara zabuni namba LGA/142/2020/2021/W/06 Kwa gharama ya fedha za Kitanzania Milioni Kumi na Mia Tano Elfu Tu (Tsh 10,500,000/=)

Kwa barua unatakiwa kufika katika Ofisi ya Mkurugenzi Mtendaji (W) tarehe 10/5/2021, saa 4:00 asubuhi kwa ajili ya kuonyeshwa eneo la ujenzi

Nakutakia kazi njema.

Eng Godfrey T Sanga
MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA YA MKALAMA

na kuikabidhi kwa msimamizi wa mradi ameridhia na kufuata makubaliano na masharti yaliyomo katika mkataba huu.

HIVYO BASI NI USHUHUDA

Kwamba; Mkataba huu utaanza tarehe 15/05/2021 na kumalizika tarehe 15/01/2022

Kwamba; Mwajiri anampa mwajiriwa kazi ya Kujenga nyumba moja ya mkuu wa Idara hadi kukamilika vitu vyote na kuikabidhi kwa msimamizi wa mradi ndani ya siku sitini tangu tarehe ya kusaini mkataba huu .

Gharama za ujenzi wa nyumba moja hadi kukamilika ni ile ambayo uliridhia katika maombi yako ya zabuni ambayo ni Milioni Kumi na Mia Tano Elfu (Tsh 10,500,000/=) gharama hii inajumuisha kazi zifuatazo:

- Site clearance
- **Substructure**
- Super structure
- Finishing
- Ufitishaji milango,Madirisha na Magrill
- Ujenzi wa mashimo ya maji taka

Kwamba; Mwajiriwa katika ajira yake atafanya kazi ya kujenga Nyumba moja ya mkuu wa Idara na kuikabidhi kwa msimamizi wa mradi ikiwa imekamilika kwa gharama ya Tsh 10,500,000/= kwa Siku 90 .

Nyaraka zifuatazo ni sehemu ya mkataba huu

- Tangazo la zabuni
- Barua ya kuomba zabuni
- Barua ya kutunuku zabuni
- Ramani ya nyumba
- Mpango kazi (Working Program)

Fundi katika malipo yake atakatwa asilimia 10% kama fedha ya matazamio ya mradi kwa siku sitini endapo hakuna dosari katika ujenzi huo alipwa fedha hizo.

Malipo yatafanyika kulingana na kazi iliyofanyika na kuthibitishwa na msimamizi wa mradi.

1. **Kwamba**; mwajiriwa atafanya kazi hiyo kwa muda wa siku ....60.... Ambapo anatakiwa kukamilisha kazi aliyopewa kwa wakati na atatakiwa kukabidhi kazi hiyo tarehe ....18/7/2021....

2. **Kwamba;** mkataba huu utavunjwa mara baada ya mwajiri kukabidhiwa kazi na Mwajiriwa kwa muda uliopangwa. Na iwapo mwajiriwa atashindwa kukamilisha kazi kwa muda uliopangwa basi mwajiri atavunja mkataba na mwajiriwa. Na mwajiriwa atalipwa kiasi cha fedha kinacholingana na kazi aliyofanya. Pia mwajiriwa atakatwa asilimia **15%** ya malipo yake ikiwa ni kufidia ya hasara ya mwajiri inayotokana na kushindwa kumaliza kazi kwa mujibu wa mkataba.

3. **Kwamba;** Malipo yatafanyika kulingana na kazi iliyofanywa ambayo yatathibitishwa na msimamizi wa mradi.

4. **Kwamba;** mkataba huu utatafasiriwa kwa sheria za Tanzania.

KAMA USHUHUDA WA MAKUBALIANO HAYO PANDE ZOTE ZINATIA SAINI KAMA IFUATAVYO:-

MKATABA UMESAINIWA NA KUTOLEWA kwa niaba ya **HALMASHAURI YA WILAYA YA MKALAMA** mbele yetu leo hii tarehe 18 Mwezi 05 Mwaka 2021

JINA: Eng. GODFREY T SANGA
CHEO: MKURUGENZI MTENDAJI(W)
MKALAMA

kwa niaba ya Halmashauri ya Wilaya ya Mkalama
leo tarehe ....18..... Mwezi ....05..... 2021

.....
MWAJIRI

JINA: JAMES JOHN MKWEGA

CHEO: MWENYEKITI WA HALMASHAURI

TAREHE: 18/05/2021

.....
SHAHIDI

Imesainiwa na kutolewa na

JINA .....
ambaye ni FUNDI MJENZI
leo tarehe ..... Mwezi 2021

FUNDI MJENZI

MBELE YA SHAHIDI .....
SAHIHI: .....

JINA: .....

TAREHE: .....

VAT 108

TANZANIA REVENUE AUTHORITY

Certificate of Registration for Value Added Tax (VAT)

(ISSUED UNDER SECTION 20 OF THE VALUE ADDED TAX ACT NO. 24 OF 1997)

THIS IS TO CERTIFY THAT
KISULULU GENERAL SUPLIES AND GENERAL WORKS

WHOSE TAXPAYER IDENTIFICATION NUMBER (TIN) IS

111-714-436

HAS BEEN REGISTERED FOR VALUE ADDED TAX (VAT)

AND ASSIGNED VAT REGISTRATION NUMBER (VRN)

40-007998-O

FOR BUSINESS LOCATED AT SOWETO 61
KIOMBOI

WITH EFFECT FROM 01 February 2011

GIVEN UNDER MY HAND

THIS 1st **DAY OF** February 2011

P.N. Kassera
COMMISSIONER FOR VAT

NOTE: THE REQUIREMENTS UNDER WHICH THIS CERTIFICATE IS ISSUED ARE STATED OVERLEAF

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA MKALAMA

Kumb Na MDC/PMU /A.10/155 16/08/2021

Ndugu : Kassimu Kingu
Fundi Ujenzi

YAH: NYONGEZA YA KAZI YA UKAMILISHAJI UZIO WA BOMA LA HALMASHAURI

Kichwa cha habari hapo juu chahusika

Halmashauri ya Wilaya Mkalama iliandaa vidadisi bei vya ukamilishaji ujenzi wa uzio wa Boma la Halmashauri kwa mafundi wanaojenga nyumba za Wakuu wa Idara.

Mwisho wa kuwasilisha vidadisi bei hivyo ilikua tarehe 12/08/2021 na kuonekana kidadisi bei ulichowasilisha kuwa na bei ndogo .

Baada ya majadiliano kati ya Mwajiri na Mwajiriwa bei iliokubalika na pande zote mbili kukamilisha kazi hii ni Tsh 6,600,000/= muda wa ukamilishaji kazi hii ni siku thelathini

Nakutakia kazi njema

Juma A Njelu
Kny : MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA YA MKALAMA

MKURUGENZI MTENDAJI WILAYA
S.L.P MKALAMA SINGIDA

JAMHURI YA MUUNGANO WA TANZANIA

OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA YA IRAMBA

MKATABA NA. LGA/118/2021/2022/KSRR-OPD/W/01

KATI YA

HALMASHAURI YA WILAYA YA IRAMBA

NA

KASIM H. KINGU

MKATABA HUU UMEANDALIWA NA:-

Ofisi ya Mkurugenzi Mtendaji (W)
S.L.P 155,
IRAMBA

NA

Mwajiriwa (Mwajiriwa)
KASIM H. KINGU.
S.L.P 63
Kiomboi.

Novemba, 2021

M/ KITI KAMATI YA AFYA

MKATABA WA UJENZI WA DARASA

[redacted]kubaliano haya yamefanyika leo siku ya.....05..... ya Mwezi wa....11.....Mwaka, 2021

kati ya

ALMASHAURI YA WILAYA YA IRAMBA-KITUO CHA AFYA KISIRIRI, S.L.P 155 [redacted]AMBA/KIOMBOI ambaye katika mkataba huu atajulikana kama **"MWAJIRI"** kwa upande a kwanza.

Na

ASIM H. KINGU wa S.L.P **155 Kiomboi**-Iramba mwenye simu Na.0784836222ambaye [redacted]uka mkataba huu atajulikana kama **"MWAJIRIWA"** kwa upande wa pili wa mkataba huu.

[redacted]SFIRI YA MANENO

Mwajiri" Maana yake ni Halmashauri ya wilaya ya Iramba.

[redacted]wajiriwa" Ni mlinzi aliyepewa dhamana na Mwajiri ya ulinzi katika maeneo yenye vizuizi (Geti)

[redacted]heria" Maana yake ni sheria zote za Tanzania

[redacted]WA KUWA Mwajiriwa anao uwezo wa kufanya kazi ya Mwajiri bila wasiwasi wowote kwani atakuwa anawezeshwa vifaa na nyezo za ujenzi na mwajiri wake.

[redacted]IVYO BASI, PANDE ZOTE MBILI ZIMEKUBALIANA KAMA IFUATAVYO:-

WAJIBU WA PAMOJA

1. **Kwamba,** Mwajiri anaingia makubaliano haya ya Ujenzi na Mwajiriwa katika kufanikisha ujenzi wa **Jengo la wagonjwa wan je(OPD).**

2. **Kwamba;** Mkataba huu utadumu kwa muda wa siku 90(tisini) tu tangu tarehe ya kusainiwa kwa mkataba huu.

3. **Kwamba,** malipo yote katika mkataba huu yatafanyika kwa kutumia utaratibu wa kiserikali na sheria na taratibu za fedha zitatakiwa kutumika katika kufanya malipo.

M/Ki ti Kama ti ya
A-f-y-A

Kwamba, imekubalika na pande zote mbili ya kuwa, Mwajiri atamlipa MILIONI ISHIRINI NA MBILI LAKI TISA ISHIRINI NA NNE ELFU MIA MOJA KUMI NA NNE TU. Tshs 28,924,114= kwa ajili ya gharama za ujenzi wa Maboma na kupaua na kulikamilisha hadi kufikia hatua ya kutumika.

5. Machanganuo wa malipo utakuwa kama ulivyoelezewa hapa chini:-

   a. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI MOJA NA KUMI ELFU TU tu (TSH 1,010,000/=) pale atakapokuwa amechimba msingi na kumwaga zege (100mm) ya kuimarisha msingi (Blinding) kwa uwiano 1:3:6 sambamba na nguzo (columns).

   b. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TATU LAKI SABA THELATHINI NA TATU ELFU NA THEMANINI TU (TSH 3,733,080/=) pale atakapopanga mawe, kuweka mchanga na kumwaga jamvi kwa uwiano wa 1:3:6.

   c. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI MOJA LAKI SITA NA ELFU NANE TU (TSH 1,608,000/=) pale atakapojenga msingi za jingo la OPD.

   d. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TANO LAKI SABA TISINI NA SITA tu (TSH 5,796,304/=) atakaposuka nondo za lenta, atakapojenga ukuta.

   e. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi LAKI SITA KUMI NA TATU ELFU MIA SABA (TSH 613720/=) ISHIRINI TU pale atakapofunga mbao za lenta na kumwaga zege ya uwiano wa 1:2:4.

   f. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TISA KUMI NA TATU ELFU NA KUMITU (TSH 9,033,010/=) pale atakapotengeneza dari (blandering) na kufunga gypsum board na cornice zake, kupaua

   g. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TATU LAKI SITA KUMI NA (TSH 3,618,000/=) NANE ELFU TU pale atakapopiga lipu kuta za ndani na kuta za nje ya jengo, uzio wa jengo na kuchimbia bomba za umeme na square box.

MKIA KAMATI YA AFYA

UPANDE WA MWAJIRI

GANGA MFAWIDHI-ZAHANATI KISIRIRI

Jina [illegible]

Saini [illegible]

Tarehe 5/11/21

MWENYEKITI WA KAMATI YA AFYA

Jina DAUDI SANANE

Saini [illegible]

Tarehe 5/11/2021

0683394558

UPANDE WA MWAJIRIWA

WAJIRIWA

Jina KASIM HUSEIN KINGU

Cheo/Wadhifa FUNDI

Saini [illegible]

Tarehe 05/11/2021

SHAHIDI WA MWAJIRIWA

Jina SHARAN M. MWINUKE

Cheo/Wadhifa SHAHIDI

Saini [illegible]

Tarehe 05/11/2021

TANZANIA REVENUE AUTHORITY

RETURN OF INCOME
MADE BY OR ON BEHALF OF AN INDIVIDUAL

YEAR OF INCOME: 2016

To:
MR. KASSIM HUSSEIN KINGU
T/A. KISULULU GENERALSUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

TIN 101-400-565

NOTE

This return is submitted under the provisions of Section 91 of the Income Tax Act, 2004. You are hereby required to furnish the return of income not later than six (6) months after the end of the year of income, showing your total worldwide income if you were resident in Tanzania or income the source of which is Tanzania if you were not resident during the year 2016 You are required to make payment of the income tax still to be paid for the year of income based on the declared income.

Please, read the notes carefully in the appendix before filling in the form.

There are penalties for not filing a tax return or for filing false return.

Date of issue:.....

Issuing office:.....
P.O. Box: .....
Tel:.....Fax:.....
E-mail address.....

GENERAL INFORMATION/INDIVIDUAL'S PARTICULARS

1 TIN: 101-400-565

2 Title: Mr [x] Mrs [ ] Ms [ ]

First Name	Middle Name	Surname
KASSIM	HUSSEIN	KINGU

3 Personal Identification Number (PIN)

4 Postal Address:

P.O. Box 63 Postal City KIOMBOI - SINGIDA

5 Physical Address:

Street/Location: SOWETO | Plot No.: 61 | Block No.: G

Residential Address:

Street/Location: | Plot No.: | Block No.:

Contact Numbers/Address:

Phone number: 0765 291666 | Second Phone: 0784 826222

Third Phone: | Fax number:

E-mail address:

Period covered by this return (basis period): From: Day 01 Month 01 Year 2016 To: Day 31 Month 12 Year 2016

Person's status and category of taxation (Please tick the appropriate boxes):

Resident ☐	Non-Resident ☐	Presumptive tax (incomplete record keeping) ☐	Presumptive tax (complete record keeping) ☐	Others ☐

COMPUTATION OF INCOME AND TAX

	Business Income	Amount	
10	Turnover (Gross receipts)	253,194,584.70	
11	Beginning Inventory		
12	Cost of construction	218,614,000.00	
	Other direct costs		
13	Goods withdrawn not sold		
14	Closing Inventory		
15	Costs of sales (11+12-13-14)		
16	**Gross profit (10-15)**	34,580,584.70	
17	**Deductions/Expenses**		
18	Wages and salaries		
19	Stamp duty		
20	Transport		
21	Bank charges/interests		
22	Utilities (Electricity, Water, Phone, Fax, etc)	125,000.00	
23	Business Rent		
24	Other Expenses (specify in a separate schedule)	23,034,636.00	
25	Total expenses (add from 18 to 24)	23,159,636.00	
		Taxable Income	**Tax Payable/ Paid (TZS)**
26	**Net profit (16-25)**	11,420,948.70	
27	**Mining Business Income** (specify in separate schedule)		
28	**Agricultural Business Income** (specify in separate schedule)		
29	**Other Business Income** (specify in separate schedule)		
30	Final withholding payments		

	(Specify in a separate schedule)		
31	**Total Business Income (26+27+28+29) and Tax**	11,420,948.70	2,011,500.00
32	Employment		
33	Commuted pension		
34	Pension Annuity		
	Investment		
35	Dividends		
36	Dividends (DSE Registered)		
37	Interest/Discount		
38	Rent		
39	Royalties		
40	Natural resource payment		
41	Capital gain		
42	Other investment (specify in a separate schedule)		
43	**Total Investment Income (from 35 to 42)**		
44	**Repatriated Income of a Domestic Permanent Establishment**		
45	**TOTAL INCOME AND TAX(26+27+28+29+32+33+34+43)**	11,420,948.70	2,011,500.00
46	**Less tax paid (Excluding final Withholding payments)**		2,000,000.00
47	**NET TAX PAYABLE (45-46)**		11,500.00

48	**DUE DATE**	

DECLARATION

I hereby declare that the information given on this form and any accompanying accounts/documents are correct, complete and contain a full and true statement of my income to the best of my knowledge and belief.

Title: Mr ☐ Mrs ☐ s ☐

KASSIM	HUSSEIN	KINGU
First Name	Middle Name	Surname

Position: PROPRIETOR

Signature ..... Date: Day 30 Month 06 Year 2017

In accordance with the provision of Section 135(1) of the Income Tax Act, 2004 I declare that I prepared or assisted in the preparation of this return and to the best of my knowledge, the return and attachments therefore present a true and fair view of the financial position.

Title: Mr ☐ Mrs ☐ Ms/Bi ☐

JOHNSON	MWIJAGE	BYENOBI
First Name	Middle Name	Surname

Position: MANAGING PARTNER

(Certified Public Accountant)

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O BOX 63
KIOMBOI - SINGIDA

FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

PREPARED BY:
BM FINANCIAL CONSULTANTS
AUTHORISED CERTIFIED PUBLIC ACCOUNTANTS / AUDITORS AND TAX CONSULTANTS
TEL: 0767 230652
E-MAIL: johnsonbyenobi@yahoo.com
P.O BOX 135
MWANZA - TANZANIA

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O BOX 63
KIOMBOI - SINGIDA

FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

CORPORATE INFORMATION:

PROPRIETOR:	MR. KASSIM HUSSEIN KINGU
BUSINESS NAME	KISULULU GENERAL SUPPLIES
LOCATION:'	SOWETO STREET PLOT NO. 61, BLOCK "G" KIOMBOI - SINGIDA
REGISTRATION:	TIN: 101 – 400 - 565
PRINCIPAL ACTIVITIES:	CIVIL AND BUILDING WORKS
AUDITORS:	BM FINANCIAL CONSULTANTS AUTHORISED CERTIFIED PUBLIC ACCOUNTANTS, AUDITORS AND TAX CONSULTANTS P.O. BOX 135 MWANZA – TANZANIA

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF FINANCIAL POSITION
S AT 31ST DECEMBER, 2016:

	NOTE	2016 Tzs
Non Current Assets:		
Plant, Property & Equipment:	11	27,500,000.00
		27,500,000.00
Current Assets:		
Inventory	7	-
Trade and other receivables	8	152,847,063.41
Cash and cash equivalent	9	5,723,885.29
		158,570,948.70
TOTAL ASSETS EMPLOYED		186,070,948.70
Capital and Retained Reserves:		
Capital:		
Brought in		99,875,000.00
Retained reserves		7,320,948.70
TOTAL		107,195,948.70
LIABILITIES:		
Current Liabilities:		
Trade and other payables	10	78,875,000.00
		78,875,000.00
TOTAL EQUITY AND LIABILITIES		186,070,948.70

CERTIFIED TRUE AND CORRECT

PROPRIETOR _____ DATE 22 - 05 - 2017

KISULULU GENERAL SUPPLIES

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF COMPREHENSIVE INCOME
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

	NOTE	Tzs
Revenue	2	253,194,584.70
Cost of sales	3	- 218,614,000.00
GROSS PROFIT		34,580,584.70
OPERATING EXPENSES:		
Establishment and administrative expenses	4	- 15,659,636.00
Depreciation & Amortization	7	- 7,500,000.00
TOTAL OPERATING EXPENSES		- 23,159,636.00
Net profit / (loss) for the year before Taxation		11,420,948.70
Less: Taxation		- 2,000,000.00
Net profit / (loss) for the year after Taxation		9,420,948.70

CERTIFIED TRUE AND CORRECT

MANAGING DIRECTOR _____ DATE 22-03-2017

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF CASH FLOW
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

		2016 Tzs
1	***Cash flows from operating activities:***	
	Net profit / (loss) for the year before Taxation	11,420,948.70
	Adjustment for depreciation	7,500,000.00
		18,920,948.70
	Working capital changes:	
	(Increases) / Decreases in stock	-
	(Increases) / Decreases in accounts receivables	- 152,847,063.41
	Increases / (Decreases) in current liabilities	78,875,000.00
	Drawings	- 2,100,000.00
	Taxation paid	- 2,000,000.00
		(78,072,063.41)
	Net cash flow from operating activities	(59,151,114.71)
2	***Cash flows from investing activities:***	
	(Acquisition) / Disposal of fixed assets	- 35,000,000.00
	Net cash flow used for investing activities	(35,000,000.00)
3	***Cash flows from financing activities:***	
	Capital brought in	99,875,000.00
	Net cash flow from financing activities	99,875,000.00
	Changes in cash and cash equivalent	5,723,885.29
	Cash and cash equivalent at start	-
	Cash and cash equivalent at close	5,723,885.29
	Cash and cash equivalent at close:	
	Cash and Bank balances	5,723,885.29

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

	Capital	Retained Reserves	Total Equity
	Tzs	Tzs	Tzs
Balance as at 1st January, 2016:	99,875,000.00	-	99,875,000.00
Net profit / (loss) for the year after Taxation	-	9,420,948.70	9,420,948.70
Drawings	-	(2,100,000.00)	(2,100,000.00)
Balance as at 31st December, 2016:	99,875,000.00	7,320,948.70	107,195,948.70

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL ENTERPRISES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30TH SEPTEMBER, 2016:

1.1: BASIS OF PREPARATION:

These financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS). The financial statements have been prepared under the historical cost conversion.

1.1: NON CURRENT ASSETS:

Non Current assets are shown at cost less subsequent depreciation and impairment.

1.2: DEPRECIATION:

Depreciation is calculated using the straight line method to allocate the cost of each asset to its residual value over the estimated useful life as follows:

- Furniture & Fittings 12.50 % P.A
- Computers & Accessories 12.50 % P.A
- Plant & Equipment 12.50 % P.A
- Motor Vehicles 25.00 % P.A

1.3: ACCOUNTS RECEIVABLES:

Accounts receivables are initially recognized at cost. No impairment review of accounts receivable has been made. No provision for impairment of debtors has been made in these accounts.

1.4: ,STOCK:

Stock and stores are valued at the lower of cost or net realizable value on FIFO basis. Net Realizable Value is the estimated selling price in the ordinary course of business less applicable variable selling expenses.

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL ENTERPRISES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30TH SEPTEMBER, 2016:

1.5: INCOME RECOGNITION:

The following specific recognition criteria must be met before revenue is recognized:

Sales of goods and services: Revenue is recognized when rewards of ownership of goods and services have passed to the buyer.

1.6: CASH AND CASH EQUIVALENT:

Cash and Bank balances in the Balance Sheet comprise cash at bank and on hand and short term deposits with the original maturity of twelve months or less. For the purpose of the cash flow statement, cash and cash equivalent consists of cash and cash equivalent as defined above.

1.7: COMPERATIVE FIGURES:

Where necessary, comparative figures could have been adjusted / reclassified to conform with changes in presentation in the current year. However, this is the first financial statements which have been prepared.

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
AS AT 31ST DECEMBER, 2016:

		2016 Tzs
NOTE 2:	REVENUE	
	Sales	253,194,584.70
		253,194,584.70
NOTE 3:	COST OF OPERATIONS:	
	Hiring of Equipment	145,185,000.00
	Fuel, Oil & Lubricants	54,532,000.00
	Labour costs	18,897,000.00
		218,614,000.00
NOTE 4:	ESTABLISHMENT AND ADMINISTARTIVE EXPENSES:	
	Salaries and Wages	5,880,000.00
	CRB	250,000.00
	Travelling & Accomodation	3,000,000.00
	Bank Charges & Commissions	444,636.00
	Motor Vehicle Running Expenses	4,800,000.00
	Business Licence	300,000.00
	Water & Electricity	360,000.00
	Stationery & Printing	125,000.00
	Audit Fees	500,000.00
		15,659,636.00
NOTE 6:	DEPRECIATION & AMORTIZATION:	
	Fixed Assets (NOTE 11)	7,500,000.00
		7,500,000.00
NOTE 8:	TRADE AND OTHER RECEIVABLES:	
	Trade Debtors	152,847,063.41
		152,847,063.41
NOTE 9:	CASH AND CASH EQUIVALENT:	
	Cash at Bank	5,278,885.29
	Cash in hand	445,000.00
		5,723,885.29
NOTE 10:	TRADE AND OTHER PAYABLES:	
	Trade Creditors	78,375,000.00
	Audit Fee Payable	500,000.00
		78,875,000.00

THE UNITED REPUBLIC OF TANZANIA

PRESSIDENT OFFICE
IONA ADMINSTRATION AND LOCAL GOVERNMENT

MKALAMA DISTRICT COUNCIL

TENDER DOCUMENT

FOR

CONSTRUCTION STAFF HOUSE THREE IN ONE IN DISTRICT HOSPITAL

TENDER NO: LGA/147/2021/2022/W/IMF/07

JANUARY 2022

SECTION I ; INVITATION FOR TENDER

Kwamba, imekubalika na pande zote mbili ya kuwa, Mwajiri atamlipa MILIONI ISHIRINI NA NANE ELFU MIA MOJA KUMI NA NNE TU Tshs 28,924,114/= kwa ajili ya gharama za ujenzi wa Maboma na kupaua na kulikamilisha hadi kufikia hatua ya kutumika.

5. Machanganuo wa malipo utakuwa kama ulivyoelezewa hapa chini:-

   a. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI MOJA NA KUMI ELFU TU tu (TSH 1,010,000/=) pale atakapokuwa amechimba msingi na kumwaga zege (100mm) ya kuimarisha msingi (Blinding) kwa uwiano 1:3:6 sambamba na nguzo (columns).

   b. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TATU LAKI SABA THELATHINI NA TATU ELFU NA THELATHINI TU (TSH 3733,080/=) pale atakapopanga mawe, kuweka mchanga na kumwaga jamvi kwa uwiano wa 1:3:6.

   c. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI MOJA LAKI SITA NA ELFU NANE TU (TSH 1,608,000/=) pale atakapojenga msingi za jingo la OPD.

   d. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TANO LAKI SABA TISINI NA SITA tu (TSH 5,796,304/=) ELFU MIA TATU NA NNE TU atakaposuka nondo za lenta, atakapojenga ukuta.

   e. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi LAKI SITA KUMI NA TATU ELFU MIA SABA (TSH 613720/=) ISHIRINI TU pale atakapofunga mbao za lenta na kumwaga zege ya uwiano wa 1:2:4.

   f. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TISA NA THELATHINI NA TATU ELFU NA KUMI tu (TSH 9,033,010/=) pale atakapotengeneza dari (blandering) na kufunga gypsum board na cornice zake, kupaua

   g. Mwajiriwa atalipwa kiasi cha fedha za Kitanzania Shilingi MILIONI TATU LAKI SITA KUMI NA NANE ELFU TU (TSH 3,618,000/=) pale atakapopiga lipu kuta za ndani na kuta za nje ya jengo, uzio wa jengo na kuchimbia bomba za umeme na square box.

MIKA KAMATI YA AFYA

h. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi Milioni Mbili Laki Tano Elfu Tano tu (TSH 2,105,000/=). pale atakapochimbia fremu za milango na grill za madirisha

i. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi Milioni Mbili Laki Nane Elfu Tano (TSH 2,805,000/=) pale atakapopiga rangi kuta za ndani na dari na kupiga chuping kuta za nje.

j. Mwajiriwa ujenzi atalipwa kiasi cha fedha za Kitanzania Shilingi Mia Nne Kumi na Mbili Elfu (TSH 412,000/=) pale atakapoweka sakafu.

WAJIBU WA MWAJIRI

6. **Kwamba**; Mwajiri atakua na jukumu la kutoa vifaa vya ujenzi vitakavyotumika katika shughuli zote za ujenzi na Mwajiriwa atahakikisha vibarua wanavaa vifaa vya usalama kazini.

7. **Kwamba,** Mwajiri atakuwa na wajibu wa kulipa gharama za Mwajiriwa kama zilivyoainishwa katika mkataba huu na kwa utaratibu/awamu kama iivyoainishwa katika mkataba huu.

8. **Kwamba,** Mwajiri atakua na wajibu wa kuunda kamati itakayosimamia ujenzi huo.

9. **Kwamba,** Mwajiri atamteua Mhandisi wa Ujenzi wa halmashauri ambaye atakua ndiye Meneja wa Mradi.

10. **Kwamba,** Mwajiri atamlipa Mwajiriwa malipo yake yote kwa namna/mfumo wa malipo ya serikali, kulingana na kazi atakayokuwa ameifanya ambayo itathibitishwa na Mhandisi wa Ujenzi wa Halmashauri ya Wilaya ya Iramba.

11. **Kwamba,** Fomu ya nukuu ya bei, Barua ya kukubaliwa (letter of acceptance) na Mutasari wa majadiliano zitakuwa sehemu ya Mkataba huu.

12. Kwamba kwa mujibu wa taratibu za ujenzi, Mhandisi wa halmashauri anatakiwa kukagua ubora wa kazi iliyofanyika kwa kila hatua iliyoorodheshwa katika mkataba huu na baada ya hapo atatoa ushauri wa kitaalamu na kuruhusu malipo kufanyika kulingana na kidadisi bei namba

M/KITI KAMATI YA
A-F-Y-A

AJIBU WA MWAJIRIWA NA SIKU YA KUANZA KAZI (THE ROLES OF EMPLOYEE AND THE DATE OF SITE POSSESSION)

13. **Kwamba** Mwajiriwa atakaye saini mkataba huu atatakiwa kufanya kazi ya Ujenzi wa darasa na sio kuwa msimamizi.

14. **Kwamba Mwajiriwa** ataanza kazi ndani ya siku tatu (3) mara baada ya kusaini mkataba huu.

15. **Kwamba** Mwajiriwa anaahidi kufanya kazi Kwa kuzingatia vipimo vilivyoelekezwa na maelezo yatakayotolewa na Msimamizi wa Ujenzi.

16. **Kwamba** Mwajiriwa atakamilisha kazi kwa muda aliokubaliana na mwajiri katika mkataba huu.

17. **Kwamba** Mwajiriwa atapewa na kufuata maelekezo atakayopewa na wasimamizi na wakaguzi wa kazi husika walioteuliwa na Mwajiri. Maelekezo yanayotolewa na Mhandisi yatakuwa kwa maandishi. Ikiwa kwa sababu nyingine yoyote ile maelekezo ambayo hayapo katika mkataba yakatolewa kwa mdomo, Mwajiriwa atafuata maelekezo hayo. Katika kipindi cha **siku moja (1)** maelekezo hayo ya mdomo yatathibitishwa kwa maandishi.

18. **Kwamba;** Mkataba huu utatafsiriwa kwa mujibu wa sheria za Tanzania.

WAJIBU WA WAFANYAKAZI WA MWAJIRIWA

19. Kwamba, Gharama zote zinazohusiana na wafanyakazi wa mwajiriwa itakuwa ni juu ya mwajiriwa ilimradi kuhakikisha kuwa masharti ya mkataba huu yanafuatwa na kazi inafanyika kwa ubora na uharaka unaotakiwa.

MAMBO YASIYOZUILIKA (FORCE MAJURE CLAUSE)

20. **Kwamba,** endapo kutatokea jambo lolote ambalo liko nje ya uwezo wa kibinadamu kama vile mafuriko, kimbunga, au magonjwa ya mlipuko na mambo mengine ambayo yapo nje ya uwezo wa kibinadamu ambayo yanaweza kuzuia utekelezaji wa mkataba huu, upande ulioathirika utatoa taarifa ya maandishi kwa upande mwingine ndani ya masaa 48 baada ya tukio hilo kutokea.

5

NJISI YA KUFANYA MABADILIKO YA MKATABA HUU (VARIATION CLAUSE)

21. **Kwamba,** kama kutatokea umuhimu wa kupitia upya mkataba huu pale itakapoonekana ni vema kufanya hivyo kwa masilahi mapana ya utekelezaji rahisi wa mkataba huu, upande unaoona ni vyema kufanya hivyo, utautarifu upande mwingine ndani ya siku saba (07) na kama upande mwingine utaridhia basi mabadiliko hayo yatafanyika

22. **Kwamba,** mawasiliano yote katika utekelezaji wa mkataba huu yatakuwa kwa lugha ya Kiswahili na kwa maandishi. Mawasiliano ambayo yatafanyika nje ya utaratibu huu hayatatambulika kama mawasiliano halali kwa maana ya utekelezaji wa mkataba huu.

KUKOMA, KUHUISHWA NA USULUHISHI WA MIGOGORO.

23. Mkataba huu unaweza kuhuishwa baada ya muda wa awali kumalizika. Upande utakaokuwa na nia ya kuhuisha mkataba utatoa kwa upande mwingine notisi ya siku 7 kabla ya kumalizika kwa muda wa awali kuelezea nia hiyo.

24. Mkataba utakaohuishwa utaenda sambamba na makubaliano yoyote mapya yatakayofanyika baina ya pande husika.

25. **Kwamba,** mkataba huu utatafisiriwa kwa sheria za Tanzania, na endapo kutajifokeza mgogoro wowote, mgogoro huu utasuluhishwa (Mediation) na kama usuluhishi utashindikana basi upande usioridhika utapeleka jambo hilo katika mahakama yenye mamalaka.

MDA WA MATAZAMIO (Completion and closer of works)

26. **Kwamba,** kutakuwa na muda wa matazamio wa siku 30 baada ya mda wa awali kuisha na muda huu utaanza kuhesabika baada ya mkataba huu kuisha.

SIRI (CONFIDENTIALITY CLAUSE)

27. Kwamba mkataba huu utakuwa ni siri baina ya pande zote mbili na ikitokea pande mmoja amevunja masharti ya mkataba huu atakuwa amekwenda kinyume na sharti hili la mkataba.

VA USHUHUDA na **UTHIBITISHO,** mkataba huu umewekwa saini na Mwajiri na Mwajiriwa mbele a mashahidi kama inavyoonyeshwa hapa chini:

M/KITI KAMATI YA
AFYA

UPANDE WA MWAJIRI

MGANGA MFAWIDHI-ZAHANATI KISIRIRI

Jina.....

Saini.....

Tarehe.....

MWENYEKITI WA KAMATI YA AFYA

Jina..... DAUDI SANANE.....

Saini.....

Tarehe..... 5/11/2021.....

0683399555

UPANDE WA MWAJIRIWA

MWAJIRIWA

Jina..... KASIM HUSEIN KINGU.....

Cheo/Wadhifa..... FUNDI.....

Saini.....

Tarehe..... 05/11/2021.....

SHAHIDI WA MWAJIRIWA

Jina..... SHABAN M. MKWAMILE.....

Cheo/Wadhifa..... SHAHIDI.....

Saini.....

Tarehe..... 05/11/2021.....

TANZANIA REVENUE AUTHORITY

RETURN OF INCOME
MADE BY OR ON BEHALF OF AN INDIVIDUAL

YEAR OF INCOME: 2016

To:
MR. KASSIM HUSSEIN KINGU
T/A. KISULULU GENERALSUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

TIN 101-400-565

NOTE
This return is submitted under the provisions of Section 91 of the Income Tax Act, 2004. You are hereby required to furnish the return of income not later than six (6) months after the end of the year of income, showing your total worldwide income if you were resident in Tanzania or income the source of which is Tanzania if you were not resident during the year 2016 You are required to make payment of the income tax still to be paid for the year of income based on the declared income.

Please, read the notes carefully in the appendix before filling in the form.

There are penalties for not filing a tax return or for filing false return.

Date of issue:.....

Issuing office:.....
P.O. Box: .....
Tel:.....Fax:.....
E-mail address.....

GENERAL INFORMATION/INDIVIDUAL'S PARTICULARS

1 TIN: 101-400-565

2 Title: Mr [x] Mrs [ ] Ms [ ]

First Name	Middle Name	Surname
KASSIM	HUSSEIN	KINGU

3 Personal Identification Number (PIN)

4 Postal Address:

P.O. Box 63 Postal City KIOMBOI - SINGIDA

5 Physical Address:

Street/Location: SOWETO | Plot No.: 61 | Block No.: G

Residential Address:

Street/Location: | Plot No.: | Block No.:

Contact Numbers/Address:

Phone number: 0765 291666 | Second Phone: 0784 826222

Third Phone: | Fax number:

E-mail address:

Period covered by this return (basis period): From: Day 01 Month 01 Year 2016 To: Day 31 Month 12 Year 2016

Person's status and category of taxation (Please tick the appropriate boxes):

Resident ☐	Non-Resident ☐	Presumptive tax (incomplete record keeping) ☐	Presumptive tax (complete record keeping) ☐	Others ☐

COMPUTATION OF INCOME AND TAX

	Business Income	Amount	
10	Turnover (Gross receipts)	253,194,584.70	
11	Beginning Inventory		
12	Cost of construction	218,614,000.00	
	Other direct costs		
13	Goods withdrawn not sold		
14	Closing Inventory		
15	Costs of sales (11+12-13-14)		
16	**Gross profit (10-15)**	34,580,584.70	
17	**Deductions/Expenses**		
18	Wages and salaries		
19	Stamp duty		
20	Transport		
21	Bank charges/interests		
22	Utilities (Electricity, Water, Phone, Fax, etc)	125,000.00	
23	Business Rent		
24	Other Expenses (specify in a separate schedule)	23,034,636.00	
25	Total expenses (add from 18 to 24)	23,159,636.00	
		Taxable Income	**Tax Payable/ Paid (TZS)**
26	**Net profit (16-25)**	11,420,948.70	
27	**Mining Business Income** (specify in separate schedule)		
28	**Agricultural Business Income** (specify in separate schedule)		
29	**Other Business Income** (specify in separate schedule)		
30	Final withholding payments		

	(Specify in a separate schedule)		
31	Total Business Income (26+27+28+29) and Tax	11,420,948.70	2,011,500.00
32	Employment		
33	Commuted pension		
34	Pension Annuity		
	Investment		
35	Dividends		
36	Dividends (DSE Registered)		
37	Interest/Discount		
38	Rent		
39	Royalties		
40	Natural resource payment		
41	Capital gain		
42	Other investment (specify in a separate schedule)		
43	Total Investment Income (from 35 to 42)		
44	Repatriated Income of a Domestic Permanent Establishment		
45	TOTAL INCOME AND TAX(26+27+28+29+32+33+34+43)	11,420,948.70	2,011,500.00
46	Less tax paid (Excluding final Withholding payments)		2,000,000.00
47	NET TAX PAYABLE (45-46)		11,500.00

48	DUE DATE	

DECLARATION

I hereby declare that the information given on this form and any accompanying accounts/documents are correct, complete and contain a full and true statement of my income to the best of my knowledge and belief.

Title: Mr ☐ Mrs ☐ s ☐

KASSIM — First Name

HUSSEIN — Middle Name

KINGU — Surname

Position: PROPRIETOR

Signature: ..... Date: Day 3 0 . Month 0 6 Year 2 0 1 7

In accordance with the provision of Section 135(1) of the Income Tax Act, 2004 I declare that I prepared or assisted in the preparation of this return and to the best of my knowledge, the return and attachments therefore present a true and fair view of the financial position.

Title: Mr ☐ Mrs ☐ Ms/Bi ☐

JOHNSON — First Name

MWIJAGE — Middle Name

BYENOBI — Surname

Position: MANAGING PARTNER

(Certified Public Accountant)

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O BOX 63
KIOMBOI - SINGIDA

FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

PREPARED BY:
BM FINANCIAL CONSULTANTS
AUTHORISED CERTIFIED PUBLIC ACCOUNTANTS / AUDITORS AND TAX CONSULTANTS
TEL: 0767 230652
E-MAIL: johnsonbyenobi@yahoo.com
P.O BOX 135
MWANZA - TANZANIA

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O BOX 63
KIOMBOI - SINGIDA

FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

CORPORATE INFORMATION:

PROPRIETOR:	MR. KASSIM HUSSEIN KINGU
BUSINESS NAME	KISULULU GENERAL SUPPLIES
LOCATION:	SOWETO STREET PLOT NO. 61, BLOCK "G" KIOMBOI - SINGIDA
REGISTRATION:	TIN: 101 – 400 - 565
PRINCIPAL ACTIVITIES:	CIVIL AND BUILDING WORKS
AUDITORS:	BM FINANCIAL CONSULTANTS AUTHORISED CERTIFIED PUBLIC ACCOUNTANTS, AUDITORS AND TAX CONSULTANTS P.O. BOX 135 MWANZA – TANZANIA

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF FINANCIAL POSITION
S AT 31ST DECEMBER, 2016:

	NOTE	2016 Tzs
Non Current Assets:		
Plant, Property & Equipment:	11	27,500,000.00
		27,500,000.00
Current Assets:	7	-
Inventory	8	152,847,063.41
Trade and other receivables	9	5,723,885.29
Cash and cash equivalent		158,570,948.70
		186,070,948.70
TOTAL ASSETS EMPLOYED		
Capital and Retained Reserves:		
Capital:		99,875,000.00
Brought in		7,320,948.70
Retained reserves		107,195,948.70
TOTAL		
LIABILITIES:		
Current Liabilities:	10	78,875,000.00
Trade and other payables		78,875,000.00
		186,070,948.70
TOTAL EQUITY AND LIABILITIES		

CERTIFIED TRUE AND CORRECT

PROPRIETOR _____ DATE 22 - 05 - 2017

KISULULU GENERAL SUPPLIES

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF COMPREHENSIVE INCOME
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

	NOTE	Tzs
Revenue	2	253,194,584.70
Cost of sales	3	- 218,614,000.00
GROSS PROFIT		34,580,584.70
OPERATING EXPENSES:		
Establishment and administrative expenses	4	- 15,659,636.00
Depreciation & Amortization	7	- 7,500,000.00
		-
TOTAL OPERATING EXPENSES		- 23,159,636.00
Net profit / (loss) for the year before Taxation		11,420,948.70
Less: Taxation		- 2,000,000.00
Net profit / (loss) for the year after Taxation		9,420,948.70

CERTIFIED TRUE AND CORRECT

MANAGING DIRECTOR _____ DATE 22-03-2017

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF CASH FLOW
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

	2016 Tzs
1 ***Cash flows from operating activities:***	
Net profit / (loss) for the year before Taxation	11,420,948.70
Adjustment for depreciation	7,500,000.00
	18,920,948.70
Working capital changes:	
(Increases) / Decreases in stock	- 152,847,063.41
(Increases) / Decreases in accounts receivables	78,875,000.00
Increases / (Decreases) in current liabilities	- 2,100,000.00
Drawings	- 2,000,000.00
Taxation paid	(78,072,063.41)
Net cash flow from operating activities	(59,151,114.71)
2 ***Cash flows from investing activities:***	
(Acquisition) / Disposal of fixed assets	- 35,000,000.00
Net cash flow used for investing activities	(35,000,000.00)
3 ***Cash flows from financing activities:***	
Capital brought in	99,875,000.00
Net cash flow from financing activities	99,875,000.00
Changes in cash and cash equivalent	5,723,885.29
Cash and cash equivalent at start	-
Cash and cash equivalent at close	5,723,885.29
Cash and cash equivalent at close:	
Cash and Bank balances	5,723,885.29

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 31ST DECEMBER, 2016:

	Capital	Retained Reserves	Total Equity
	Tzs	Tzs	Tzs
Balance as at 1st January, 2016:	99,875,000.00	-	99,875,000.00
Net profit / (loss) for the year after Taxation	-	9,420,948.70	9,420,948.70
Drawings	-	(2,100,000.00)	(2,100,000.00)
Balance as at 31st December, 2016:	99,875,000.00	7,320,948.70	107,195,948.70

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL ENTERPRISES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30TH SEPTEMBER, 2016:

1.1: BASIS OF PREPARATION:

These financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS). The financial statements have been prepared under the historical cost conversion.

1.1: NON CURRENT ASSETS:

Non Current assets are shown at cost less subsequent depreciation and impairment.

1.2: DEPRECIATION:

Depreciation is calculated using the straight line method to allocate the cost of each asset to its residual value over the estimated useful life as follows:

➢ Furniture & Fittings	12.50 % P.A
➢ Computers & Accessories	12.50 % P.A
➢ Plant & Equipment	12.50 % P.A
➢ Motor Vehicles	25.00 % P.A

1.3: ACCOUNTS RECEIVABLES:

Accounts receivables are initially recognized at cost. No impairment review of accounts receivable has been made. No provision for impairment of debtors has been made in these accounts.

1.4: ,STOCK:

Stock and stores are valued at the lower of cost or net realizable value on FIFO basis. Net Realizable Value is the estimated selling price in the ordinary course of business less applicable variable selling expenses.

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL ENTERPRISES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30TH SEPTEMBER, 2016:

1.5: INCOME RECOGNITION:

The following specific recognition criteria must be met before revenue is recognized:

Sales of goods and services: Revenue is recognized when rewards of ownership of goods and services have passed to the buyer.

1.6: CASH AND CASH EQUIVALENT:

Cash and Bank balances in the Balance Sheet comprise cash at bank and on hand and short term deposits with the original maturity of twelve months or less. For the purpose of the cash flow statement, cash and cash equivalent consists of cash and cash equivalent as defined above.

1.7: COMPERATIVE FIGURES:

Where necessary, comparative figures could have been adjusted / reclassified to conform with changes in presentation in the current year. However, this is the first financial statements which have been prepared.

MR. KASSIM HUSSEIN KINGU
T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

NOTES TO THE FINANCIAL STATEMENTS
AS AT 31ST DECEMBER, 2016:

		2016 Tzs
NOTE 2:	REVENUE	
	Sales	253,194,584.70
		253,194,584.70
NOTE 3:	COST OF OPERATIONS:	
	Hiring of Equipment	145,185,000.00
	Fuel, Oil & Lubricants	54,532,000.00
	Labour costs	18,897,000.00
		218,614,000.00
NOTE 4:	ESTABLISHMENT AND ADMINISTARTIVE EXPENSES:	
	Salaries and Wages	5,880,000.00
	CRB	250,000.00
	Travelling & Accomodation	3,000,000.00
	Bank Charges & Commissions	444,636.00
	Motor Vehicle Running Expenses	4,800,000.00
	Business Licence	300,000.00
	Water & Electricity	360,000.00
	Stationery & Printing	125,000.00
	Audit Fees	500,000.00
		15,659,636.00
NOTE 6:	DEPRECIATION & AMORTIZATION:	
	Fixed Assets (NOTE 11)	7,500,000.00
		7,500,000.00
NOTE 8:	TRADE AND OTHER RECEIVABLES:	
	Trade Debtors	152,847,063.41
		152,847,063.41
NOTE 9:	CASH AND CASH EQUIVALENT:	
	Cash at Bank	5,278,885.29
	Cash in hand	445,000.00
		5,723,885.29
NOTE 10:	TRADE AND OTHER PAYABLES:	
	Trade Creditors	78,375,000.00
	Audit Fee Payable	500,000.00
		78,875,000.00

T/A: KISULULU GENERAL SUPPLIES
P.O. BOX 63
KIOMBOI - SINGIDA

COMPUTATION OF TAXABLE INCOME - YOI 2016:

	Tzs	Tzs	Tzs	Tzs
Net profit / (loss) for the year before depreciation				11,420,948.70
Adjustments for depreciation				7,500,000.00
				18,920,948.70
Adjustments:				7,500,000.00
Wear and Tear as per schedule				11,420,948.70
Adjusted taxable income				2,011,500.00
Tax thereon				2,000,000.00
Tax Paid				11,500.00

WEAR AND TEAR SCHEDULE - 2016:

	Class 1	Class 2	Class 3	Toral
	37.50%	25.00%	12.50%	
	Tzs	Tzs	Tzs	Tzs
W.D.V - 01.01.2016:	-	-	-	-
Additions / (Disposal)	-	25,000,000.00	10,000,000.00	35,000,000.00
	-	25,000,000.00	10,000,000.00	35,000,000.00
Wear and Tear	-	6,250,000.00	1,250,000.00	7,500,000.00
W.D.V - 31.12.2016:	-	18,750,000.00	8,750,000.00	27,500,000.00

THE UNITED REPUBLIC OF TANZANIA

PRESSIDENT OFFICE
IONA ADMINSTRATION AND LOCAL GOVERNMENT

MKALAMA DISTRICT COUNCIL

TENDER DOCUMENT

FOR

CONSTRUCTION STAFF HOUSE THREE IN ONE IN DISTRICT HOSPITAL

TENDER NO: LGA/147/2021/2022/W/IMF/07

JANUARY 2022

SECTION I ; INVITATION FOR TENDER