



Republic of Kenya

TENDER NO. MOT/05/2018-2019

**PROPOSED REGENERATION OF
JOMO KENYATTA PUBLIC BEACH**

FOR

**MINISTRY OF TOURISM AND WILDLIFE
STATE DEPARTMENT OF TOURISM**

IN

**MOMBASA COUNTY
APROXIMATE
BILLS OF QUANTITIES
(MAIN WORKS ESTIMATE)**

Planning Systems Services Ltd.,
Architects,
P.O. Box 188 - 00606,
Nairobi.

Planning Project Management Ltd.,
Project Managers,
P.O. Box 188 - 00606,
Nairobi.

Davson & Ward,
Quantity Surveyors, Building
Economists & Project Managers,
P.O. Box 46611 - 00100 GPO,
Nairobi.

APRIL, 2019

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BILLS OF QUANTITIES

FOR

PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH

FOR

MINISTRY OF TOURISM AND WILDLIFE
STATE DEPARTMENT OF TOURISM

Prepared by: Davson and Ward,
Quantity Surveyors and
Building Economists,
P.O. Box 46611,
NAIROBI.

April, 2019

The Contract for the above-mentioned works, entered into on theday of.....20..... by the undersigned parties refers to these Bills of Quantities comprising 360 pages numbered 'Contents', Signature Page, Tender Invitation Notice, Instructions to Tenderers 1 – 25, Conditions of Contract 26 – 47, Appendix to Conditions of Contract 48 – 49, 1/1 - 1/18, 2/1 – 2/15, 3/1 – 3/19, 4/1 – 4/10, 5/1 – 5/5, 6/1 – 6/8, 7/1 - 7/5, 8/1 – 8/2, 9/1 – 9/12,10/1 – 10/21, 11/1 – 11/6, 12/1 – 12/1, 13/1 – 13/5, FS/1, E/1, F/1 – F/57, G/1 – G/13, H/1 – H/5, I/1 – I/42, and J/1 – J/60 inclusive, which shall be read and construed as part of the said Contract.,

..... EMPLOYER CONTRACTOR

Date: Date:

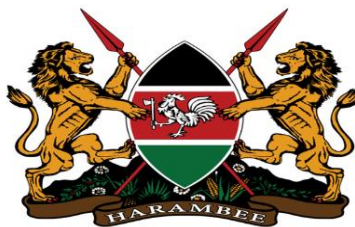
SPECIAL NOTE

The Contractor is required to check the numbers of the pages of these Bills of Quantities and should he find any missing or in duplicate or the figures indistinct he must inform the Quantity Surveyor at once and have the same rectified.

Should the Contractor be in doubt about the precise meaning of any items or figures for any reason whatsoever he must inform the Quantity Surveyor in order that the correct meaning may be decided before the date for submission of tenders.

No liabilities will be admitted nor claim allowed in respect of errors in the Contractor's tender due to mistakes in the Bills of Quantities which should have been rectified in the manner described above.

SIGNATURE PAGE



REPUBLIC OF KENYA

MINISTRY OF TOURISM & WILDLIFE
STATE DEPARTMENT FOR TOURISM

TENDER INVITATION NOTICE

The Government of Kenya Through the **Ministry of Tourism & Wildlife, State Department for Tourism** intends to undertake construction works to the **PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH AND MAMA NGINA DRIVE WATERFRONT IN MOMBASA COUNTY** and invites tenders from contractors who will carry out the following works: -

| N O | TENDER NO. | DESCRIPTION | CATEGORY | TENDER FEE | BID BOND | CLOSING DATE |
|-----|---------------------|--|----------------|------------|----------|------------------------------|
| 1 | MOT/05/2018-2019 | Proposed Regeneration of Jomo Kenyatta Public Beach in Mombasa County– Main Works | NCA 1 & 2 only | Ksh.1000 | 2% | 30 th April, 2019 |
| 2 | MOT/06/2018-2019(a) | Proposed Regeneration of Mama Ngina drive waterfront and cultural District in Mombasa County- Electrical Installation works | NCA 1-6 | Ksh.1000 | 2% | 30 th April, 2019 |
| 3 | MOT/06/2018-2019(b) | Proposed Regeneration of Mama Ngina drive waterfront and cultural District in Mombasa County- Plumbing, Drainage and firefighting & protection Equipment | NCA 1-6 | Ksh.1000 | 2% | 30 th April, 2019 |
| 4 | MOT/06/2018-2019(c) | Proposed Regeneration of Mama Ngina drive waterfront and cultural District in Mombasa County- HVAC Installation works | NCA 1-6 | Ksh.1000 | 2% | 30 th April, 2019 |

Interested Contractors who are registered in relevant trades and categories, (proof of registration required) may obtain revised Tender Documents from **The Supply Chain Management Office, 6th Floor Room 631, Ministry of Tourism and Wildlife, (State Department for Tourism), Utalii House** in person, upon payment of a non-refundable fee of **Kshs. 1000/-** in cash office on 15th floor, NSSF Building Block A. **before 4.00pm on normal working days or in banker's cheque payable to The Principal Secretary, State Department for Tourism, Nairobi** or downloaded from State Department for Tourism website www.tourism.go.ke and Treasury portal www.supplier.treasury.go.ke. Those who download should send their contact details including email addresses, telephone numbers and contact name to procurement@tourism.go.ke for registration.

There will be a mandatory pre-tender site visit on 23rd April 2019 for tender no. MOT/05/2018-2019 [Jomo Kenyatta Public Beach in Mombasa] **bidders will assemble at Jomo Kenyatta Public Beach, next to KWS Offices, Mombasa at 10.30AM**. For those bidders who attended the last pre-tender site visit may opt not to attend.

On 24th April 2019, there will be a Mandatory pre- tender site visit for all bidders for tender no MOT/06/2018-2019(a -c) Mama Ngina drive. Bidders will assemble at the parking lot of the Galaxy Chinese restaurant [next to Florida club] along mama Ngina drive, Mombasa at 10.30 am

Interested bidders should note that only those meeting the criteria indicated below as a minimum, supported by relevant documents at submission will be considered for further evaluation, detailed technical evaluation criteria will appear in the tender documents.

1. The Bid Bond must be in form of Bank Guarantee from a reputable bank or approved insurance company.
2. List of Directors with respective shareholding and citizenship details (CR 12)
3. Confidential Business Questionnaire
4. Tax Compliance Certificate.
5. Audited Accounts for the Last two years

6. Certificate of company registration
7. Current Business permits from relevant local authority
8. Current category of Licence with the relevant statutory bodies Energy Regulatory Commission, County Governments, and Water Management Boards etc

Tenders in plain sealed envelopes, marked tender number on the right-hand side corner and bearing no indication of the tenderer should be addressed to: -

**THE PRINCIPAL SECRETARY
MINISTRY OF TOURISM AND WILDLIFE
STATE DEPARTMENT OF TOURISM
P. O. Box 30027-00100
NAIROBI**

and placed in the **Tender Box on 6th Floor at the Utalii House Nairobi** or sent by post so as to reach the above address on or before Tuesday, **30TH April, 2019 at 11.00 a.m.**

Submitted bids will be opened publicly in the **7th floor Conference room, Utalii House** soon after the above stated closing date and time in the presence of the tenderers or their representatives who choose to attend. Late bids will be returned unopened.

Prices quoted must be net inclusive of VAT and all Government Taxes and must remain valid for one hundred twenty (120) days from the opening date of the tender.

The Bid Security in the right format must be from **a reputable bank or from a PPRA accredited insurance company**, shall be valid for one hundred fifty (150) days from tender opening date.

The Government reserves the right to reject any tender giving reasons for the rejection and does not bind itself to accept the lowest or any tender.

**PRINCIPAL SECRETARY,
MINISTRY OF TOURISM AND WILDLIFE
STATE DEPARTMENT FOR TOURISM.**

SECTION A
INSTRUCTIONS TO TENDERERS

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INSTRUCTIONS TO TENDERERS

1. General

- 1.1 The Employer as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.
- 1.2 All tenderers shall provide the Qualification Information, a statement that the tenderer (including all members of a joint venture and Contractors) is not associated, or has not been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works, and any of its affiliates, shall not be eligible to tender.
- 1.3 All tenderers shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.
- 1.4 In the event that pre-qualification of potential tenderers has been undertaken, only tenders from pre-qualified tenderers will be considered for award of contract. These qualified tenderers should submit with their tenders any information updating their original pre-qualification applications or, alternatively, confirm in their tenders that the originally submitted pre-qualification information remains essentially correct as of the date of tender submission.
- 1.5 Where no pre-qualification of potential tenderers has been done, all tenderers shall include the following information and documents with their tenders , unless otherwise stated:
 - (a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer:
 - (b) total monetary value of construction work performed for each of the last five years:

- (c) experience in works of a similar nature and size for each of the last five years, and details of work under way or Contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;
- (d) major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the contract.
- (e) qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the contract.
- (f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past five years;
- (g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);
- (h) authority to seek references from the tenderer's bankers;
- (i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and
- (j) proposals for Sub-Contracting components of the Works amounting to more than 10 percent of the contract Price.

1.6 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated:

- (a) the tender shall include all the information listed in clause 1.5 above for each joint venture partner;
- (b) the tender shall be signed so as to be legally binding on all Partners;
- (c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
- (d) one of the partners will be nominated as being in charge and authorized to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and
- (e) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

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

2. Tender Documents

- 2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.
 - (a) These Instructions to Tenderers
 - (b) Form of Tender and Qualification Information
 - (c) Conditions of contract
 - (d) Appendix to Conditions of contract
 - (e) Drawings
 - (f) Bills of Quantities
 - (g) Specifications
 - (h) Forms of Securities
- 2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.

- 2.3 A prospective tenderer requiring any clarification of the tendering documents may notify the Employer in writing or by cable, telex, facsimile or e-mail at the address indicated in the letter of invitation to tender. The Employer will only respond to requests for clarification received earlier than seven days prior to the deadline for submission of tenders. Copies of the Employer's response will be forwarded to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.
- 2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing to the Employer.
- 2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders, in accordance with Clause 4.2 herebelow.

3. Preparation of Tenders

- 3.1 All documents relating to the tender and any correspondence shall be in English language.
- 3.2 The tender submitted by the tenderer shall comprise the following:
- (a) These Instructions to Tenderers, Form of Tender, Conditions of Contract, Appendix to Conditions of contract and Specifications;
 - (b) Tender Security – 2% of tender amount from a reputable bank valid for an additional 30 days beyond the 90 days tender validity period.
 - (c) Priced Bill of Quantities:
 - (d) Alternative offers where invited; and
 - (e) Any other materials required to be completed and submitted by the tenderers.
- 3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.

- 3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.
- 3.5 The unit rates and prices shall be in Kenya Shillings.
- 3.6 Tenders shall remain valid for a period of 90 days from the date of submission. However in exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.
- 3.7 The tenderer shall furnish, as part of the tender, a Tender Security for the amount specified in the invitation to tender. This shall be in the form of a bank draft or a bank guarantee from an established and reputable bank approved by the Employer.
- 3.8 The format of the Tender Security should be in accordance with the form of Tender Security included in Section G – Sample forms or any other form acceptable to the Employer. Tender Security shall be valid for 30 days beyond the validity of the tender.
- 3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as “Tenderer” all joint venture partners and list them in the following manner: a joint venture consisting of””, ”.....”,and “.....”.
- 3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.
- 3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.

3.12 The Tender Security may be forfeited

- (a) if the tenderer withdraws the tender after tender opening during the period of tender validity;
- (b) if the tenderer does not accept the correction of the tender price, pursuant to Clause 5.7;
- (c) in the case of a successful tenderer, if the tenderer fails within the specified time limit to
 - (i) sign the Agreement, or
 - (ii) furnish the required Performance Security.

3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tender conforming to the basic technical requirements shall be considered.

3.14 The tenderer shall prepare one original of the documents comprising the tender documents as described in Clause 3.2 of these Instructions to Tenderers, bound with the volume containing the Form of Tender, and clearly marked "ORIGINAL".

3.15 The original shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised to sign on behalf of the tenderer, pursuant to Clause 1.5 (a) or 1.6 (b), as the case may be. All pages of the tender where alterations or additions have been made shall be initialled by the person or persons signing the tender.

4. Submission of Tenders

4.1 The tenderer shall seal the original and all copies of the tender in two inner envelopes and one outer envelope, duly marking the inner envelopes as “**ORIGINAL**” and “**COPIES**” as appropriate.

The outer and inner envelopes shall:-

(a) be addressed to the Employer at the address provided in the invitation to tender which is :- **The Principal Secretary,
Ministry of Tourism and Wildlife,
State Department of Tourism,
P.O. Box 30027 – 00100,
Nairobi**

(b) have the name and identification number of the Tender as defined in the invitation to tender; and

(c) provide a warning **not to open** before the specified time and date for tender opening.

4.2 Tenders shall be delivered to the Employer at the address specified above not later than the time and date specified in the invitation to tender. However, the Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Sub-Clause 2.5 in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.

4.3 Any tender received after the deadline prescribed in clause 4.2 will be returned to the tenderer un-opened.

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

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

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

5. Tender Opening and Evaluation

5.1 The tenders will be opened by the Employer, including modifications made pursuant to Clause 4.4, in the presence of the tenderers' representatives who choose to attend at the time and in the place specified in the invitation to tender. Envelopes marked “**WITHDRAWAL**” shall be opened and read out first. Tenderers' and Employer's representatives who are present during the opening shall sign a register evidencing their attendance.

- 5.2 The tenderers' names, and presence or otherwise of Envelopes A and B will be announced and recorded. Envelope A shall be opened, the total amount of each tender, completion periods for phases one and two and of any alternative tender (if alternatives have been requested or permitted), any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening. Minutes of the tender opening, including the information disclosed to those present will be prepared by the Employer.
- 5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Employer's officials, processing of tenders or award decisions may result in the rejection of his tender.
- 5.4 To assist in the examination, evaluation, and comparison of tenders, the Employer at his discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex or facsimile but no change in the price or substance of the tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.
- 5.5 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender (a) meets the eligibility criteria defined in Clause 1.7;(b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.
- 5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.
- 5.7 The tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
- (a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and
 - (b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious

typographical error, in which case the adjustment will be made to the entry containing that error.

- (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bill of Quantities, the amount as stated in the Form of Tender shall prevail.
- (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)
- (e) The Error Correction Factor shall be applied to all Builder's Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.
- (f) the amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 3.11.

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

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

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

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

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

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

5.13 Stages of Evaluation- see details in clause 8 page 12 hereinafter.

6. Award of Contract

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

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

6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by email or facsimile. This notification (hereinafter and in all Contract documents called the "Letter of Acceptance") will state the sum (hereinafter and in all Contract documents called the "Contract Price") that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract.

The notification of award will constitute the formation of the Contract, subject to the tenderer furnishing the Performance Security in accordance with Clause 6.5 and signing the Agreement in accordance with Clause 6.4., **if the award is not challenged within 14 days of notification.**

6.4 The Agreement will incorporate all agreements between the Employer and the successful tenderer. It will be signed by the Procuring Entity and sent to the successful tenderer, **after** 30 days following the notification of award. Within 14 days of receipt the successful tenderer will sign the Agreement and return it to the Employer.

6.5 **On expiry** of 14 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the form of a Bank Guarantee, and shall be issued at the tenderer's option, by a reputable bank located in Kenya and acceptable to the Employer.

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

6.7 The Employer will simultaneously notify the successful tenderer and unsuccessful tenderers of the fate of their tenders.

- 6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months)
- 6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.
- 6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.
- 6.11 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)
- 6.12 Where contract price variation is allowed, the valuation shall not exceed 15% of the original contract price.
- 6.13 Price variation request shall be processed by the procuring entity within 30 days of receiving the request.
- 6.14 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.
- 6.15 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.
- 6.16 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

7 Corrupt and Fraudulent practices

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

8. Stages of Evaluation

PRELIMINARY EVALUATION:

ENAME.....

| | |
|------------|--|
| Bidder No. | |
| 1 | Tax Compliance Certificate from KRA |
| 2 | List of Directors with respective shareholding and citizenship details (CR12 and copies of National IDs) |

| | |
|------------|--|
| Bidder No. | |
| 3 | Confidential Business Questionnaire |
| 4 | Audited Accounts for the Last two years |
| 5 | Certificate of Company Registration |
| 6 | Class 2 and above Contractor for National Construction Authority (copy of registration certificate to be attached) |
| 7 | Current Business permits from relevant local authority |
| 8 | Bid Bond/Tender Security of 2% of the Tender amount from a reputable Bank or approved Insurance Company |
| 9 | The proposed Domestic sub-contractors to submit (Electrical |
| | a) Tax Compliance Certificate from KRA |
| | b) Certificate of Company registration |
| | c) National Construction Authority registration and NCA category 3 or higher (copy of certificate to be attached) |
| | d) Electrical sub-contractor to provide ERC category A-1 and be licensed with Communications Authority of Kenya |
| 10 | The proposed Domestic sub-contractors to submit (Mechanical |
| | a) Tax Compliance Certificate from KRA |
| | b) Certificate of Company registration |
| | c) National Construction Authority registration and NCA category 3 or higher (copy of certificate to be attached) |
| | REMARKS |

NOTES;

1. Tenders which do not satisfy any of the above requirements shall be rejected
2. ✓ Responsive
3. X Non Responsive

STAGE 2 TECHNICAL EVALUATION

| | CRITERIA | MAX POINTS |
|----------|---|-------------------|
| A | Documents fully completed/ compliance with pricing instructions | 4 |
| | Duly filled/Completed Documents or Rejection under Clause 2.2 of instructions to Tenderers 4 | |
| | No Errors 2 | |
| | Up to 15% error 1 | |
| | Above 15% error NR | |
| | Consistency in Price Distribution 1 | |
| | Not consistent 0 | |
| | SUB TOTAL SECTION A | |
| B | Personnel | 28 |
| | Contract Manager to have at least University Degree in Architecture, Quantity Surveying or Civil Engineering with at least five years' experience as a Contract Manager in works of an equivalent nature and Volume OR Higher National Diploma in Building Construction/Engineering with 15 years' experience as a Contract Manager in works of an equivalent nature and Volume • Qualification (5 points) and experience for the Period Indicated (points) – (total 10 Points) | 10 |

| | | |
|----------|---|-----------|
| | <ul style="list-style-type: none"> • With the required qualification but less experience than the period indicated (Pro-rate) • Less Qualifications than stated above (0 Points regardless of experience) | |
| | <p>Site Manager to have at least Higher National Diploma in Building Construction/Engineering with 10 years (if degree holder 5 years) experience as a Site Manager in works of an equivalent nature and Volume OR Certificate holder in Building Construction/Engineering with 15 years' experience as a Site Manager in works of an equivalent nature and Volume</p> <ul style="list-style-type: none"> • Qualification (4 points) and experience for the Period Indicated (4 points) – (total 8Points) • With the required qualification but less experience than the period indicated (Pro-rate) • Less Qualifications than stated above (0 Points regardless of experience) | 8 |
| | <p>Construction Supervisors (at least 2 No.) to have at least Ordinary National Diploma in Building Construction/Engineering with 10 years (if degree holder 5 years) experience as a Construction Supervisor OR Certificate holder in Building construction/Eng with 15 years experience as a Construction Supervisor in works of similar nature.</p> <ul style="list-style-type: none"> • Qualification (2 points each) and experience for the Period Indicated (1 point each) – (total 6 Points) • With the required qualification but less experience than the period indicated (Pro-rate) • Less Qualifications than stated above (0 Points regardless of experience) | 6 |
| | <p>Detailed curriculum vitae of the above personnel certified and signed by both employee and bidding company representative to be attached</p> <ul style="list-style-type: none"> • Submission for all the above staff (2 Points) • Submission for less (Pro-rata | 2 |
| | <p>Copies of employment letters for the above personnel on permanent or contract terms to be attached</p> <ul style="list-style-type: none"> • Submission of employment letters for all staff (2 Points) • Submission for less (Pro-rata) | 2 |
| | SUB TOTAL SECTION B | |
| C | Relevant Experience and Capacity | 30 |
| | <p>Details of experience and past performance on at least five completed projects as a main contractor (builders works) within the past ten years each with a value of a lesser magnitude including names of clients/firms, clear physical address and contact persons [At least three (3) of these projects must be located in Kenya]. (Attach Contract agreements and Certificates of completion)</p> <p>Completed projects to include the following name of project, address of client, contact persons. Providing evidence of such contracts(attach contract agreements and practical completion certificates. (6 Points on each project)</p> <ul style="list-style-type: none"> • Any project submitted as above which of a lesser magnitude or not accompanied by evidence of contract i.e. Contract agreement and Completion Certificate shall not be considered for scoring of the assigned points. • Projects that are at least 70% complete with evidence in regard to (1) above would be considered for scoring | 30 |
| | SUB TOTAL SECTION C | |
| D | Machinery & Equipment | 13 |
| | <p>Provide a list of Major items of construction equipment proposed to carry out the Contract including, but not limited to the listed items as shown in page 23 and 24 hereinafter {tenderers are expected to complete this table as necessary, failure to do so may attract nil points for this item}. State if own or lease and an undertaking letter that they will be available for the Contract. (Provide Proof of ownership e.g. copies of log books, receipts, letters of insurance e.t.c. or lease agreements</p> | |

| | | |
|----------|---|------------|
| | or a firm commitment letter on its availability for inspection by Ministry of Tourism and Wildlife, State Department of Tourism at any time) – 10 points. | |
| | Concrete mixing & placing plant/ Equipment (3 Points) | 3 |
| | Vertical Transport Equipment (3 Points) | 3 |
| | Vehicle Transport(2 Points) | 2 |
| | Earthmoving & Compaction Equipment (5Points) | 5 |
| | - All the listed Equipment (10 Points) - Less than the listed items (Pro-rata) | |
| | SUBTOTAL SECTION D | |
| E | Business Support | 19 |
| | Availability of Liquid assets (5 points) and access to lines of credit or other financial resources (5 points) - (total 10 Points) | 10 |
| | Proof of Financial stability (current ratio of 2:1) – (4 Points) | 4 |
| | Information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount. If none, state so. (5 Point) | 5 |
| | SUB TOTAL SECTION E | |
| F | At least 3 referees List below (attach copies of referees). | 3 |
| | Three referees (3 points) | 3 |
| | Less or none(0) | 0 |
| | SUBTOTAL SECTION F | |
| G | Completion programme for the works – | 3 |
| | Realistic shortest contract period (3 Points) | 3 |
| | Any other period (Pro-rata) | 0 |
| | SUB TOTAL SECTION G | |
| | GRAND TOTAL | 100 |

Cut off – 75% to qualify for financial evaluation.

STAGE 3 – FINANCIAL EVALUATION

Price comparison and checking for arithmetic errors.

RECOMMENDATION

THE LOWEST EVALUATED TENDER TO BE RECOMMENDED FOR CONSIDERATION OF AWARD SUBJECT TO THE STATED CONDITIONS OF AWARD.

EVALUATION QUESTIONNAIRE

A. Documents to be duly filled in accordance with instructions to tender

B. Personnel

1. Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.

| Position | Name | Academic Qua. | Professional Qualification | Years of experience in Construction | Years as manager |
|----------------------|------|---------------|----------------------------|-------------------------------------|------------------|
| 1.1 Contract Manager | | | | | |
| 1.2 Site Manager | | | | | |

2 Proposed Technical Staff (attach relevant certificates)

| Name | Academic Qualification | Professional Qualification | Years of Experience |
|-------------------------------------|------------------------|----------------------------|---------------------|
| 2.1 Construction/Site supervisor I | | | |
| 2.2 Construction/Site Supervisor II | | | |
| - | | | |

FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED PROFESSIONAL STAFF

Proposed Position: _____ **Contract manager** _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____ Nationality: _____

Membership in Professional Societies: _____

Detailed Tasks, which will be assigned;

- i)
- ii)
- iii)

Key Qualifications:

(Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations).

Education:

(Summarise college/university and other specialised education of staff member, giving names of schools, dates attended and degree(s) obtained).

Employment Record:

(Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organisations, titles of positions held, and locations of assignments.)

Certification:

I, the undersigned, certify that these data correctly describe me, my qualifications, and my experience.

_____ Date: _____

(Signature of staff member)

_____ Date: _____

_____ Date: _____

(Signature of authorised representative of the firm)

Full name of staff member: _____

Full name of authorised representative: _____

CURRICULUM VITAE (CV) FOR PROPOSED PROFESSIONAL STAFF

Proposed Position: Site manager

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____ Nationality: _____

Membership in Professional Societies: _____

Detailed Tasks, which will be assigned;

iv)

v)

vi)

Key Qualifications:

(Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations).

Education:

(Summarise college/university and other specialised education of staff member, giving names of schools, dates attended and degree(s) obtained).

Employment Record:

(Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organisations, titles of positions held, and locations of assignments.)

Certification:

I, the undersigned, certify that these data correctly describe me, my qualifications, and my experience.

_____ Date: _____

(Signature of staff member)

_____ Date: _____

_____ Date: _____
(Signature of authorised representative of the firm)

Full name of staff member: _____

Full name of authorised representative: _____

CURRICULUM VITAE (CV) FOR PROPOSED PROFESSIONAL STAFF

Proposed Position: _____ *Construction Supervisor* _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____ Nationality: _____

Membership in Professional Societies: _____

Detailed Tasks, which will be assigned;

vii)

viii)

ix)

Key Qualifications:

(Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations).

Education:

(Summarise college/university and other specialised education of staff member, giving names of schools, dates attended and degree(s) obtained).

Employment Record:

(Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organisations, titles of positions held, and locations of assignments.)

Certification:

I, the undersigned, certify that these data correctly describe me, my qualifications, and my experience.

(Signature of staff member) Date: _____

Date: _____

(Signature of authorised representative of the firm) Date: _____

Full name of staff member: _____

Full name of authorised representative: _____

CURRICULUM VITAE (CV) FOR PROPOSED PROFESSIONAL STAFF

Proposed Position: _____ *Construction Supervisor* _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____ Nationality: _____

Membership in Professional Societies: _____

Detailed Tasks, which will be assigned;

x)

xi)

xii)

Key Qualifications:

(Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations).

Education:

(Summarise college/university and other specialised education of staff member, giving names of schools, dates attended and degree(s) obtained).

Employment Record:

(Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organisations, titles of positions held, and locations of assignments.)

Certification:

I, the undersigned, certify that these data correctly describe me, my qualifications, and my experience.

_____ Date: _____

(Signature of staff member)

_____ Date: _____

_____ Date: _____

(Signature of authorised representative of the firm)

Full name of staff member: _____

Full name of authorised representative: _____

C. Relevant Experience

1. Constitution or legal status of tenderer (attach copy or Certificate of incorporation);

Section 1.01 Place of registration: _____

Principal place of business _____

Power of attorney of signatory of tender _____ (In case of Joint venture or if signatory is non-director)

2. Ten Years Experience as Contractor in ConstructionYear of Commencement of Business(attach certificate of Registration as Contractor).

Schedule of works for the last 10 years:-

| Name and address of Client | Type of construction & contract period | Location | Contact Person | Contract Year | Contract sum (KShs.) |
|----------------------------|--|----------|----------------|---------------|----------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total (KShs.) | | | | | |

3. Total monetary value of construction Works performed for each for the last five years.

| Year | Specify the year (2014-2019) | Name of Client(s) | Address of Client(s) | Value (KShs.) |
|--------------|------------------------------|-------------------|----------------------|---------------|
| | | | | |
| Year 1 | | | | |
| Year 2 | | | | |
| Year 3 | | | | |
| Year 4 | | | | |
| Year 5 | | | | |
| Total (Kshs) | | | | |

4. List of Works of similar nature and value not less than 200 Million for the last five years. Also list details of works under way or committed, including expected completion.

a) Completed similar Projects

| Name and address of client | Contact Person | Project Name and Brief Description of Works | Contract Dates | Value of Contract(KShs.) | Status of Project |
|----------------------------|----------------|---|----------------|--------------------------|-------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

b) Works under way or committed [Tenderer to list current contracts, Contract Values, name of client and contact person giving addresses and telephone numbers]

| Name and address of client | Contact Person and Telephone | Project Name and Brief Description of Works | Contract Dates | Value of Contract(KShs.) | Expected date of completion |
|----------------------------|------------------------------|---|----------------|--------------------------|-----------------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

6. Estimated monthly cashflow for this project in Kenya Shillings (Kshs.)
 per month.

D Machinery and Equipment

Major items of Contractor's Machinery, Tools and Equipment proposed for carrying out the Works. List all information requested below. Indicate whether owned and /or lease, or give proposals for purchase.

| <u>Item of Equipment</u> | No. Available | Description, Make and age (years) | Condition (new, good, poor) | Owned and/or leased (attach lease agreement copy) |
|--|---------------|-----------------------------------|-----------------------------|---|
| <p align="center"><u>Tools & Plant</u></p> <p>1 <u>Concreting Plant</u></p> <ul style="list-style-type: none"> - Offsite Weight batching plant - Truck mixers - Weigh mixers - concrete pump - water pumps - poker vibrators <p>2. <u>Vertical Transport Equip</u></p> <ul style="list-style-type: none"> - Tower crane - Mobile cranes - Hoists (Alimack or equiv.) <p>3. <u>Vehicle Transport Equip</u></p> <ul style="list-style-type: none"> - Tipper lorries - Dumpers - pick-up trucks - Saloon cars <p>4. <u>Earthmovers/Compactors</u></p> <ul style="list-style-type: none"> - Compactors (Dynapac or equiv.) - Motor Graders - Excavators - Water Bourses - Compressors - Buckets - Rollers <p>5. Steel cutters/bending machine</p> | | | | |

| | | | | |
|--|--|--|--|--|
| <p>6. Power tools/equip.</p> <ul style="list-style-type: none"> - Generating Set - Welding Machine - Grinders - Cutting tools - Floor sanding machine <p>7. Metal Formwork capacity</p> <p>8. Workshops</p> <ul style="list-style-type: none"> - Metalwork - Electrical - woodwork - Mechanical <p>9. Set of Survey Equipment</p> | | | | |
|--|--|--|--|--|

E. Business support

1. Evidence of insurance cover for equipment and indemnity list below and attach certified copies

2. Financial reports for the last three years: balance sheets, profit and loss statements, auditor's reports, etc. List below and attach copies.

3. Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of supportive documents.

4. Name, address and telephone, email and facsimile numbers of appointed bankers that may provide reference if contacted by the Employer. List below and attach copies.

Attach bankers' letter of authority to seek reference.

5. Statement of compliance with the requirements of Clause 1.2 of the Instructions to Tenderers

6. Names of legal advisors and a statement and nature of any litigation in the last 5 years. (If none state so.)

F. At least three referees. Give names, company/firm, contact addresses of Clients/consultants for whom the Contractor has worked.

1.

2.

3.

G. Proposed program for of works

| Task/Activity Description | Delivery period (weeks) | Commission/handover (weeks) | Total contract period (weeks) | Defects liability period (weeks) |
|---------------------------|-------------------------|-----------------------------|-------------------------------|----------------------------------|
| | | | | 6 months (27 weeks) |

SECTION B
CONDITIONS OF CONTRACT
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SECTION B:

CONDITIONS OF CONTRACT

1. Definitions

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

“Bill of Quantities” means the priced and completed Bill of Quantities forming part of the tender.

“Compensation Events” are those defined in Clause 24 hereunder.

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

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

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

“Other Contractors” shall refer to persons or corporate bodies whose tenders to carry out the works have been accepted by the Employer, **working under the Contractor.**

“The Contractor's Tender” is the completed tendering 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.

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

“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 Contract Data and calculated from the Completion Date.

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

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

“Employer”, or the **“Procuring entity”** as defined in the Public Procurement Regulations (i.e. Central or Local Government administration, Universities, Public Institutions and Corporations, etc) is the party who employs the Contractor to carry out the Works.

“Equipment” is the Contractor's machinery and vehicles brought temporarily to the Site for the execution of the Works.

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

“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.

“Project Manager” is the person named in the Appendix to Conditions of Contract (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract and shall be an “Architect” or a “Quantity Surveyor” registered under the Architects and Quantity Surveyors Act Cap 525 or an “Engineer” registered under Engineers Registration Act Cap 530.

“Prime cost sum” – Means a sum included in the contract bills for works or services to be executed by a nominated sub-contractor, statutory or other authority or for materials or goods to be obtained from a nominated supplier.

“Provisional sum” – Means a sum included in the contract bills for the execution of work which cannot be entirely foreseen, defined or detailed at the time the tender documents are issued.

“Site” is the area defined as such in the Appendix to Condition of Contract.

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

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

“Start Date” is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with the Site possession date(s).

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

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

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

“The Works” are what the Contract requires the Contractor to construct, install, And turnover to the Employer, as defined in the Appendix to 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 in English Language unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.
- 2.2 If sectional completion is specified in the Appendix to Conditions of Contract, reference in the Conditions of Contract to the Works, the Completion Date and the Intended Completion Date apply to any section of the Works (other than references to the Intended Completion Date for the whole of the Works).
- 2.3 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;
 - (1) Agreement,
 - (2) Letter of Acceptance,
 - (3) Contractor's Tender,
 - (4) Appendix to Conditions of Contract,
 - (5) Conditions of Contract,
 - (6) Specifications,
 - (7) Drawings,
 - (8) Bill of Quantities,
 - (9) Any other documents listed in the Appendix to Conditions of Contract as forming part of the Contract.

Immediately after the execution of the Contract, the Project Manager shall furnish both the Employer and the Contractor with two copies each of all the Contract documents. Further, as and when necessary the Project Manager shall furnish the Contractor [always with a copy to the Employer] with three [3] copies of such further drawings or details or descriptive schedules as are reasonably necessary either to explain or amplify the Contract drawings or to enable the Contractor to carry out and complete the Works in accordance with these Conditions.

3. Language and Law

- 3.1 Language of the Contract and the law governing the Contract shall be English language and the Laws of Kenya respectively

4. Project Manager's Decisions

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

5. Delegation

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

6. Communications

- 6.1 Communication between parties shall be effective only when in writing. A notice shall be effective only when it is delivered.

7. SubContracting

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

8. Other Contractors

- 8.1 The Contractor shall cooperate and share the Site with other Contractors, public authorities, utilities etc. as listed in the Appendix to Conditions of Contract and also with the Employer, as per the directions of the Project Manager. The Contractor shall also provide facilities and services for them. The Employer may modify the said List of Other Contractors etc., and shall notify the Contractor of any such modification.

9. Personnel

- 9.1 The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said Information or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Qualification Information. If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the Work in the Contract.

10 Works

- 10.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings. The Works may commence on the Start Date and shall be carried out in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

11 Safety and Temporary Works

- 11.1 The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their approval. No erection of temporary works shall be done until such approvals are obtained.
- 11.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent Works, shall be subject to prior approval by the Project Manager before they can be used.
- 11.3 The Contractor shall be responsible for the safety of all activities on the Site.

12. Discoveries

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

13. Work Program

- 13.1 Within the time stated in the Appendix to Conditions of Contract, the Contractor shall submit to the Project Manager for approval a program showing the general methods, arrangements, order, and timing for all the activities in the Works. An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining Work, including any changes to the sequence of the activities.

The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract. If the Contractor does not submit an updated program within this period, the Project Manager may withhold the amount stated in the said Appendix from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue program has been submitted. The Project Manager's approval of the program shall not alter the Contractor's obligations. The Contractor may revise the program and submit it to the Project Manager again at any time. A revised program shall show the effect of Variations and Compensation Events.

14. Possession of Site

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

15. Access to Site

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

16. Instructions

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

17. Extension or Acceleration of Completion Date

- 17.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining Work, which would cause the Contractor to incur additional cost. The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager in writing for a decision upon the effect of a Compensation Event or variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay caused by such failure shall not be considered in assessing the new (extended) Completion Date.
- 17.2 No bonus for early completion of the Works shall be paid to the Contractor by the Employer.

18. Management Meetings

- 18.1 A contract management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project Manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

19. Early Warning

- 19.1 The Contractor shall warn the Project 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 be provided by the Contractor as soon as reasonably possible.
- 19.2 The Contractor shall cooperate with the Project Manager in making and considering proposals on how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the Work and in carrying out any resulting instructions of the Project Manager.

20. Defects

- 20.1 The Project Manager shall inspect the contractor's work and notify the contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Project Manager may instruct the contractor to search for a defect and to uncover and test any Work that the Project Manager considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the contractor, However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the contract Price.
- 20.2 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 Appendix to Conditions of Contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.
- 20.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Project Manager's notice. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

21. Bills Of Quantities

- 21.1 The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rate in the Bills of Quantities for each item.

- 21.2 If the final quantity of the Work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contract price, the Project Manager shall adjust the rate to allow for the change.
- 21.3 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bills of Quantities.

22. Variations

- 22.1 All variations shall be included in updated programs produced by the Contractor.
- 22.2 The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.
- 22.3 If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills of Quantities shall be used to calculate the value of the variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the variation does not correspond with items in the Bills of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
- 22.4 If the contractor's quotation is unreasonable, the Project Manager may order the variation and make a change to the Contract price, which shall be based on the Project Manager's own forecast of the effects of the variation on the Contractor's costs.
- 22.5 If the Project Manager decides that the urgency of varying the Work would prevent a quotation being given and considered without delaying the Work, no quotation shall be given and the variation shall be treated as a Compensation Event.
- 22.6 The contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 22.7 When the Program is updated, the contractor shall provide the Project Manager with an updated cash flow forecast.

23. Payment Certificates, Currency of Payments and Advance Payments

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

23.6 The contract Price shall be stated in Kenya Shillings. All payments to the contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the contract Agreement and indicated therein. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services the Employer reserves the right to pay the equivalent at the time of payment in the currencies of the countries of such goods and services. The Employer and the Project Manager shall be notified promptly by the contractor of any changes in the expected foreign currency requirements of the contractor during the execution of the Works as indicated in the Schedule of Foreign Currency Requirements and the foreign and local currency portions of the balance of the contract Price shall then be amended by agreement between Employer and the contractor in order to reflect appropriately such changes.

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

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

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

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

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

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

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

d) with each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.

24. Compensation Events

24.1 The following issues shall constitute Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Appendix to Conditions of contract.
- (b) The Employer modifies the List of Other contractors, etc., in a way that affects the Work of the contractor under the contract.
- (c) The Project Manager orders a delay or does not issue drawings, specifications or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon the Work, which is then found to have no defects.
- (e) The Project Manager unreasonably does not approve a Sub-contract 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 tenderers (including the Site investigation reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer or additional 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 effects on the contractor of any of the Employer's risks.
- (j) The Project Manager unreasonably delays issuing a Certificate of Completion.
- (k) Other compensation events described in the contract or determined by the Project Manager shall apply.

- 24.2 If a compensation event would cause additional cost or would prevent the Work being completed before the Intended Completion Date, the contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
- 24.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the contractor, it shall be assessed by the Project Manager, and the contract Price shall be adjusted accordingly. If the contractor's forecast is deemed unreasonable, the Project Manager shall adjust the contract Price based on the Project Manager's own forecast. Project Manager will assume that the contractor will react competently and promptly to the event.
- 24.4 The contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the contractor not having given early warning or not having co-operated with the Project Manager.
- 24.5 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of contract.
- 24.6 The contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.

Provided always that should the event giving rise to the claim of continuing effect, the contractor shall submit an interim claim within the said thirty days and a final claim within thirty days of the end of the event giving rise to the claim.

25. Price Adjustment

- 25.1 The Project Manager shall adjust the contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the contractor.
- 25.2 The contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the contractor of materials to be specifically imported (by express provisions in the contract Bills of Quantities or Specifications) for permanent incorporation in the Works. Unless otherwise stated in the contract, if at any time during the period of the contract exchange rates shall be varied and this shall affect the cost to the contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the contract Price, as the case may be.

- 25.3 Unless otherwise stated in the contract, the contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;
- (i) The prices contained in the contract Bills of Quantities shall be deemed to be based upon the rates of wages and other emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the contractor in his pricing shall be attached in the Appendix to Conditions of contract.
 - (ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of Work remaining to be executed at the date of publication of such increase or decrease.
 - (iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.4 The prices contained in the contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the Works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the contractor in his pricing shall be attached in the Appendix to Conditions of contract.
- 25.5 Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.
- 25.6 No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.7 The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rates.

26. Retention

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

27. Liquidated Damages

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

27.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the contractor by adjusting the next payment certificate. The contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rate specified in Clause 23.30

28. Securities

28.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a reputable bank acceptable to the Employer, and denominated in Kenya Shillings. The Performance Security shall be valid until a date 30 days beyond the date of issue of the Certificate of Completion.

29. Dayworks

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

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

29.3 The contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

30. Liability and Insurance

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

- (a) The risk of personal injury, death or loss of or damage to property (excluding the Works, Plant, Materials and Equipment), which are due to;
 - (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or
 - (ii) negligence, breach of statutory duty or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
- (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in Employer's design, or due to war or radioactive contamination directly affecting the place where the Works are being executed.

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

- (a) a defect which existed on or before the Completion Date.
- (b) an event occurring before the Completion Date, which was not itself the Employer's risk
- (c) the activities of the Contractor on the Site after the Completion Date.

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

The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts stated in the Appendix to Conditions of contract for the following events;

- (a) loss of or damage to the Works, Plant, and Materials;
- (b) loss of or damage to Equipment;
- (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract, and
- (d) personal injury or death.

30.4 Policies and certificates for insurance shall be delivered by the contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation required to rectify the loss or damage incurred.

- 30.5 If the contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the contractor should have provided and recover the premiums from payments otherwise due to the contractor or, if no payment is due, the payment of the premiums shall be a debt due.
- 30.6 Alterations to the terms of insurance shall not be made without the approval of the Project Manager. Both parties shall comply with any conditions of insurance policies.

31. Completion and taking over

- 31.1 Upon deciding that the Works are complete, the contractor shall issue a written request to the Project Manager to issue a Certificate of Completion of the Works. The Employer shall take over the Site and the Works within seven [7] days of the Project Manager issuing a Certificate of Completion.

32. Nominated Subcontractors

- 32.1 All specialists, merchants, tradesmen and others executing any work or supplying any goods, materials, Plant or services for which Provisional sums or Prime Cost sums are included in the Contract, who may have been or be nominated or selected or approved by the Employer or the Project Manager, and all persons to whom by virtue of the provisions of the Contract the Contractor is required to subcontract on an approved sub-contract agreement shall, in the execution of such work or the supply of such goods, materials, Plant or services, be deemed to be subcontractors to the Contractor and are referred to in this Contract as "nominated subcontractors".
- 32.2 The Contractor shall not be required by the Employer or the Project Manager, or be deemed to be under any obligation, to employ any nominated Subcontractor against whom the Contractor may raise reasonable objection, or who declines to enter into a subcontract with the Contractor containing provisions:
- (a) that in respect of the work, goods, materials, Plant or services the subject of the subcontract, the nominated Subcontractor will undertake towards the Contractor such obligations and liabilities as will enable the Contractor to discharge his own obligations and liabilities towards the Employer under the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities, and
 - (b) that the nominated Subcontractor will save harmless and indemnify the Contractor from and against any negligence by the nominated subcontractor, his agents, workmen and servants and from and against any misuse by him or them of any Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

32.3 For all work executed or goods, materials, Plant or services supplied by any nominated subcontractor, the Contractor shall be entitled to:

- (a) the actual price paid or due to be paid by the Contractor, on the instructions of the Project Manager, and in accordance with the subcontract;
- (b) in respect of labour supplied by the Contractor, the sum, if any, entered in the Bill of Quantities or, if instructed by the Project Manager pursuant to the contract, as may be determined in accordance with the Contract.
- (c) in respect of all other charges and profit, a sum being a percentage rate or sum of the actual price paid or due to be paid calculated, where provision has been made in the Bill of Quantities for a rate or sum to be set against the relevant Prime Cost sum at the rate or sum inserted by the Contractor against that item.

32.4 Before issuing, under the contract, any certificate, which includes any payment in respect of work done or goods, materials, Plant or services supplied by any nominated Subcontractor, the Project Manager shall be entitled to demand from the Contractor reasonable proof that all payments, less retentions, included in previous certificates in respect of the work or goods, materials, Plant or services of such nominated Subcontractor have been paid or discharged by the Contractor. If the Contractor fails to supply such proof then, unless the Contractor:

- (a) Satisfies the Project Manager in writing that he has reasonable cause for withholding or refusing to make such payments, and
- (b) Produces to the Project Manager reasonable proof that he has so informed such nominated Subcontractor in writing.

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

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

33. Final Account

33.1 The Contractor shall issue the Project Manager with a detailed account of the total amount that the contractor considers payable to him by the Employer under 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 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within

30 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a Payment Certificate. The Employer shall pay the contractor the amount due in the Final Certificate within 60 days.

34. Termination

- 34.1 The Employer or the Contractor may terminate the contract if the other party causes a fundamental breach of the contract. These fundamental breaches of contract shall include, but shall not be limited to, the following;
- (a) the contractor stops work for 30 days when no stoppage of work is shown on the current program and the stoppage has not been authorised by the Project Manager;
 - (b) the Project Manager instructs the contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days;
 - (c) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
 - (d) a payment certified by the Project Manager is not paid by the Employer to the contractor within 30 days (for Interim Certificate) or 60 days (for Final Certificate) of issue.
 - (e) the Project Manager gives notice that failure to correct a particular defect is a fundamental breach of contract and the contractor fails to correct it within a reasonable period of time determined by the Project Manager;
 - (f) the contractor does not maintain a security, which is required.
- 34.2 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 Clause 34.1 above, the Project Manager shall decide whether the breach is fundamental or not.
- 34.3 Notwithstanding the above, the Employer may terminate the contract for convenience.
- 34.4 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. The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

35. Payment Upon Termination

- 35.1 If the contract is terminated because of a fundamental breach of contract by the contractor, the Project Manager shall issue a certificate for the value of

the Work done and materials ordered and delivered to Site up to the date of the issue of the certificate. Additional liquidated damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable by the Contractor.

- 35.2 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.
- 35.3 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on the Site, plant, equipment and temporary works.
- 35.4 The Contractor shall, during the execution or after the completion of the Works under this clause remove from the Site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

Until after completion of the Works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefor the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

36. Release from Performance

- 36.1 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.

37. Corrupt gifts and payments of commission

The Contractor shall not;

- (a) Offer or give or agree to give to any person in the service of the Employer any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other Contract for the Employer or for showing or forbearing to show favour or disfavor to any person in relation to this or any other Contract for the Employer.
- (b) Enter into this or any other Contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.

Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the provisions of the Public Procurement Regulations issued under The Exchequer and Audit Act Cap 412 of the Laws of Kenya.

38. Settlement Of Disputes

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

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

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

- 38.2 The arbitration may be on the construction of this Contract or on any matter or thing of whatsoever nature arising thereunder or in connection therewith, including any matter or thing left by this Contract to the discretion of the Project Manager, or the withholding by the Project Manager of any certificate to which the Contractor may claim to be entitled to or the measurement and valuation referred to in clause 23.0 of these conditions, or the rights and liabilities of the parties subsequent to the termination of Contract.
- 38.3 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference has not been given by the applying party within ninety days of the occurrence or discovery of the matter or issue giving rise to the dispute.
- 38.4 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or difference amicably with or without the assistance of third parties. Proof of such attempt shall be required.
- 38.5 Notwithstanding anything stated herein the following matters may be referred to arbitration before the practical completion of the Works or abandonment of the Works or termination of the contract by either party:
- 38.5.1 The appointment of a replacement Project Manager upon the said person ceasing to act.
- 38.5.2 Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions.
- 38.5.3 Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.
- 38.5.4 Any dispute or difference arising in respect of war risks or war damage.
- 38.6 All other matters shall only be referred to arbitration after the completion or alleged completion of the Works or termination or alleged termination of the Contract, unless the Employer and the Contractor agree otherwise in writing.
- 38.7 The Arbitrator shall, without prejudice to the generality of his powers, have powers to direct such measurements, computations, tests or valuations as may in his opinion be desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject of or included in any certificate.
- 38.8 The Arbitrator shall, without prejudice to the generality of his powers, have powers to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had been given
- 37.9 The award of such Arbitrator shall be final and binding upon the parties.

SECTION C :

APPENDIX TO CONDITIONS OF CONTRACT

NOTES: Appendix to the Conditions of Contract (ACC) shall supplement the Conditions of Contract (CC) whenever there is a conflict between the CC and the ACC, the provisions of the ACC shall prevail over those of the CC.

THE EMPLOYER IS

Name: **THE MINISTRY OF TOURISM AND WILDLIFE,**
STATE DEPARTMENT OF TOURISM

Address: **P.O. BOX 30027- 00100, NAIROBI**

Name of Authorised Representative: **THE PRINCIPAL SECRETARY**

Telephone: **020 2724646**

Email: **info@tourism.go.ke**

The Project Manager is

Name: **PLANNING PROJECT MANAGEMENT LIMITED,**

Address: **P.O. BOX 188- 00606, NAIROBI, KENYA**

Email : **info@planning-kenya.com**

The name (and identification number) of the contract is **PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN MOMBASA COUNTY**

The Works consist of **See Page 1/4 of Bill No. 1 Preliminaries & General Conditions**

The Start Date shall be **To be notified by Project Manager**

The Intended Completion Date for the whole of the Works shall be

(To be submitted with Form of Tender)

The following documents also form part of the contract:

See Clause 2.1 of the Conditions of Contract

The contractor shall submit a revised program for the Works within **14** days after the statutory 21 days requirement for contract award.

The Site Possession Date shall be **To be notified by the Project Manager**

The Site is located at **See Page 1/4 of Bill No. 1 – Preliminaries & General Conditions**

and is defined in drawings nos.

The Defects Liability period is 180 days.

Other Contractors, utilities etc., to be engaged by the Employer through the Contractor on the Site include those for the execution of;

1. **Electrical Installations**

2. **Plumbing, drainage and fire fighting installations**

3. _____

The minimum insurance covers shall be;

1. The minimum cover for insurance of the Works and of Plant and Materials in respect of the Contractor's faulty design is KShs. 10.0 million
2. The minimum cover for loss or damage to Equipment is KShs. 10.0 million
3. The minimum for insurance of other property is KShs. 10.0 million
4. The minimum cover for personal injury or death insurance
 - For the Contractor's employees KShs. 10.0 million
 - And for other people is KShs. 10.0 million

The following events shall also be Compensation Events:

1 – 4 N/A

The period between Program updates is As determined by the Project Manager

The amount to be withheld for late submission of an updated Program is 10% of certified amount

The proportion of certified payments retained is 10%.

The Price Adjustment Clause shall not apply (Clause 25)

The liquidated damages for the whole of the Works is KShs. **500,000/-** per month or part thereof.

The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price 10 percent (%)

The Completion Period for the Works is **(as in Form of Tender) (weeks)**

The rate of exchange for calculation of foreign currency payments is Not Applicable

The schedule of basic rates used in pricing by the Contractor is as attached - *contractor to attach*].

Advance Payment shall not be granted.

The rate of exchange for calculation of foreign currency payments is Not applicable

| ITEM No. | | Shs. | Cts. |
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| | <p style="text-align: center;"><u>BILL NO 1</u></p> <p style="text-align: center;"><u>PRELIMINARIES AND GENERAL CONDITIONS</u></p> <p>A. <u>NAMES OF PARTIES</u></p> <p>The following names will be inserted in the Articles of Agreement:</p> <p>The Employer Ministry of Tourism and Wildlife, State Department of Tourism, P.O Box 30027 - 00100, Nairobi, Kenya.</p> <p>The Project Manager Planning Project Management Limited, Planning House, Lower Kabete Road, P.O. Box 188 - 00606, Nairobi.</p> <p>The Architect Planning Systems Services Limited, Architects, Planning House, Lower Kabete Road, P.O. Box 188 - 00606, Nairobi.</p> <p>The Quantity Surveyor Davson & Ward, Quantity Surveyors and Building Economists, Davard House, 5 Cedar Road, Westlands, P.O. Box 46611 - 00100 GPO, Nairobi.</p> <p>B. <u>DEFINITIONS OF TERMS</u></p> <p>The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all Contract documents.</p> <p><u>Structural Engineer</u>' for this project shall be Mangat IB Patel Structures Limited, Consulting Engineers, P.O. Box 48674 - 00100, Nairobi, or in the event of his death, or ceasing to be the Structural Engineer for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of the structural engineering works, the Engineer shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p style="text-align: right;">Shs.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | | |

| ITEM No. | | Shs. | Cts. |
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| | <p><u>Mechanical and Electrical Engineer'</u> for this project shall be Emplan Limited P.O. Box 1746 - 00606, Nairobi, or in the event of his death, or ceasing to be the Mechanical and Electrical Engineer for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of the mechanical and electrical engineering works, the Engineer shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p><u>Civil Engineer & Geotech Surveyor'</u> for this project shall be Britech Ltd P.O. Box 15130 - 00509, Nairobi, or in the event of his death, or ceasing to be the Civil Engineer & Geotech Surveyor for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of the civil engineering and geotech survey, works, the Engineer shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p><u>Landscape Architect'</u> for this project shall be Insite Landscape Architects (PTY) Ltd, 117 Karim Avenue, Doringkloor, Centurion, South Africa, 0157, or in the event of his death, or ceasing to be the Landscape Architect for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of landscaping works, the Landscaper shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p><u>Transport & Mobility Specialists'</u> for this project shall be Mobility In Chain Srl, a company duly organized and existing under the Republic of Italy, with its principal place of business in Milan, via Ciovasso 4 - 20021 Milan, Italy, or in the event of his death, or ceasing to be the Transport & Mobility Specialists for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of the transport and mobility works, the Transport & Mobility Specialists shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p><u>Environmental Consultant'</u> for this project shall be Green by Choice, P.O. Box 21212 - 00505, Nairobi, or in the event of his death, or ceasing to be the Environmental Consultant for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of the environmental works, the Consultant shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> | | |
| 1165 | PRELIMINARIES | Shs. | |

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| | <p><u>Surveyor</u>' for this project shall be Map Surveys (K) Ltd, P.O. Box 44902 - 00100, Nairobi, or in the event of his death, or ceasing to be the Surveyor for the purpose of this Contract, such other person as the Employer shall nominate for that purpose. For the purpose of surveying works, the Surveyor shall be deemed vested with the duties of and be the representative of the Architect, except in respect of variations which involve the Contract Sum.</p> <p><u>'Contractor'</u> shall mean the person or persons, partnership, firm or company, whose tender for this work has been accepted, and who has or have, signed this Contract and shall include his or their heirs, executors, administrators, assigns, successors and duly appointed representatives.</p> <p><u>Works</u>' shall mean all or any portion of the work, materials and articles, wherever the same are being manufactured or prepared, which are to be used in the execution of this Contract and whether the same may be on the site or not.</p> <p><u>'Approved'</u> shall mean approved by the Architect at his absolute discretion,</p> <p><u>'Directed'</u> shall mean directed by the Architect at his absolute discretion.</p> <p><u>'Selected'</u> shall mean selected by the Architect at his absolute discretion.</p> <p><u>'m3'</u> shall mean cubic metre.</p> <p><u>'m2'</u> shall mean square metre.</p> <p><u>'m'</u> shall mean linear metre.</p> <p><u>'mm'</u> shall mean linear millimetre.</p> <p><u>'Kg.'</u> shall mean Kilogramme</p> <p><u>'No.'</u> shall mean Number</p> <p><u>'Prs.'</u> shall mean Pairs,</p> <p><u>'K.S.'</u> shall mean the current Kenya Standard Specification published by the Kenya Bureau of Standards.</p> <p><u>As described'</u> shall mean as described in the 'Descriptions of Materials and Workmanship' contained in the Appendices to these Bills of Quantities.</p> <p><u>'As before'</u> shall mean in all respects as earlier described in the same or a previous Bill.</p> <p style="text-align: right;">Shs.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | | |

| ITEM No. | | Shs. | Cts. |
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| | <p><u>'Do.'</u> shall mean the whole of the preceding description except as qualified in the description in which it occurs. Where it occurs in descriptions of succeeding items it shall mean the same as in the first description of the series in which it occurs except as qualified in the description concerned. Where it occurs in brackets it shall mean the whole of the preceding description which is contained within the appropriate brackets.</p> <p><u>Fix Only'</u> shall mean take delivery in Mombasa (unless otherwise stated), pay all demurrage and transport charges, load and transport to site where necessary, unload, store, unpack, check contents against orders and packing lists, assemble as necessary, distribute to position, hoist and fix only.</p> <p>A. <u>GROUPED SIZES</u></p> <p>Girths, depths or sizes grouped together in the Bills of Quantities item descriptions by means of hyphenated upper and lower limits shall be interpreted as 'exceeding' the lower limit and 'not exceeding' the upper limit.</p> <p>B. <u>DESCRIPTION OF SITE</u></p> <p>The site of the proposed works is located in Bamburi, Mombasa County.</p> <p>The Contractor is recommended to visit the site and will be deemed to have satisfied himself with regard to the conditions of the site, the risk of injury to the property adjacent to the site, or to the occupiers of such property, the nature of the materials to be excavated and conditions under which the works will have to be carried out, the supply of and conditions affecting labour and the facilities for obtaining the articles or materials referred to in these Bills of Quantities. No claim by the Contractor for additional payment will be allowed on the ground of any misunderstanding or misapprehension in respect of any such matter or otherwise. Any damage caused to existing accesses and roads must be made good as directed by and to the approval of the Architect</p> <p>C. <u>DESCRIPTION OF THE WORKS</u></p> <p>The works in this Contract comprise construction and completion of the following facilities:-</p> <ol style="list-style-type: none"> 1 Demolitions and Alterations 2 1No. Gateway 3 3No. Ablution blocks 4 Enabling works for the kiosks | | |
| | Shs. | | |

| ITEM No. | | Shs. | Cts. |
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| 1165 | <p><u>PRELIMINARIES</u></p> <p>5 Refuse collection area</p> <p>6 Hard landscape areas</p> <p>a) Matatu interchange parking and driveways</p> <p>b) Beachfront squares (2000m2)</p> <p>c) New access road (450m long x 4m wide)</p> <p>d) Pedestrian access way</p> <p>7 Stormwater drainage</p> <p>8 Foul drainage</p> <p>9 Electrical installations</p> <p>10 Mechanical installations</p> <p>12 Soft landscaping and furniture</p> <p>13 Shade areas in food market</p> <p>14 Restoration & refurbishment of existing structures</p> <p>15 100No. Food kiosks</p> <p>16 Sculptures and artworks</p> <p>A. <u>SCOPE OF WORKS</u></p> <p>The scope of works described above and contained within these Bills of Quantities is subject to amendment and change at the sole discretion of the Architect and the Employer. The work to be undertaken may be added to, omitted or amended to any extent.</p> <p>No adjustment of any submitted tender rates or prices, including those for this Bill No. 1, will be permitted as a result of finalization of the scope of works and under no circumstance will claim for resultant extra cost etc. be accepted from the Contract.</p> <p>Bill No. 13 "Schedule of rates" which must be priced by the tenderer will be used for valuation of additional works ordered which are not part of the measured works.</p> <p>B. <u>ACCESS TO SITE</u></p> <p>Means of access to the site shall be agreed with the Ministry of Tourism and Wildlife State Department of Tourism and the Architect prior to the commencement of work. The Contractor must allow here for any temporary access roads required for the transport of all materials, plant and the workmen necessary for the complete execution of the works, removing same at completion and for making good and reinstating to the entire satisfaction of the Architect all works or services disturbed at the completion of the Contract. The Contractor must also allow for keeping the existing Public Highways and Roads clean and for making good all damage to the satisfaction of the Architect and Local Authority.</p> <p style="text-align: right;">Shs.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | | |

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| C. | <p><u>AREA TO BE OCCUPIED BY THE CONTRACTOR</u></p> <p>The areas to be occupied by the Contractor for use as storage or for the erection of workshops etc. shall be defined on the site by the Architect and the Contractor must confine his activities to the areas so marked and must ensure that his own and his sub-contractors workmen do not trespass on the adjoining property or cause inconvenience to its occupiers.</p> | | |
| A. | <p><u>DRAWINGS</u></p> <p>The Contractor will be deemed to have examined the drawings before tendering and to have satisfied himself regarding their details and regarding the nature and extent of the works and the method of construction involved. No claims arising out of misapprehension in these respects will be allowed. Drawings may be seen by appointment at the offices of the Architect during normal working hours.</p> <p>The works are to be executed in accordance with the drawings referred to in the Schedule of Drawings used for Bills of Quantities contained in Appendix 'A' to these Bills of Quantities together with Contract drawings and any drawings which may be supplied in amplification or amendment thereof.</p> | | |
| B. | <p><u>NOMINATED SUPPLIERS' AND SUB-CONTRACTORS' MATERIALS</u></p> <p>Nominated Sub-contract and Nominated Supply Agreements will be finalised as soon as possible after the contract has been signed. The Contractor will be deemed to have taken account of this in his allowance for the provision of space for storage of Nominated Sub-Contractors' materials and for the provision of storage facilities on or off site for Nominated Suppliers' materials until required.</p> | | |
| C. | <p><u>VALUATION OF LUMP SUM PRELIMINARY COSTS</u></p> <p>Lump sums entered in these Bills of Quantities against any item of Preliminaries and General Conditions will be included in appropriate valuations according to reasonable assessment of actual costs involved in the item. Any balance between this assessment and the actual sum entered in the Bills of Quantities will be included in subsequent valuations as monthly instalments over the balance of the Contract Period.</p> | | |
| D. | <p><u>PAYMENT FOR MATERIALS ON SITE</u></p> <p>All materials for incorporation in the works must be stored on or adjacent to the site before payment is effected, unless specifically exempted by the Architect. This is to include the materials of the Contractor, Nominated Sub-Contractors and Nominated Suppliers.</p> | | |
| 1165 | <p><u>PRELIMINARIES</u></p> <p style="text-align: right;">Shs.</p> | | |

| ITEM No. | | Shs. | Cts. |
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| A. | <p><u>COMPLIANCE WITH REGULATION NOTICES ETC.</u></p> <p>The Contractor shall allow for paying all legally demandable fees, rates or taxes including VAT (currently rated at 16%), and those for hoardings and temporary buildings, and no adjustment of the Contract Sum will be made in respect of such payments unless expressly stated to the contrary in these Bills of Quantities.</p> <p>The Contractor shall apply for, provide all transport necessary for, any pay all costs and charges in connection with the Occupation Certificate Documentation required for such Certificate(s) will be provided by the Architect.</p> | | |
| B. | <p><u>INSURANCE(S) AND SECURITIES</u></p> | | |
| | <p>The Contractor to provide the following insurances and securities as the Conditions of the Contract.</p> | | |
| C. | <p>Provide Bid Security.</p> | | |
| D. | <p>Provide Performance Security.</p> | | |
| E. | <p>Provide Insurance for the Works.</p> | | |
| F. | <p>Provide Insurance for Third Party.</p> | | |
| G. | <p>Provide Insurance for Contractor's employees and loss or damage to equipment.</p> | | |
| H. | <p><u>TOOLS, PLANT, ETC.</u></p> | | |
| | <p>The Contractor shall allow for providing all ladders, tools, plant and transport required for the works, except in so far as may be specifically stated otherwise herein.</p> | | |
| I. | <p><u>SAFETY, HEALTH AND WELFARE OF WORK PEOPLE</u></p> | | |
| | <p>The Contractor shall allow for providing for the safety, health and welfare of workpeople and for complying with any relevant Ordinances, Regulations or Union Agreement.</p> | | |
| J. | <p><u>NATIONAL INSURANCE AND PENSIONS</u></p> | | |
| | <p>The Contractor shall allow for making any National Hospital Insurance Fund, National Social Security Fund payments due in respect of workpeople.</p> | | |
| K. | <p><u>HOLIDAYS AND TRANSPORT FOR WORKPEOPLE</u></p> | | |
| | <p>The Contractor shall allow for providing holidays and transport for workpeople and for complying with any relevant Ordinances, Regulations or Union Agreement.</p> | | |
| | <p style="text-align: right;">Shs.</p> | | |
| 1165 | <p><u>PRELIMINARIES</u></p> | | |

| ITEM No. | | Shs. | Cts. |
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| | <p>Time being of the essence in this Contract, however, the Contractor shall be deemed to have allowed for necessary overtime payments for work people who may be called to work during the public and gazetted holidays.</p> <p>A. <u>TRAINING LEVY</u></p> <p>The Contractor's attention is drawn to Legal Notice No. 237 of October, 1971, which requires payment by the Contractor of a Training Levy on all contracts of more than Shs. 50,000/- in value and his tender must include for all costs arising or resulting therefrom. Proof of payment of this Training Levy will be required.</p> <p>B. <u>PROTECTION OF WORKS AND PERSONS</u></p> <p>The Contractor shall allow for the protection of the whole of the existing temporary and permanent works as well as of his own and his Sub-Contractor's work liable to damage, including provision of temporary roofs, gutters, drains, etc., if necessary and shall case-up, cover, or in other suitable ways protect all finished work liable to injury, to the satisfaction of the Architect until completion of the Contract.</p> <p>From the beginning to the completion of the works, the same shall be under the entire care and control of the Contractor, who shall take all possible precautions to prevent any nuisance, inconvenience or injury to the holders or occupiers of surrounding properties and to the public generally, and shall at all times keep all paths and roads affected by the works in a safe and clear state, and shall use proper precautions to ensure the safety of all wheeled traffic and pedestrians. The Contractor shall allow for providing all watching, lighting, barriers, covering open trenches and protection of the works, including Sub-Contract works, as may be necessary for the safety of the works and for the protection of the public and his own and Sub-Contractors' employees.</p> <p>In the event of any damage or loss occurring to the works, or to materials or to any sewers, gullies, drains, paths, or other works on the site in temporary possession of the Contractor for the purpose of this Contract, either from the weather, want of proper protection, defects, theft, insufficiency of the works, or any other cause whatsoever during the progress of the works, or for any accident or damage to property or persons by reason of the said works, the Contractor alone shall be responsible and shall without extra charge, make good all damage and pay all costs incurred.</p> <p>C. <u>STANDARDS LEVY AND STANDARDS ACTS</u></p> <p>The Contractor's attention is drawn to legal notice No. 267 of 1990 which requires payment by Contractors of an annual Standards Levy and his tender must include for all costs arising or resulting therefrom.</p> <p style="text-align: right;">Shs.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | | |

| ITEM No. | | Shs. | Cts. |
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| A. | <p><u>POLICE REGULATIONS</u></p> <p>The Contractor shall allow for complying with any relevant police regulations.</p> | | |
| B. | <p><u>WORKING HOURS</u></p> <p>The working hours shall be those generally operated by good employers in the building industry. No concrete work shall be carried out at night or on gazetted holidays unless the Architect shall so direct. All other works shall be executed at the discretion of the Contractor.</p> | | |
| C. | <p><u>PROCEDURE, TIME FOR COMPLETION</u></p> <p>the Contractor shall proceed with the works in such manner and such order as the Architect may direct.</p> | | |
| D. | <p><u>CONTRACT SUM</u></p> <p>This is a fixed price contract. The Contractor should therefore allow in his rates for any anticipated price increase in the cost labour, material, plant, fuel etc. Until completion of the works. No claim of increase in costs will be entertained except on changes arising from duties, taxes, levies etc.</p> | | |
| E. | <p><u>PROGRAMME AND PROGRESS</u></p> <p>The Contractor shall furnish to the Architect, within 14 days, for approval and display in the site offices, a programme and progress chart devised in such a way that the previously agreed contractually enforceable lined programme is shown and progress can be marked up as the work proceeds. The Contractor shall keep this chart up to date at all times.</p> <p>If required by the Architect this chart shall be generated and up-dated by an approved computer program.</p> <p>Approval by the Architect of the programme shall not relieve the Contractor of any of his obligations under the Contract.</p> <p>The Contractor shall not without the Architects consent make any material alteration to the approved programme.</p> <p>If the Architect decides that progress does not match the programme, he may order the Contractor to revise the programme. The Contractor shall thereafter revise the programme to show the modifications necessary to ensure completion of the works by the Date of Practical Completion.</p> | | |
| 1165 | <p><u>PRELIMINARIES</u></p> <p style="text-align: right;">Shs.</p> | | |

| ITEM No. | | Shs. | Cts. |
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| 1165 | <p>The Architect shall notify the Contractor if the Architect decides that the rate of progress of the works, or any section is too slow to meet the Date for Practical Completion and that this is not due to a circumstance for which the Contractor is entitled to an extension of time under the Contract.</p> <p>Following receipt of such a notice the Contractor shall take such steps as may be necessary, and as the Architect may approve, to remedy or mitigate the likely delay, including revision of the programme. The Contractor shall not be entitled to any additional payment for taking such steps.</p> <p>A. <u>BLASTING OPERATIONS</u></p> <p>Blasting will not be allowed.</p> <p>B. <u>DAYWORKS</u></p> <p>The Architect may, if in his opinion it is necessary or desirable, order in writing that any additional or substituted work shall be executed on a Daywork basis. The Contractor shall then be paid for such work in accordance with Daywork rates and percentage additions as inserted hereafter in these Bills of Quantities.</p> <p>The Contractor shall furnish to the Architect all receipts or vouchers as may be necessary to prove the amounts paid and before ordering materials shall submit to the Architect quotations for the same for his approval.</p> <p>In respect of all work executed on a Daywork basis the Contractor shall, during the continuance of such work, deliver each day to the Architect a list in duplicate of the names, occupation and time of all workmen employed on such work and a statement also in duplicate showing the description and quantity of all materials and plant used thereon or therefor (other than plant which is included in the percentage addition on net amount of wages). One copy of each list and statement will, if correct or when agreed, be signed by the Architect and returned to the Contractor.</p> <p>At the end of each month the Contractor shall deliver to the Architect a priced statement of the labour, material and plant (except as aforesaid) used and the Contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually rendered. Provided always that, if the Architect shall consider that for any reason the sending of such list or statement by the Contractor in accordance with the foregoing provision was impracticable, he shall nevertheless be entitled to authorize payment for such work either as Daywork (on being satisfied as to the time employed and plant and materials used on such work) or at such value thereof as he shall consider fair and reasonable.</p> <p style="text-align: right;">Shs.</p> | | |
| <u>PRELIMINARIES</u> | | | |

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| A. | <p><u>WATER FOR THE WORKS</u></p> <p>The Contractor shall allow for providing all temporary water supplies required for the works, including Sub-Contract works, together with all necessary storage tanks, meters and distribution systems for the same and must allow for bearing all expenses incurred and paying for all water consumed without charge to any Sub-Contractor. Expenses in connection with Nominated Sub-Contractors should be allowed for in the attendance items under the relevant P.C. Sums.</p> | | |
| B. | <p><u>LIGHTING AND POWER FOR THE WORKS</u></p> <p>The Contractor shall allow for providing all temporary lighting and power supplies required for the works, including Sub-Contract works, together with all necessary meters and distribution systems for the same and must allow for bearing all expenses incurred and paying for all current consumed without charge to any Sub-Contractor. Expenses in connection with Nominated Sub-Contractors should be allowed for in the attendance items under the relevant P.C. Sums.</p> | | |
| C. | <p><u>TELEPHONE</u></p> <p>The Contractor shall arrange to provide telephone and Email contacts which shall be accessible at all times. The Contractor shall pay all charges for hire or purchase of equipment, licences, connection, rental and calls made through these lines.</p> | | |
| D. | <p><u>CROSSINGS AND TEMPORARY ROADS</u></p> <p>The Contractor must allow for providing, forming and maintaining necessary crossings on to the site and temporary roads as may be required by the Architect and removing the same at completion and making good damaged or disturbed surfaces as directed by and to the approval of the Architect.</p> | | |
| E. | <p><u>SITE OFFICES</u></p> <p>a) The Contractor may allow for erecting and maintaining on the site in such positions as may be directed, adequate site offices for the use of his own site staff and removing same at completion and making good all surfaces disturbed. The site office shall be of adequate size and shall have sufficient furniture to permit the Architect to hold site meetings in it.</p> <p>b) The Contractor shall also allow for providing erecting and maintaining, on the site where directed, an adequate office of approved construction and finishes and with sufficient furniture for the sole use of the Clerk of Works appointed by the Architect with sufficient space to accommodate 25 persons during site meetings.</p> | | |
| 1165 | <p><u>PRELIMINARIES</u></p> <p style="text-align: right;">Shs.</p> | | |

| ITEM No. | | Shs. | Cts. |
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| | <p>c) The Contractor shall also allow for providing, erecting and maintaining where directed a lock-up hut containing a pedestal type water closet and wash basin for the sole use of the Architect, other consultants and Clerk of Works including making temporary connections to drains and water supplies and paying all charges for connections, conservancy and water consumed.</p> <p>d) The Contractor shall also allow for providing the services of a cleaner for keeping both offices and closet in a clean and sanitary condition from the commencement to completion of the works; and for dismantling at completion and making good all disturbed surfaces. The offices and closet shall be completed before the Contractor will be permitted to commence the works.</p> <p>A. <u>SHEDS FOR STORAGE OF MATERIALS</u></p> <p>The Contractor shall provide, erect and maintain on the site, in such positions as may be directed, ample temporary watertight, lock-up sheds for the proper storage and protection of cement and other materials liable to damage and shall remove same at completion and make good all surfaces disturbed. He shall also provide space for storage accommodation which Sub-Contractors may wish to erect for themselves.</p> <p>B. <u>SANITATION OF THE WORKS</u></p> <p>The Contractor shall allow for providing the necessary latrines for the labour employed on the works, including labour employed by Sub-Contractors, to the satisfaction of the Health and Medical Authorities and for maintaining the same in a thoroughly clean and sanitary condition and paying all conservancy fees.</p> <p>The Contractor shall allow for removing the said latrines and leaving the ground clean and free from pollution upon completion to the satisfaction of the Health and Medical Authorities.</p> <p>C. <u>NO WORKMEN TO BE HOUSED ON SITE</u></p> <p>No labour with the exception of a watchman may be housed on the site. The cost of transporting labour to and from the site or elsewhere will be deemed to be included in the tender.</p> <p>D. <u>WORK TO BE OPENED UP AT THE REQUEST OF THE ARCHITECT</u></p> <p>The Contractor shall, at the request of the Architect within such time as the Architect shall name, open for inspection any work covered up, and, should the Contractor refuse or neglect to comply with such request, the Architect may employ workmen other than those employed by the Contractor to open up the same.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | Shs. | |

| ITEM No. | | Shs. | Cts. |
|----------|--|------|------|
| | <p>If the said work has been covered up in contravention of the Architect's instructions, or if, on being opened up, it be found not in accordance with the drawings or Bills of Quantities or the instructions of the Architect, the expenses of opening and covering it up again whether done by the Contractor or by the Architect, shall be borne by and be recoverable from the Contractor or may be deducted from any monies due to the Contractor. If the work has not been covered up in contravention of such instructions and be found in accordance with the said drawings and Bills of Quantities, then the expenses aforesaid shall be borne by the Employer, and be added to the Contract Sum; provided always that, in the case of foundations or of any other urgent work so opened up and requiring immediate attention, the Architect shall, within a reasonable time after the work has been opened, make or cause to be made the inspection thereof, and at the expiration of such time, if such inspection shall not have been made the Contractor may cover up the same and shall not be required to open it up again for inspection except at the expense of the Employer.</p> <p>A. <u>HOARDING</u></p> <p>The Contractor shall allow for providing and clearing away on completion such hoarding, fencing, gates etc. as may be required for the security of the site, and as instructed by the Architect to prevent access to the site by the public. The exact location and type of these items are to be agreed with the Architect and negotiated with the local Authority by the Contractor who will also be responsible for paying any fees or taxes to the Local Authority in respect of the hoarding, fencing or gates and providing any drawings necessary for approval.</p> <p>The Contractor shall allow for thoroughly maintaining the hoarding and gates throughout the Contract and clearing away and making good disturbed ground on completion. All materials arising will remain the property of the Contractor and he should allow credit against this accordingly.</p> <p>B. <u>SCAFFOLDING</u></p> <p>The Contractor shall allow for providing, erecting and dismantling all general scaffolding required for the works. The Contractor must allow here or in his rates for providing all special scaffolding required by his Sub-Contractors, other than Nominated Sub-Contractors carrying out works for which P.C. Sums are included in these Bills. Where the Contractor is required to provide special scaffolding for these latter Sub-Contractors, an item is included for pricing under the relevant P.C. Sum.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | Shs. | |

| ITEM No. | | Shs. | Cts. |
|----------|---|------|------|
| A. | <p><u>HOISTING</u></p> <p>The Contractor shall allow for all costs related to hoisting materials for fixing at any level within the limits shown on the drawings or included in the general description of the works.</p> | | |
| B. | <p><u>TRADE NAMES</u></p> <p>Where trade names or manufacturers' catalogue numbers are mentioned in these Bills of Quantities, the reference is intended as a guide to the type of article or quality of materials required. The Contractor may use any article or material equal in type or quality to those herein described subject to the prior approval of the Architect and at his absolute discretion. The onus of proof as to equivalent quality will rest with the Contractor, whose tender will be deemed to include for the makes described herein.</p> | | |
| C. | <p><u>SIGNBOARD</u></p> <p>The Contractor must allow for providing, erecting and maintaining a site signboard, the size, type of construction and lettering of which shall be to the Architect's design. The names of the Consultants are to be in lettering 50mm high. The board is to be fixed in an elevated position on the site where indicated by the Architect. On completion of the works, the notice board shall be removed and making good shall be carried out as necessary.</p> | | |
| D. | <p><u>REMOVAL OF PLANT, RUBBISH ETC.</u></p> <p>The Contractor must allow for removing and clearing away all plant, rubbish and unused materials, and leaving the whole of the site of the works in a clean and tidy state at completion to the satisfaction of the Architect. He must also allow for removing all rubbish and dirt from the site as it accumulates during the performance of the Contract.</p> | | |
| E. | <p><u>DEDUCTION FROM MONEY DUE TO THE CONTRACTOR</u></p> <p>The Architect shall be entitled to deduct any monies which the Contractor shall be liable to pay under the Contract to the Employer from any sum which may become payable to the Contractor hereunder and the Architect in issuing his Certificates as provided in Clause 34 of the Schedule of Conditions shall have regard to any sum so chargeable to the Contractor. Provided always that this provision shall not affect any other remedy by action at law or otherwise to which the Employer may be entitled for the recovery of such monies.</p> | | |
| 1165 | <p><u>PRELIMINARIES</u></p> <p style="text-align: right;">Shs.</p> | | |

| ITEM No. | | Shs. | Cts. |
|----------|--|------|------|
| A. | <p><u>WORKS TO BE DELIVERED UP CLEAN</u></p> <p>On completion of the Contract, the site and the works shall be cleared of all plant, scaffolding, rubbish and unused materials and shall be delivered up clean and in perfect condition in every respect to the satisfaction of the Architect. Particular attention is to be paid to leaving all windows and floors clean and removing all paint and cement stains.</p> | | |
| B. | <p><u>APPROVED SUB-CONTRACTORS</u></p> <p>Where in these Bills of Quantities work is described to be executed by an approved Sub-Contractor the firms appointed will be treated as Sub-Contractors employed by the Contractor and not as Nominated Sub-Contractors. The unit prices for such work must, therefore, include not only the Sub-Contractor's charges but also the Contractors' overheads, profits and attendance. Such firms where not prequalified shall be classified on the Ministry of Works lists as suitable to undertake class 'A' works.</p> | | |
| C. | <p><u>APPROVAL OF ARCHITECT FOR EMPLOYMENT OF SUB-CONTRACTORS</u></p> <p>The Contractor will be required to obtain the approval of the Architect/Engineer in writing before Employing any of his own (i.e. not nominated) Sub-Contractors for any portion of the work.</p> | | |
| D. | <p><u>EXISTING PROPERTY</u></p> <p>The Contractor shall take every precaution to avoid damage to all existing property including buildings on and adjacent to the site, roads, cables, drains and other services and he will be held responsible for all damage arising from the execution of this Contract to the aforementioned and he shall make good all such damage where directed at his own expense to the satisfaction of the Architect.</p> | | |
| E. | <p><u>DISPOSAL OF WATER</u></p> <p>Allow for keeping the works free from all water, including spring and running water, by pumping or other means as required.</p> | | |
| F. | <p><u>MAINTAINING SIDES OF EXCAVATIONS</u></p> <p>Allow for maintaining the sides of all excavations by planking and strutting or other means as required. Additional works caused by the collapse of excavations through inadequate planking and strutting (e.g. re-routing of adjacent drain runs) will be at the Contractor's expense.</p> | | |
| | Shs. | | |
| 1165 | <u>PRELIMINARIES</u> | | |

| ITEM No. | | Shs. | Cts. | | | | | | | | | | | | | | |
|---|---|------|-------------|-------------------------|--------|---------------------|--------|--------------------------|--------|--|--------|--|--------|---|--------|--|--|
| A. | <p><u>WHITE ANTS</u></p> <p>Allow for destroying any white ants' nests found in the vicinity of the buildings, destroying Queen Ants, depositing cyanide lumps in holes and tunnels and filling with hardcore and murrum well rammed and sealed.</p> | | | | | | | | | | | | | | | | |
| B. | <p><u>SITE PHOTOGRAPHS</u></p> <p>The contractor shall take and hand over to the Architect at approved intervals site progress photographs in a format to be directed by the Architect.</p> | | | | | | | | | | | | | | | | |
| C. | <p><u>TESTING</u></p> <p>Allow for all expenses in connection with the testing of materials as specified hereunder including the supply and preparation of materials to be tested, the cost of materials and their packing and conveyance to the nearest approved Testing Laboratory, laboratory charges, etc. The following items of tests will be measured according to the number of tests actually called for by the Architect but unsuccessful tests will not be included in the remeasurement.</p> <p><u>Allow for executing the following tests as detailed in the Appendices to these Bills of Quantities (PROVISIONAL)</u></p> <table> <thead> <tr> <th></th> <th style="text-align: right;"><u>Rate</u></th> </tr> </thead> <tbody> <tr> <td>Water Test (4.5 litres)</td> <td style="text-align: right;">No. 15</td> </tr> <tr> <td>Sand Test (0.028m3)</td> <td style="text-align: right;">No. 15</td> </tr> <tr> <td>Aggregate Test (0.028m3)</td> <td style="text-align: right;">No. 15</td> </tr> <tr> <td>Reinforcement test (1m of mild steel rod or high tensile steel bar of various sizes)</td> <td style="text-align: right;">No. 15</td> </tr> <tr> <td>Concrete Test (One test comprising three cubes as described hereinafter)</td> <td style="text-align: right;">No. 15</td> </tr> <tr> <td>Testing of concrete or stone blocks of various strengths in accordance with British Standard Specification (one test comprising six blocks)</td> <td style="text-align: right;">No. 15</td> </tr> </tbody> </table> | | <u>Rate</u> | Water Test (4.5 litres) | No. 15 | Sand Test (0.028m3) | No. 15 | Aggregate Test (0.028m3) | No. 15 | Reinforcement test (1m of mild steel rod or high tensile steel bar of various sizes) | No. 15 | Concrete Test (One test comprising three cubes as described hereinafter) | No. 15 | Testing of concrete or stone blocks of various strengths in accordance with British Standard Specification (one test comprising six blocks) | No. 15 | | |
| | <u>Rate</u> | | | | | | | | | | | | | | | | |
| Water Test (4.5 litres) | No. 15 | | | | | | | | | | | | | | | | |
| Sand Test (0.028m3) | No. 15 | | | | | | | | | | | | | | | | |
| Aggregate Test (0.028m3) | No. 15 | | | | | | | | | | | | | | | | |
| Reinforcement test (1m of mild steel rod or high tensile steel bar of various sizes) | No. 15 | | | | | | | | | | | | | | | | |
| Concrete Test (One test comprising three cubes as described hereinafter) | No. 15 | | | | | | | | | | | | | | | | |
| Testing of concrete or stone blocks of various strengths in accordance with British Standard Specification (one test comprising six blocks) | No. 15 | | | | | | | | | | | | | | | | |
| 1165 | <u>PRELIMINARIES</u> | Shs. | | | | | | | | | | | | | | | |

| ITEM No. | | Shs. | Cts. |
|-------------|---|------|------|
| | <p>The Contractor shall allow for all other testing of materials, apart from the above, required by the Appendices of the Bills of Quantities and he shall be responsible for all expenses incurred in completing such tests including costs of materials and labour, equipment, transport and charges of testing authority, etc.</p> <p>A. <u>APPENDICES</u></p> <p>The Appendices to the Bills of Quantities shall be regarded for Contract purposes as part of the Bills and shall be read and construed with the appropriate sections of the Bills as if contained therein.</p> | | |
| 1165 | <u>PRELIMINARIES</u> | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>BILL NO. 2</u> <u>GATEWAY</u> <u>(ALL PROVISIONAL)</u> <u>ELEMENT A</u> <u>SUBSTRUCTURES</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | | Item | | |
| B. | Allow for keeping excavations free from all spring and running water | | Item | | |
| C. | Excavate oversite to remove vegetable soil average 150mm deep and cart away. | m2 | 77 | | |
| D. | Excavate oversite to reduce levels commencing at stripped site level and not exceeding 1.50m deep. | m3 | 74 | | |
| E. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 33 | | |
| F. | Do. <u>but</u> 1.50-3.00m deep | m3 | 11 | | |
| G. | Do. <u>but</u> column base | m3 | 23 | | |
| H. | Do. <u>but</u> 1.50-3.00m deep | m3 | 8 | | |
| I. | Extra over excavation for excavating in coral rock. | m3 | 74 | | |
| J. | Return, fill in and ram selected excavated material around foundations | m3 | 48 | | |
| K. | Remove surplus excavated material from site | m3 | 26 | | |
| | <u>Selected hardcore</u> | | | | |
| L. | Filling in making up levels under floors, spread, levelled, well rammed and consolidated in 150mm layers | m3 | 110 | | |
| M. | 300mm Bed spread, levelled, well rammed and consolidated and blinded with 50mm thick murrum, quarry dust or sand to receive damp proof membrane (measured separately) | m2 | 48 | | |
| N. | Approved insecticide treatment | m2 | 59 | | |
| | | | | Shs. | |
| 1165 | <u>GATEWAY</u> <u>SUBSTRUCTURES</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| A. | 1000 Gauge approved polythene sheeting laid on blinded hardcore (measured separately) as damp proof membrane with welted laps (measured net-no allowance made for laps) | m2 | 59 | | |
| | <u>Plain concrete (1:3:6)</u> | | | | |
| B. | 50mm blinding under foundations. | m2 | 23 | | |
| C. | Do. <u>but</u> column bases. | m2 | 17 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| D. | Foundations. | m3 | 6 | | |
| E. | Column bases | m3 | 5 | | |
| F. | Columns | m3 | 2 | | |
| G. | 150mm Bed laid on damp proof membrane (measured separately) in bays not exceeding 50 square metres including formwork to edge of bays. | m2 | 59 | | |
| | <u>Ribbed steel bar reinforcement to B.S 4461 and K.S. ISO 6935-2:2007</u> | | | | |
| H. | Assorted bar reinforcement sizes in foundations | Kg. | 600 | | |
| I. | Do. (column bases) | Kg. | 450 | | |
| J. | Do. (columns) | Kg. | 180 | | |
| K. | Steel wire fabric mesh reinforcement to B.S. 4483 Ref. A 142 and K.S. 02-18:1976 in concrete bed (measured net, no allowance made for minimum 225mm laps) including tying and supporting as required. | m2 | 88 | | |
| | | | | Shs. | |
| 1165 | <u>GATEWAY</u> <u>SUBSTRUCTURES</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>Sawn formwork</u> | | | | |
| A. | Sides of foundations. | m2 | 18 | | |
| B. | Sides of column bases | m2 | 14 | | |
| C. | Sides of columns | m2 | 15 | | |
| D. | Edge of bed 150-225mm high. | m | 54 | | |
| E. | No. 16 B.W.G Hoop iron fixing clamp 25mm wide x 450mm girth once bent and tucked to inner face of formwork, one end cast into concrete and the other end afterwards straightened and built into joints of walling. | No. | 132 | | |
| F. | 200mm Approved load bearing (7N/mm2) concrete block walling in cement motar (1:3). | m2 | 80 | | |
| G. | 100mm Thick smooth dressed zero jointed cut coral cladding on rendered plinths bedded and jointed on and including 15mm cement and sand (1:3) backing and including all necessary ties and finished with brush applied protective silicone sealant. | m2 | 30 | | |
| H. | Approved plaster render on plinths finished smooth with a steel trowel. | m2 | 18 | | |
| | | | | Shs. | |
| | <u>ELEMENT A</u> | | | | |
| | <u>SUBSTRUCTURES</u> | | | | |
| | <u>COLLECTION</u> | | | | |
| | Brought forward from Page No. 2/1 | | | | |
| | " " " " " 2/2 | | | | |
| | " " " " " 2/3 | | | | |
| | <u>TOTAL AMOUNT OF ELEMENT A</u> | | | | |
| | <u>CARRIED TO SUMMARY AT END OF BILL</u> | | | | |
| | <u>NO. 2</u> | | | Shs. | |
| 1165 | <u>GATEWAY</u> | | | | |
| | <u>SUBSTRUCTURES</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT B</u> | | | | |
| | <u>FRAME</u> | | | | |
| | <u>Vibrated reinforced concrete (class 25)</u> | | | | |
| A. | Columns. | m3 | 3 | | |
| B. | Beams. | m3 | 15 | | |
| C. | 75mm Projecting moulding brackets | m2 | 12 | | |
| D. | 150mm Suspended slab | m2 | 59 | | |
| E. | Extra over 200mm bed for thickening | m2 | 9 | | |
| F. | 200mm Wide x 75mm thick decorative moulding | m | 44 | | |
| G. | 100mm Wide x 75mm thick decorative moulding | m | 63 | | |
| | <u>Ribbed steel bar reinforcement to B.S 4461 and K.S. ISO 6935-2:2007</u> | | | | |
| H. | Assorted bar reinforcement sizes to columns | Kg. | 360 | | |
| I. | Do. (beams) | Kg. | 1,500 | | |
| I. | Do. (projecting moulding brackets) | Kg. | 173 | | |
| J. | Do. (Suspended slabs) | Kg. | 608 | | |
| | <u>Sawn formwork</u> | | | | |
| K. | Sides of columns. | m2 | 45 | | |
| L. | Sides and soffits of beams. | m2 | 147 | | |
| M. | Sides and soffits of projecting moulded bracket. | m2 | 24 | | |
| N. | Soffits of suspended slab | m2 | 59 | | |
| O. | Sides and soffits of decorative moulding 75 - 150mm high. | m | 95 | | |
| P. | Sides and soffits of decorative moulding 150 - 225mm high. | m | 65 | | |
| Q. | Edge of suspended slab 225 - 300 mm high | m | 54 | | |
| | <u>TOTAL AMOUNT OF ELEMENT B</u> | | | | |
| | <u>CARRIED TO SUMMARY AT END OF BILL</u> | | | | |
| | <u>NO. 2</u> | | | Shs. | |
| 1165 | <u>GATE WAY</u> | | | | |
| | <u>FRAME</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT C</u> | | | | |
| | <u>EXTERNAL WALLS</u> | | | | |
| | <u>Precast concrete (class 25) bedded, jointed and pointed in gauged mortar</u> | | | | |
| A. | 300 x 250mm Lintol reinforced with and including three 10mm ribbed steel bars hooked at ends | m | 27 | | |
| B. | 600 x 450mm Crenelations moulded to approval on precast coping (measured separately). | No. | 6 | | |
| C. | 350 x 50mm Coping twice throated and weathered and reinforced as necessary for handling. | m | 51 | | |
| D. | 150 x 150mm Decorative opening in 250mm masonry wall with and including finishing to approval. | No. | 18 | | |
| E. | 200mm Solid concrete block walling in gauged mortar | m2 | 107 | | |
| F. | No. 16 B.W.G Hoop iron fixing clamp 25mm wide x 450mm girth as before. | No. | 324 | | |
| | <u>Pluvex No. 1 or other equal and approved horizontal bitumen damp proof course to B.S. 743 (measured net - no allowance made for laps).</u> | | | | |
| G. | 200mm Wide under walling. | m | 24 | | |
| H. | 200mm Wide under coping. | m | 77 | | |
| | <u>TOTAL AMOUNT OF ELEMENT C</u> | | | | |
| | <u>CARRIED TO SUMMARY AT END OF BILL</u> | | | | |
| | <u>NO. 2</u> | | | Shs. | |
| 1165 | <u>GATEWAY</u> | | | | |
| | <u>EXTERNAL WALLS</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT D</u> | | | | |
| | <u>ROOF FINISHES AND RAINWATER DISPOSAL</u> | | | | |
| | <u>Cement and sand (1:3) beds and backings</u> | | | | |
| A. | 40mm (Average) lightweight screed laid to falls and crossfalls on concrete flat roof finished to receive waterproofing membrane (measured separately). | m2 | 48 | | |
| B. | 15mm Do. <u>but</u> on parapet wall sides. | m2 | 15 | | |
| C. | 50 x 50mm Triangular fillet. | m | 48 | | |
| | <u>Note:- A ten year guarantee against defects will be required for the following flat roof waterproofing.</u> | | | | |
| | <u>4mm A.P.P. or other equal and approved waterproofing membrane laid on concrete flat roof in accordance with the manufacturers specifications to be executed by an approved Sub-Contractor.</u> | | | | |
| D. | Finish to flat roof. | m2 | 72 | | |
| E. | Do. <u>but</u> laid vertically on parapet wall sides. | m2 | 23 | | |
| F. | Turn edge of rubber membrane into and including groove in wall and pointed in gauged mortar. | m | 72 | | |
| G. | 100mm Diameter 'Fullbora' rainwater outlet from East African Foundry or other equal and approved and fixing in concrete slab including jointing to down pipe (measured separately) | No. | 5 | | |
| H. | Precast concrete roof pergola (class 25) bedded, jointed and pointed in gauged mortar | m2 | 26 | | |
| | | | | Shs. | |
| 1165 | <u>GATEWAY ROOF</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | 200 x 200 x 20mm Mitchell Cotts (Kenya) Ltd or other equal and approved precast concrete interlocking roofing tiles bedded, jointed and pointed in cement screed on APP waterproofing membrane (measured separately). | m2 | 108 | | |
| B. | Do. <u>but</u> skirting finish. | m | 108 | | |
| C. | Extra over do. for return on 50 x 50mm triangular fillet. | m | 108 | | |
| D. | Cut and fit interlocking tiles around 100mm diameter rainwater outlet | No. | 7 | | |
| | <u>PVC rainwater pipes and fittings to B.S. 4514</u> | | | | |
| E. | 100mm Diameter down pipe fixed to masonry or concrete with and including approved brackets. | m | 27 | | |
| F. | Extra for shoe | No | 7 | | |
| G. | Extra for bend | No | 7 | | |
| | | | | Shs. | |
| | <u>ELEMENT D</u> | | | | |
| | <u>ROOF FINISHES AND RAINWATER DISPOSAL</u> | | | | |
| | <u>COLLECTION</u> | | | | |
| | Brought forward from Page No. 2/6 | | | | |
| | " " " " " 2/7 | | | | |
| | <u>TOTAL AMOUNT OF ELEMENT D CARRIED TO SUMMARY AT END OF BILL NO. 2</u> | | | Shs. | |
| 1165 | <u>GATEWAY ROOF FINISHES COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT E</u> | | | | |
| | <u>EXTERNAL WALL FINISHES</u> | | | | |
| A. | 15mm cement, lime and river sand (1:2:9) Lamu plaster on walls finished smooth with a wood float. | m2 | 48 | | |
| B. | Do. (columns, moulded brackets and beams surfaces) | m2 | 117 | | |
| C. | Do. (moulded concrete surfaces) | m | 160 | | |
| D. | 300mm Wide x 50mm thick Swahili decorative plaster as 'Vidaka' to approval. | m | 44 | | |
| E. | 250mm Do. | m | 114 | | |
| F. | 100 x 100mm square decorated recessed plaster to approval. | m | 45 | | |
| | <u>The following work is to be executed by an approved Sub-Contractor.</u> | | | | |
| G. | Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved Marine external quality paint on rendered walls externally. | m2 | 72 | | |
| H. | Do. (columns, moulded brackets and beams surfaces) | m2 | 176 | | |
| I. | Do. <u>but</u> surfaces not exceeding 100mm girth (moulded concrete surfaces) | m | 240 | | |
| J. | Do. <u>but</u> surfaces 200 -300mm girth (Swahili decorated plastered areas) | m | 171 | | |
| K. | 100mm Thick smooth dressed zero jointed cut-coral cladding on rendered wall bedded and jointed on and including 15mm cement and sand (1:3) backing including all necessary ties and finished with brush applied protective silicone sealant. | m2 | 59 | | |
| | <u>TOTAL AMOUNT OF ELEMENT E</u> | | | | |
| | <u>CARRIED TO SUMMARY AT END OF BILL NO. 2</u> | | | | |
| 1165 | <u>GATEWAY</u> <u>EXTERNAL WALL FINISHES</u> <u>COLLECTION</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|--|------|----------|------|-----------|
| <u>ELEMENT F</u> | | | | | |
| <u>INTERNAL WALL FINISHES</u> | | | | | |
| A. | 12mm Two coat internal lime plaster on walls finished smooth with a steel trowel. | m2 | 156 | | |
| B. | 100mm Wide x 25mm thick plain cement and sand (1:3) plaster strip to approval. | m | 114 | | |
| C. | Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved Marine quality paint on plastered walls internally to be executed by an approved Sub-Contractor. | m2 | 156 | | |
| D. | Do. <u>but</u> surfaces not exceeding 100mm girth (Gateway opening) | m | 114 | | |
| <u>TOTAL AMOUNT OF ELEMENT F</u> <u>CARRIED TO SUMMARY AT END OF BILL</u> <u>NO. 2</u> | | | | | |
| | | | | Shs. | |
| 1165 | <u>GATEWAY</u> <u>INTERNAL WALL FINISHES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT G</u> <u>FLOOR FINISHES</u> <u>Cement and sand (1:3)</u> A. 40mm Paving laid on concrete and trowelled hard and smooth and polished with and including yellow ochre additive to the entire satisfaction of the Architect. | m2 | 56 | | |
| | <u>TOTAL AMOUNT OF ELEMENT G</u> <u>CARRIED TO SUMMARY AT END OF BILL</u> NO. 2 | | | Shs. | |
| | 1165 <u>GATEWAY</u> <u>FLOOR FINISHES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT H</u> <u>CEILING FINISHES</u> | | | | |
| | A 12mm Two coat internal lime plaster (cement lime and riversand 1:2:9) on concrete soffits finished smooth with a steel trowel. <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | m2 | 50 | | |
| | B. Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved Marine quality paint on soffits of plastered suspended slab. | m2 | 50 | | |
| | <u>TOTAL AMOUNT OF ELEMENT H CARRIED TO SUMMARY AT END OF BILL NO. 2</u> | | | Shs. | |
| 1165 | <u>GATEWAY CEILING FINISHES COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT I</u> <u>BUILDER'S WORK IN CONNECTION WITH</u> <u>SPECIALIST SERVICES</u> <u>Electrical Installation</u> <u>Cut away for and make good after electrician</u> <u>installing concealed conduit system to the</u> <u>following points including cutting or leaving</u> <u>holes, notches, mortices, sinking in both the</u> <u>structure and its coverings and make good to</u> <u>them.</u> | | | | |
| | A. Lighting points and associated switch points | | | | No. |
| 1165 | <u>GATEWAY</u> <u>B.W.I.C.</u> <u>COLLECTION</u> | | | | |
| | <u>TOTAL AMOUNT OF ELEMENT I</u> <u>CARRIED TO SUMMARY AT END OF BILL</u> <u>NO. 2</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT J</u> | | | | |
| | <u>PAVED AREAS</u> | | | | |
| A. | Excavate over site to reduce levels commencing at existing ground level and not exceeding 1.50m deep. | m3 | 153 | | |
| B. | Extra over excavation for excavating in coral rock. | m3 | 15 | | |
| C. | Remove surplus excavated material from site. | m3 | 153 | | |
| D. | 300mm Bed of hand packed and compacted stone base well rammed and consolidated in 150mm layers. | m2 | 511 | | |
| E. | Telvar 'W' or other equal and approved weed killer under paving. | m2 | 511 | | |
| F. | 50mm (Average) sand bed blinding spread and well compacted to falls and crossfalls and cambers and finished to receive stone paving (measured separately). | m2 | 511 | | |
| G. | 60mm Thick medium duty 'Bamburi'/Blox or other equal and approved precast concrete cobble paver blocks in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | 113 | | |
| H. | Do. <u>but</u> in colour charcoal topping. | m2 | 142 | | |
| I. | 60mm Thick medium duty 'Bamburi'/Blox' or other equal and approved precast concrete quad paver blocks in colour red topping in approved pattern laid on sand bed (measured separately) to falls, crossfalls and cambers including necessary compaction. | m2 | 256 | | |
| | | | | Shs. | |
| 1165 | <u>GATEWAY</u> <u>PAVED AREAS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|---|--|------|----------|------|-----------|
| A. | 125 x 250mm Precast concrete (Class 20) kerb with one chamfered edge finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) on and including 325 x 100mm plain concrete (1:3:6) foundation haunched up on one side including all necessary excavation, formwork and soil disposal. | m | 101 | | |
| B. | 125 x 100mm Precast concrete (Class 20) channel finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) on and including 375 x 100mm plain concrete (1:3:6) foundation haunched up on one side including all necessary excavation, formwork and soil disposal. | m | 101 | | |
| Shs. | | | | | |
| <u>ELEMENT H</u> <u>PAVED AREAS</u> <u>COLLECTION</u> Brought forward from Page No. 2/13 " " " " " 2/14 | | | | | |
| <u>TOTAL AMOUNT FOR ELEMENT J</u> <u>CARRIED TO SUMMARY AT END OF BILL</u> <u>NO 2</u> | | | | | |
| Shs. | | | | | |
| 1165 | <u>GATEWAY</u> <u>PAVED AREAS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | | Shs. | Cts. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|-----------------|---------------|-----------------|----|---------------|-----|---|-------|-----|---|-----------------------------|-----|---|--------------------------------------|-----|----|------------------------|-----|----|------------------------|-----|----|----------------|------|----|------------------|------|----|---|------|----|-------------|------|--|--|
| | <u>BILL NO. 2</u> <u>GATEWAY</u> <u>(ALL PROVISIONAL)</u> <u>SUMMARY</u> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;"><u>Element</u></th> <th style="text-align: left;"><u>Title.</u></th> <th style="text-align: right;"><u>Page No.</u></th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Substructures</td> <td style="text-align: right;">2/3</td> </tr> <tr> <td>B</td> <td>Frame</td> <td style="text-align: right;">2/4</td> </tr> <tr> <td>C</td> <td>External and Internal Walls</td> <td style="text-align: right;">2/5</td> </tr> <tr> <td>D</td> <td>Roof Finishes and Rainwater Disposal</td> <td style="text-align: right;">2/7</td> </tr> <tr> <td>E.</td> <td>External Wall Finishes</td> <td style="text-align: right;">2/8</td> </tr> <tr> <td>F.</td> <td>Internal Wall Finishes</td> <td style="text-align: right;">2/9</td> </tr> <tr> <td>G.</td> <td>Floor Finishes</td> <td style="text-align: right;">2/10</td> </tr> <tr> <td>H.</td> <td>Ceiling Finishes</td> <td style="text-align: right;">2/11</td> </tr> <tr> <td>I.</td> <td>Builder Work in Connection with Specialist Services</td> <td style="text-align: right;">2/12</td> </tr> <tr> <td>J.</td> <td>Paved Areas</td> <td style="text-align: right;">2/14</td> </tr> </tbody> </table> | <u>Element</u> | <u>Title.</u> | <u>Page No.</u> | A. | Substructures | 2/3 | B | Frame | 2/4 | C | External and Internal Walls | 2/5 | D | Roof Finishes and Rainwater Disposal | 2/7 | E. | External Wall Finishes | 2/8 | F. | Internal Wall Finishes | 2/9 | G. | Floor Finishes | 2/10 | H. | Ceiling Finishes | 2/11 | I. | Builder Work in Connection with Specialist Services | 2/12 | J. | Paved Areas | 2/14 | | |
| <u>Element</u> | <u>Title.</u> | <u>Page No.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Substructures | 2/3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Frame | 2/4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | External and Internal Walls | 2/5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | Roof Finishes and Rainwater Disposal | 2/7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E. | External Wall Finishes | 2/8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F. | Internal Wall Finishes | 2/9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G. | Floor Finishes | 2/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H. | Ceiling Finishes | 2/11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I. | Builder Work in Connection with Specialist Services | 2/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J. | Paved Areas | 2/14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <u>TOTAL AMOUNT OF BILL NO. 2 CARRIED TO FINAL SUMMARY.</u> | SHS. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1165 | <u>BILL NO. 2</u> <u>SUMMARY</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>BILL NO. 3</u> | | | | |
| | <u>3NO. NEW ABLUTION BLOCKS</u> <u>(ALL PROVISIONAL)</u> | | | | |
| | <u>Note: Quantities are measured for one abluion block only.</u> | | | | |
| | <u>ELEMENT A</u> | | | | |
| | <u>SUBSTRUCTURES</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | | Item | | |
| B. | Allow for keeping excavations free from all spring and running water. | | Item | | |
| C. | Excavate over site to remove vegetable soil average 150mm deep and cart away. | m2 | 96 | | |
| D. | Excavate oversite to reduce levels commencing at stripped site level and not exceeding 1.50m deep. | m3 | 48 | | |
| E. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 53 | | |
| F. | Extra over excavation for excavating in coral rock. | m3 | 101 | | |
| G. | Return fill and ram selected excavated material around foundations. | m3 | 25 | | |
| H. | Remove surplus excavated material from site | m3 | 29 | | |
| | <u>Selected hardcore</u> | | | | |
| I. | Filling in making up levels under floors, spread, levelled, well rammed and consolidated in 150mm layers | m3 | 77 | | |
| J. | 300mm Bed spread, levelled, well rammed and consolidated and blinded with 50mm thick murrum, quarry dust or sand to receive damp proof membrane (measured separately) | m2 | 85 | | |
| K. | Approved insecticide treatment. | m2 | 85 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>SUBSTRUCTURES</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | 1000 Gauge 'Diothene' or other equal and approved polythene sheeting as damp proof membrane laid on blinded hardcore (measured separately) with welted laps (measured net-no allowance made for laps). | m2 | 85 | | |
| | <u>Plain Concrete (Class 15)</u> | | | | |
| B. | 50mm Blinding under foundations. | m2 | 42 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| C. | Foundations | m3 | 8 | | |
| D. | Columns | m3 | 1 | | |
| E. | 150mm Bed laid on damp proof membrane (measured separately) in bays not exceeding 50 square metre including formwork to edge of bays. | m2 | 85 | | |
| F. | Extra over 150mm bed for thickening to a total of 200mm thick x 450mm average wider under 100mm walling including hand packing hardcore to two sloping sides and all additional binding and steel fabric mesh reinforcement | m | 22 | | |
| | <u>Ribbed bar steel reinforcement as before.</u> | | | | |
| G. | Assorted bar reinforcement bars in foundations. | Kg. | 422 | | |
| H. | Do. (columns) | Kg. | 100 | | |
| I. | Steel wire fabric mesh reinforcement to B.S. 4483 Ref: A 193 and K.S. 02 - 18: 1976 in concrete bed (measured net, no allowance made for minimum 225mm laps) including tying and supporting as required. | m2 | 85 | | |
| | <u>Sawn formwork</u> | | | | |
| J. | Sides of foundations. | m2 | 28 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>SUBSTRUCTURES</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|---|--|------|----------|------|-----------|
| A. | Sides of column | m2 | 7 | | |
| B. | Edge of bed 75- 150mm high. _____ | m | 57 | | |
| C. | 200mm Approved load bearing (7N/mm2) concrete block walling in cement mortar (1:3). | m2 | 91 | | |
| D. | 100mm Thick smooth dressed zero jointed cut-coral cladding on rendered surfaces bedded and jointed on and including 15mm cement and sand (1:3) backing including all necessary ties and finished with brush applied protective silicone sealant. | m2 | 12 | | |
| Shs. | | | | | |
| <u>ELEMENT A</u> | | | | | |
| <u>SUBSTRUCTURES</u> | | | | | |
| <u>COLLECTION</u> | | | | | |
| Brought forward from Page No. 3/1 | | | | | |
| " " " " " 3/2 | | | | | |
| " " " " " 3/3 | | | | | |
| <u>TOTAL AMOUNT FOR ELEMENT A</u> <u>CARRIED TO SUMMARY AT THE END OF</u> <u>BILL NO. 3</u> | | | | | |
| Shs. | | | | | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>SUBSTRUCTURES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT B</u> | | | | |
| | <u>FRAME</u> | | | | |
| | <u>Vibrated reinforced concrete (class 25)</u> | | | | |
| A. | Beams. | m3 | 5 | | |
| B. | 150mm Suspended roof slab | m2 | 59 | | |
| | <u>Ribbed bar steel reinforcement as before</u> | | | | |
| C. | Assorted bar reinforcement sizes in beams | Kg. | 515 | | |
| D. | Do. (suspended slab). | Kg. | 622 | | |
| | <u>Sawn formwork</u> | | | | |
| E. | Sides and soffits of beams. | m2 | 62 | | |
| F. | Soffit of suspended slab. | m2 | 59 | | |
| G. | Edge of suspended slab 75-150mm high | m | 54 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT B</u> | | | | |
| | <u>CARRIED TO SUMMARY AT THE END OF</u> | | | | |
| | <u>BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> | | | | |
| | <u>FRAME</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT C</u> | | | | |
| | <u>EXTERNAL AND INTERNAL WALLS</u> | | | | |
| | <u>Precast concrete (class 25) bedded, jointed and pointed in gauged mortar.</u> | | | | |
| A. | 350 x 70mm Coping twice throated and once weathered and reinforced as necessary for handling and finished fair on all exposed surfaces. | m | 54 | | |
| B. | 200 x 200mm Lintol reinforced with and including three 100mm ribbed steel bars hooked at ends. | m | 1 | | |
| C. | Approved Swahili decorated concrete louvre panels. | m2 | 26 | | |
| | <u>Solid concrete block walling in gauged mortar</u> | | | | |
| D. | 100mm Thick internal walling, reinforced. | m2 | 31 | | |
| E. | 200mm Thick internal walling. | m2 | 12 | | |
| F. | Do. (external walling). | m2 | 81 | | |
| G. | Do. (parapet walling). | m2 | 69 | | |
| H. | <u>Pluvex No. 1 or other equal and approved horizontal bitumen damp proof course to B.S. 743 (measured net - no allowance made for laps)</u> | | | | |
| I. | 200mm Wide under walling. | m | 52 | | |
| J. | 100mm Wide under walling. | m | 16 | | |
| K. | 200mm wide under coping | m | 54 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT C CARRIED TO SUMMARY AT THE END OF BILL NO. 3</u> | | | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS EXTERNAL AND INTERNAL WALLS COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT D</u> | | | | |
| | <u>ROOFING FINISHES AND RAINWATER DISPOSAL</u> | | | | |
| | <u>Cement and sand (1:3) beds and backings</u> | | | | |
| A. | 40mm (Average) lightweight screed laid to falls and crossfalls on concrete finished to receive waterproofing membrane (measured separately). | m2 | 48 | | |
| B. | 15mm Do. <u>but</u> on parapet wall sides. | m2 | 15 | | |
| | <u>Note: A ten year guarantee against defects will be required for the following flat roof waterproofing.</u> | | | | |
| C. | 4mm A.P.P. or other equal and approved waterproofing membrane on concrete flat roof laid in accordance with the manufacturers printed specifications to be executed by an approved Sub-Contractor. | m2 | 48 | | |
| D. | Do. <u>but</u> laid vertically on concrete sides. | m2 | 15 | | |
| E. | Turn edge of A.P.P. waterproofing membrane into and including groove in concrete beam or wall and point in gauged mortar. | m | 50 | | |
| F. | Dress roofing around 100mm diameter rainwater outlet. | No. | 3 | | |
| G. | 200 x 200 x 20mm Mitchell Cotts (Kenya) Limited or other equal and approved precast concrete interlocking roofing tiles bedded, jointed and pointed in cement and sand screed on A.P.P waterproofing membrane (measured separately). | m2 | 48 | | |
| H. | Do. <u>but</u> skirting finish | m | 50 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS ROOF</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | 100mm Diameter approved 'Fulbora' rainwater outlet from East African Foundry or other equal and approved and fixing in concrete slab including jointing to down pipe (measured separately). | No. | 3 | | |
| | <u>PVC rainwater pipes and fittings to B.S 4514</u> | | | | |
| B. | 100mm diameter down pipe fixed to concrete or stone wall with and including approved brackets. | m | 9 | | |
| C. | Extra for swanneck 600mm projection. | No. | 3 | | |
| D. | Extra for bend. | No. | 3 | | |
| E. | Extra for shoe. | No. | 3 | | |
| | | | | Shs. | |
| | <u>ELEMENT D</u> | | | | |
| | <u>ROOFING FINISHES AND RAINWATER DISPOSAL</u> | | | | |
| | <u>COLLECTION</u> | | | | |
| | Brought forward from Page No. 3/6 | | | | |
| | " " " " " 3/7 | | | | |
| | <u>TOTAL AMOUNT OF ELEMENT D CARRIED TO SUMMARY AT END OF BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS ROOF COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT E</u> | | | | |
| | <u>DOORS</u> | | | | |
| | <u>Wrot mvule</u> | | | | |
| | <u>45mm (Finished) framed, tongued and grooved panel door to the approval of the Architect</u> | | | | |
| A. | Door size 900 x 2100mm (cleaner's store) | No. | 1 | | |
| B. | Door size 800 x 2100mm (washrooms) | No. | 8 | | |
| | <u>Wrot mvule framed frames and finishings</u> | | | | |
| C. | 100 x 50mm Frame with one labour. | m | 45 | | |
| D. | 45 x 20mm Architrave with three labours. | m | 45 | | |
| E. | 15 x 15mm Quadrant. | m | 45 | | |
| | <u>Supply and fix only the following HAFELE GRADE 316 catalogue ironmongery complete with all matching screws and keys to timber/metal. (Reference to this particular catalogue is given as a guide to type and quality only and equal and approved alternatives may be used).</u> | | | | |
| F. | 100mm thick butt hinges | Prs. | 13 1/2 | | |
| G. | Two lever internal lockset. | No. | 1 | | |
| H. | Pull Handle. | No. | 8 | | |
| I. | Push plate | No. | 8 | | |
| J. | Alumiumm satin anodized kick plate | No. | 16 | | |
| K. | Bathroom indicator bolt. | No. | 8 | | |
| L. | Male/female symbol. | No. | 2 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS DOORS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| A. | Aluminium coat hook | No. | 8 | | |
| B. | Floor mounted door stopper. | No. | 9 | | |
| C. | Prepare and apply one coat of aluminium wood primer on backs of wood surfaces as before. | m2 | 5 | | |
| | <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | | | | |
| D. | Prepare and apply approved stain, sanding sealer and three coats of 'Jotun Paints' or other equal and approved varnish on general surfaces of timber doors internally. | m2 | 31 | | |
| E. | Do. <u>but</u> surfaces 100 - 200mm girth internally. | m | 45 | | |
| | | | | Shs. | |
| | <u>ELEMENT E</u> | | | | |
| | <u>DOORS</u> | | | | |
| | <u>COLLECTION</u> | | | | |
| | Brought forward from page No. 3/8 | | | | |
| | " " " " " 3/9 | | | | |
| | <u>TOTAL AMOUNT OF ELEMENT E CARRIED TO SUMMARY AT END OF BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>DOORS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|---|--|------|----------|------|-----------|
| <u>ELEMENT F</u> | | | | | |
| <u>EXTERNAL WALL FINISHES</u> | | | | | |
| A. | 15mm Cement and sand (1:4) external rendering on walls finished smooth with a wood float | m2 | 77 | | |
| B. | Do. (parapet walling). | m2 | 119 | | |
| C. | Do. (beam surfaces). | m2 | 11 | | |
| <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | | | | | |
| D. | Prepare and apply one undercoat and two finishing coats of 'Jotun paints' or other equal and approved Marine quality paint on rendered walls externally. | m2 | 77 | | |
| E. | Do. (parapet walling). | m2 | 50 | | |
| F. | Do. (beam surfaces). | m2 | 11 | | |
| _____ | | | | | |
| G. | 100mm Thick smooth dressed zero jointed cut-coral cladding on rendered surfaces bedded and jointed on and including 15mm cement and sand (1:3) backing including all necessary ties and finished with brush applied protective silicone sealant. | m2 | 41 | | |
| <u>TOTAL AMOUNT FOR ELEMENT F CARRIED TO SUMMARY AT THE END OF BILL NO. 3</u> | | | | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS EXTERNAL WALL FINISHES COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT G</u> | | | | |
| | <u>INTERNAL WALL FINISHES</u> | | | | |
| A. | 12mm Two coat internal lime plaster on walls and beam surfaces finished smooth with a steel trowel. | m2 | 70 | | |
| B. | Do. <u>but</u> finished to receive ceramic wall tiles (measured separately) | m2 | 48 | | |
| C. | Do. <u>but</u> finished to receive terrazzo dado (measured separately) | m2 | 124 | | |
| D. | Approved coloured Saj ceramic wall tiles fixed to plastered walls with and including approved adhesive and jointed and flush pointed with grout to match tile (wet areas). | m2 | 48 | | |
| | <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | | | | |
| E. | Polished terrazzo dado on plastered walls. | m2 | 124 | | |
| F. | Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved marine quality paint on plastered walls internally. | m2 | 70 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT G CARRIED TO SUMMARY AT THE END OF BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>INTERNAL WALL FINISHES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|---|------|----------|------|-----------|
| <u>ELEMENT H</u> | | | | | |
| <u>FLOOR FINISHES</u> | | | | | |
| <u>Polished Terrazzo to be executed by an approved Sub-Contractor.</u> | | | | | |
| A. | 40mm Paving laid on concrete. | m2 | 47 | | |
| B. | 100 x 25 Coved and rounded skirting. _____ | m | 57 | | |
| C. | Approved plastic dividing strips cut to lengths and set in terrazzo paving to form margins and patterns to details. | m | 118 | | |
| <u>TOTAL AMOUNT OF ELEMENT H CARRIED TO SUMMARY AT END OF BILL NO. 3</u> | | | | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>FLOOR FINISHES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT I</u> <u>CEILING FINISHES</u> | | | | |
| A | 12mm two coat internal lime plaster on concrete soffits finished smooth with a steel trowel. <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | m2 | 47 | | |
| B. | Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved marine quality paint on plastered soffits internally. | m2 | 47 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT I</u> <u>CARRIED TO SUMMARY AT THE END OF</u> <u>BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>CEILING FINISHES</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT J</u> <u>JOINERY FITTINGS</u> | | | | |
| | <u>Joinery Fittings</u> <u>The following in 2 No. Concrete Troughs</u> <u>Vibrated reinforced concrete (class 25)</u> | | | | |
| A. | 75mm Suspended slab. | m2 | 5 | | |
| B. | 75 x 50mm Upstand | m | 8 | | |
| C. | Steel wire fabric mesh reinforcement Ref:A 142 in suspended concrete trough otherwise as before. | m2 | 5 | | |
| | <u>Sawn formwork</u> | | | | |
| D. | Soffit of suspended concrete slab. | m2 | 5 | | |
| E. | Edge of suspended concrete slab not exceeding 75mm high | m | 11 | | |
| F. | Do. Edges of upstand. | m | 1 | | |
| G. | 75mm Chase in stone wall for building in end of 75mm concrete slab. | m | 13 | | |
| | <u>Polished Terrazzo to be executed by an approved Sub-Contractor.</u> | | | | |
| H. | 20mm paving on concrete worktop | m2 | 5 | | |
| I. | 75mm high finish to edges of worktop | m | 11 | | |
| J. | Do. (concrete fascia). | m | 8 | | |
| | <u>The following in Urinal Troughs</u> <u>Vibrated reinforced concrete (class 25)</u> | | | | |
| K. | 75mm Suspended slab. | m2 | 1 | | |
| L. | 75 x 50mm Upstand | m | 2 | | |
| M. | Steel wire fabric mesh Ref: A142 in suspended trough as before. | m2 | 1 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>JOINERY FITTINGS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>Sawn formwork</u> | | | | |
| A. | Soffit of suspended concrete slab. | m2 | 1 | | |
| B. | Edge of suspended concrete slab not exceeding 75mm high | m | 3 | | |
| C. | Do. Edges of upstand. | m | 2 | | |
| D. | 75mm Chase in stone wall for building in end of 75mm concrete slab. | m | 3 | | |
| | <u>Polished Terrazzo to be executed by an approved Sub-Contractor.</u> | | | | |
| E. | 20mm paving on concrete top | m2 | 1 | | |
| F. | 75mm high finish to edges | m | 2 | | |
| G. | Do. (concrete fascia). | m | 2 | | |
| | <u>The following in Concrete bench</u> | | | | |
| H. | 100mm Suspended concrete bench | m2 | 2 | | |
| I. | Steel wire fabric mesh reinforcement Ref:A 142 in suspended concrete otherwise as before. | m2 | 2 | | |
| | <u>Sawn formwork</u> | | | | |
| J. | Soffit of suspended concrete bench. | m2 | 2 | | |
| K. | Edge of concrete bench 75-150mm high. | m | 3 | | |
| | <u>Finishes</u> | | | | |
| L. | 20mm thick screed on concrete bench finished smooth with a steel trowel. | m | 4 | | |
| | <u>Bathroom mirrors.</u> | | | | |
| M. | 6mm Grade 'A' mirror size 3500 x 900mm with bevelled edges fixed on MDF backing (measured separately) complete with and including 4No. Chrome capped screws. | No. | 2 | | |
| N. | 12mm MDF backing fixed to masonry walling to approval. | m2 | 6 | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>JOINERY FITTINGS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|-------------|---|------|----------|------|-----------|
| | <p style="text-align: center;"><u>ELEMENT J</u></p> <p style="text-align: center;"><u>JOINERY FITTINGS</u></p> <p style="text-align: center;"><u>COLLECTION</u></p> <p>Brough forward from page 3/14</p> <p style="text-align: center;">" " " " 3/15</p> <p><u>TOTAL AMOUNT FOR ELEMENT J</u> <u>CARRIED TO SUMMARY AT END OF BILL</u> <u>NO. 3</u></p> | | | | |
| | | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>JOINERY FITTINGS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>ELEMENT K</u> | | | | |
| | <u>BUILDER'S WORK IN CONNECTION WITH SPECIALIST SERVICES</u> | | | | |
| | <u>Internal plumbing, fire-fighting and drainage installations.</u> | | | | |
| A. | Hole through 150mm reinforced concrete slab for small pipe and make good. | No. | 4 | | |
| B. | Do. <u>but</u> large pipe. | No. | 2 | | |
| C. | Hole through 200mm thick masonry wall for small pipe and make good. | No. | 10 | | |
| D. | Cut horizontal or vertical chase in masonry walling for small pipe and make good. | m | 15 | | |
| E. | Hole through suspended roof slab for large pipe including forming collar around pipe. | No. | 2 | | |
| | <u>Electrical Installation</u> | | | | |
| | <u>Cut away for and make good after electrician installing concealed conduit system to the following points including cutting or leaving holes, notches, mortices, sinking in both the structure and its coverings and make good to them.</u> | | | | |
| F. | Lighting points | No. | 16 | | |
| G. | Lighting switch points. | No. | 16 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT K CARRIED TO SUMMARY AT THE END OF BILL NO.3</u> | | | | Shs. |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> | | | | |
| | <u>B.W.I.C.</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>ELEMENT L</u> | | | | |
| | <u>EXTERNAL WORKS</u> | | | | |
| | <u>PAVED AREAS</u> | | | | |
| A. | Excavate oversite to reduce levels commencing at existing ground level and not exceeding 1.50m deep. | m3 | 14 | | |
| B. | Extra over excavation for excavating in coral rock. | m3 | 2 | | |
| C. | Remove surplus excavated material from site. | m3 | 14 | | |
| D. | 300mm Bed of selected hardcore, spread, levelled, well rammed and consolidated in 150mm layers | m2 | 47 | | |
| E. | Telvar 'W' or other equal and approved weed killer under paving. | m2 | 47 | | |
| F. | 50mm (Average) sand bed spread and well compacted to falls and crossfalls and cambers and finished to receive paving slabs (measured separately) | m2 | 47 | | |
| G. | 50mm washed aggregate precast concrete (Class 25) paving slabs size 600x600 on 50mm sand bed(measured separately) bedded jointed and pointed in cement mortar(1:3) and finished fair on all exposed surfaces | m2 | 47 | | |
| | <u>TOTAL AMOUNT FOR ELEMENT L</u> <u>CARRIED TO SUMMARY AT THE END OF</u> <u>BILL NO. 3</u> | | | Shs. | |
| 1165 | <u>3NO. NEW ABLUTION BLOCKS</u> <u>EXTERNAL WORKS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | | Amount Shs. Cts. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|------------------|---------------|-----------------|----|----------------|-----|----|--------|-----|----|------------------------------|-----|----|--------------------------------------|-----|----|-------|-----|----|-------------------------|------|----|-------------------------|------|----|-----------------|------|----|-------------------|------|----|------------------|------|---|---|------|---|-------------|------|--|
| | <u>BILL NO.3</u> <u>3NO. NEW ABLUTION BLOCKS</u> <u>(ALL PROVISIONAL)</u> <u>SUMMARY</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;"><u>Element</u></th> <th style="text-align: left;"><u>Title.</u></th> <th style="text-align: left;"><u>Page No.</u></th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Substructures.</td> <td>3/3</td> </tr> <tr> <td>B.</td> <td>Frame.</td> <td>3/4</td> </tr> <tr> <td>C.</td> <td>External and Internal Walls.</td> <td>3/5</td> </tr> <tr> <td>D.</td> <td>Roof finishes and rainwater disposal</td> <td>3/7</td> </tr> <tr> <td>E.</td> <td>Doors</td> <td>3/9</td> </tr> <tr> <td>F.</td> <td>External Wall Finishes.</td> <td>3/10</td> </tr> <tr> <td>G.</td> <td>Internal Wall Finishes.</td> <td>3/11</td> </tr> <tr> <td>H.</td> <td>Floor Finishes.</td> <td>3/12</td> </tr> <tr> <td>I.</td> <td>Ceiling Finishes.</td> <td>3/13</td> </tr> <tr> <td>J.</td> <td>Joinery Fittings</td> <td>3/16</td> </tr> <tr> <td>K</td> <td>Builder's Works in Connection with Specialist Services.</td> <td>3/17</td> </tr> <tr> <td>L</td> <td>Paved areas</td> <td>3/18</td> </tr> </tbody> </table> | <u>Element</u> | <u>Title.</u> | <u>Page No.</u> | A. | Substructures. | 3/3 | B. | Frame. | 3/4 | C. | External and Internal Walls. | 3/5 | D. | Roof finishes and rainwater disposal | 3/7 | E. | Doors | 3/9 | F. | External Wall Finishes. | 3/10 | G. | Internal Wall Finishes. | 3/11 | H. | Floor Finishes. | 3/12 | I. | Ceiling Finishes. | 3/13 | J. | Joinery Fittings | 3/16 | K | Builder's Works in Connection with Specialist Services. | 3/17 | L | Paved areas | 3/18 | |
| <u>Element</u> | <u>Title.</u> | <u>Page No.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A. | Substructures. | 3/3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. | Frame. | 3/4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C. | External and Internal Walls. | 3/5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D. | Roof finishes and rainwater disposal | 3/7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E. | Doors | 3/9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F. | External Wall Finishes. | 3/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G. | Internal Wall Finishes. | 3/11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H. | Floor Finishes. | 3/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I. | Ceiling Finishes. | 3/13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J. | Joinery Fittings | 3/16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | Builder's Works in Connection with Specialist Services. | 3/17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | Paved areas | 3/18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TOTAL FOR 1NO. ABLUTION BLOCK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MULTIPLY BY 3 FOR 3NO. ABLUTION BLOCK | X 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <u>TOTAL AMOUNT OF BILL NO. 3 CARRIED TO FINAL SUMMARY.</u> | SHS. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1165 | <u>BILL NO. 3</u> <u>SUMMARY</u> | 3/19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|---|------|----------|------|------------------|
| | <u>BILL NO. 4</u> <u>ENABLING WORKS FOR KIOSKS</u> <u>(ALL PROVISIONAL)</u> <u>SECTION A</u> <u>6 NO. 40 FEET CONTAINERS</u> <u>Note: Quantities are measured for one 40ft container only.</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | Item | | | |
| B. | Allow for keeping excavations free from all spring and running water. | Item | | | |
| C. | Excavate over site to remove vegetable soil average 150mm deep and cart away. | m2 | 52 | | |
| D. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 14 | | |
| E. | Extra over excavation for excavating in coral rock. | m3 | 14 | | |
| F. | Return fill and ram selected excavated material around foundations. | m3 | 7 | | |
| G. | Remove surplus excavated material from site | m3 | 7 | | |
| | <u>Plain Concrete (Class 15)</u> | | | | |
| H. | 50mm Blinding under foundations. | m2 | 24 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| I. | Foundations | m3 | 8 | | |
| | <u>Ribbed bar steel reinforcement as before</u> | | | | |
| J. | Assorted bar reinforcement bars in foundations. | Kg. | 400 | | |
| K. | Steel wire fabric mesh reinforcement to B.S. 4483 Ref: A 193 and K.S. 02 - 18: 1976 in concrete bed (measured net, no allowance made for minimum 225mm laps) including tying and supporting as required. | m2 | 12 | | |
| | <u>Sawn formwork</u> | | | | |
| L. | Sides of foundations. | m2 | 26 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|--|--|
| | <p style="text-align: center;"><u>SECTION A</u></p> <p style="text-align: center;"><u>6 NO. 40 FEET CONTAINERS</u></p> <p style="text-align: center;"><u>COLLECTION</u></p> <p>Brought forward from Page No. 4/1</p> <p>TOTAL FOR 1NO. 40 FEET CONTAINER</p> <p>MULTIPLY BY 6 FOR 6NO. 40 FEET CONTAINERS</p> <p><u>TOTAL AMOUNT FOR SECTION A CARRIED TO SUMMARY AT THE END OF BILL NO. 4</u></p> | | | <p style="text-align: right;">Shs.</p> <p style="text-align: right;">Shs.</p> <p style="text-align: right;">Shs.</p> | <p style="text-align: center;">X 6</p> |
| 1165 | <p><u>ENABLING WORKS FOR KIOSKS</u></p> <p><u>SECTION A</u></p> <p><u>COLLECTION</u></p> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| | <u>SECTION B</u> | | | | |
| | <u>13No. 20 FEET CONTAINERS</u> | | | | |
| | <u>Note: Quantities are measured for one 20 feet container only.</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | Item | | | |
| B. | Allow for keeping excavations free from all spring and running water. | Item | | | |
| C. | Excavate over site to remove vegetable soil average 150mm deep and cart away. | m2 | 20 | | |
| D. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 3 | | |
| E. | Extra over excavation for excavating in coral rock. | m3 | 3 | | |
| F. | Return fill and ram selected excavated material around foundations. | m3 | 1 | | |
| G. | Remove surplus excavated material from site | m3 | 2 | | |
| | <u>Plain Concrete (Class 15)</u> | | | | |
| H. | 50mm Blinding under foundations. | m2 | 11 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| I. | Foundations | m3 | 4 | | |
| | <u>Ribbed bar steel reinforcement as before</u> | | | | |
| J. | Assorted bar reinforcement bars in foundations. | Kg. | 200 | | |
| | <u>Sawn formwork</u> | | | | |
| K. | Sides of foundations. | m2 | 13 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> | | | | |
| | <u>SECTION B</u> | | | | |
| | <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|-------------|--|------|----------|-------------------------------------|---------------------|
| 1165 | <p style="text-align: center;"><u>SECTION B</u></p> <p style="text-align: center;"><u>13No. 20 FEET CONTAINERS</u></p> <p style="text-align: center;"><u>COLLECTION</u></p> <p>Brought forward from Page No. 4/3</p> <p>TOTAL FOR 1NO. 20 FEET CONTAINER</p> <p>MULTIPLY BY 13 FOR 13 NO. 20 FEET CONTAINERS</p> <p><u>TOTAL AMOUNT FOR SECTION B CARRIED TO SUMMARY AT THE END OF BILL NO. 4</u></p> <p><u>ENABLING WORKS FOR KIOSKS</u></p> <p><u>SECTION B</u></p> <p><u>COLLECTION</u></p> | | | <p>Shs.</p> <p>Shs.</p> <p>Shs.</p> | <p>X 13</p> |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|---|------|----------|------|------------------|
| | <u>SECTION C</u> | | | | |
| | <u>6NO. SERVICE AREAS</u> | | | | |
| | <u>Note: Quantities are measured for one service area only.</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | Item | | | |
| B. | Allow for keeping excavations free from all spring and running water. | Item | | | |
| C. | Excavate over site to remove vegetable soil average 150mm deep and cart away. | m2 | 10 | | |
| D. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 3 | | |
| E. | Extra over excavation for excavating in coral rock. | m3 | 3 | | |
| F. | Return fill and ram selected excavated material around foundations. | m3 | 1 | | |
| G. | Remove surplus excavated material from site | m3 | 2 | | |
| | <u>Plain Concrete (Class 15)</u> | | | | |
| H. | 50mm Blinding under foundations. | m2 | 3 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| I. | Foundations | m3 | 1 | | |
| | <u>Ribbed bar steel reinforcement as before</u> | | | | |
| J. | Assorted bar reinforcement bars in foundations. | Kg. | 50 | | |
| | <u>Sawn formwork</u> | | | | |
| K. | Sides of foundations. | m2 | 3 | | |
| L. | 150mm Approved load bearing (7N/mm ²) coral block walling in cement mortar (1:3). | m2 | 12 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> | | | | |
| | <u>SECTION C</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| A. | 15mm Cement and sand (1:4) external rendering to plinth finished smooth with a wood float. | m2 | 3 | | |
| B. | Prepare and apply one undercoat and two finishing coats of bituminous paint or other equal an approved water resistant paint on rendered plinth. | m2 | 3 | | |
| | <u>Precast concrete (class 25) bedded, jointed and pointed in gauged mortar.</u> | | | | |
| C. | 350 x 70mm Coping twice throated and once weathered and reinforced as necessary for handling and finished fair on all exposed surfaces. | m | 8 | | |
| D. | Approved Swahili patterned concrete breeze blocks to approval. | m | 4 | | |
| | <u>Pluvex No. 1 or other equal and approved horizontal bitumen damp proof course to B.S. 743 (measured net - no allowance made for laps)</u> | | | | |
| E. | 150mm Wide under coping. | m | 5 | | |
| | <u>Wall Finishes</u> | | | | |
| F. | 100mm Thick smooth dressed zero jointed cut-coral cladding on rendered wall bedded and jointed on and including 15mm cement and sand (1:3) backing including all necessary ties and finished with brush applied protective silicone sealant. | m2 | 9 | | |
| G. | 12mm Two coat internal lime plaster (cement, lime and riversand 1:2:9) on walls finished smooth with a steel trowel. | m2 | 9 | | |
| | <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | | | | |
| H. | Prepare and apply one undercoat and two finishing coats of 'Jotun Paints' or other equal and approved Marine quality paint on plastered walls internally. | m2 | 9 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> <u>SECTION C</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| | <u>Paved Areas</u> | | | | |
| A. | Excavate oversite to reduce levels commencing at existing ground level and not exceeding 1.50m deep. | m3 | 4 | | |
| B. | Extra over excavation for excavating in coral rock. | m3 | 1 | | |
| C. | Remove surplus excavated material from site. | m3 | 4 | | |
| D. | 150mm Bed of selected hardcore, spread, levelled, well rammed and consolidated in 150mm layers | m2 | 12 | | |
| E. | Telvar 'W' or other equal and approved weed killer under paving. | m2 | 12 | | |
| F. | 50mm (Average) sand bed spread and well compacted to falls and crossfalls and cambers and finished to receive paving slabs (measured separately) | m2 | 12 | | |
| G. | 50mm washed aggregate precast concrete (Class 25) paving slabs size 600x600 on 50mm sand bed(measured separately) bedded jointed and pointed in cement mortar(1:3) and finished fair on all exposed surfaces | m2 | 12 | | |
| | <u>Joinery Fittings</u> | | | | |
| | <u>The following in 2 No.Concrete Troughs</u> | | | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| H. | 75mm suspended slab. | m2 | 2 | | |
| I. | 75 x 50mm upstand _____ | m | 4 | | |
| J. | Steel wire fabric mesh reinforcement Ref:A 142 in suspended concrete trough otherwise as before. | m2 | 2 | | |
| | <u>Sawn formwork</u> | | | | |
| K. | Soffit of suspended concrete slab. | m2 | 2 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> <u>SECTION C</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| A. | Edge of suspended concrete slab not exceeding 75mm high | m | 5 | | |
| B. | Do. Edges of upstand. | m | 1 | | |
| C. | 75mm Chase in stone wall for building in end of 75mm concrete slab. | m | 6 | | |
| | <u>Polished Terrazzo</u> | | | | |
| D. | 20mm paving on concrete worktop | m2 | 2 | | |
| E. | 75mm high finish to edges of worktop | m | 5 | | |
| | <u>Builder's Work in connection with specialist services</u> | | | | |
| | <u>Internal plumbing, fire-fighting and drainage installations.</u> | | | | |
| F. | Hole through 200mm thick masonry wall for small pipe and make good. | No. | 10 | | |
| G. | Cut horizontal or vertical chase in masonry walling for small pipe and make good. | m | 2 | | |
| | <u>Electrical Installation</u> | | | | |
| | <u>Cut away for and make good after electrician installing concealed conduit system to the following points including cutting or leaving holes, notches, mortices, sinking in both the structure and its coverlug and make good to them.</u> | | | | |
| H. | Lighting points | No. | 10 | | |
| I. | Lighting switch points. | No. | 10 | | |
| J. | Consumer unit point. | No. | 1 | | |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> <u>SECTION C</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|---|------|----------|------|------------------|
| | <u>SECTION C</u> <u>6NO. SERVICE AREAS</u> <u>COLLECTION</u> Brought forward from Page No. 4/5 " " " " " " 4/6 " " " " " " 4/7 " " " " " " 4/8 TOTAL FOR 1NO. SERVICE AREA MULTIPLY BY 6 FOR 6 NO. SERVICE AREAS <u>TOTAL AMOUNT FOR SECTION C CARRIED TO SUMMARY AT THE END OF BILL NO. 4</u> | | | | |
| | | | | Shs. | |
| | | | | Shs. | X 6 |
| | | | | Shs. | |
| 1165 | <u>ENABLING WORKS FOR KIOSKS</u> <u>SECTION C</u> <u>COLLECTION</u> | | | | |

| ITEM No. | | AMOUNT Shs. Cts. | | | | | | | | | | | | |
|----------------|---|---------------------|---------------|-----------------|----|-------------------------|-----|----|--------------------------|-----|----|--------------------|-----|--|
| | <p style="text-align: center;"><u>BILL NO.4</u></p> <p style="text-align: center;"><u>ENABLING WORKS FOR KIOSKS</u> <u>(ALL PROVISIONAL)</u></p> <p style="text-align: center;"><u>SUMMARY</u></p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;"><u>Section</u></th> <th style="text-align: left;"><u>Title.</u></th> <th style="text-align: left;"><u>Page No.</u></th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>6No. 40 Feet Containers</td> <td>4/2</td> </tr> <tr> <td>B.</td> <td>13No. 20 Feet Containers</td> <td>4/4</td> </tr> <tr> <td>C.</td> <td>6No. Service Areas</td> <td>4/9</td> </tr> </tbody> </table> | <u>Section</u> | <u>Title.</u> | <u>Page No.</u> | A. | 6No. 40 Feet Containers | 4/2 | B. | 13No. 20 Feet Containers | 4/4 | C. | 6No. Service Areas | 4/9 | |
| <u>Section</u> | <u>Title.</u> | <u>Page No.</u> | | | | | | | | | | | | |
| A. | 6No. 40 Feet Containers | 4/2 | | | | | | | | | | | | |
| B. | 13No. 20 Feet Containers | 4/4 | | | | | | | | | | | | |
| C. | 6No. Service Areas | 4/9 | | | | | | | | | | | | |
| | <p><u>TOTAL AMOUNT OF BILL NO. 4 CARRIED TO FINAL SUMMARY.</u></p> | SHS. | | | | | | | | | | | | |
| 1165 | <p style="text-align: center;">4/10</p> <p><u>BILL NO. 4</u> <u>SUMMARY</u></p> | | | | | | | | | | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| | <u>BILL NO. 5</u> | | | | |
| | <u>REFUSE COLLECTION AREA</u> <u>(ALL PROVISIONAL)</u> | | | | |
| | <u>Substructures</u> | | | | |
| A. | Allow for planking and strutting to sides of excavations. | Item | | | |
| B. | Allow for keeping excavations free from all spring and running water. | Item | | | |
| C. | Excavate over site to remove vegetable soil average 150mm deep and cart away. | m2 | 25 | | |
| D. | Excavate foundation trench commencing at reduced level and not exceeding 1.50m deep. | m3 | 30 | | |
| E. | Extra over excavation for excavating in coral rock. | m3 | 30 | | |
| F. | Return fill and ram selected excavated material around foundations. | m3 | 10 | | |
| G. | Remove surplus excavated material from site | m3 | 20 | | |
| | <u>Selected Hardcore</u> | | | | |
| H. | Filling in making up levels under floor, spread, levelled, well rammed and consolidated in 150mm layers. | m3 | 13 | | |
| I. | 300mm Bed of selected sub-grade material compacted in layers not exceeding 150mm thick. | m2 | 21 | | |
| J. | Approved insecticide treatment. | m2 | 21 | | |
| K. | 1000 Gauge 'Diothene' or other equal and approved polythene sheeting as damp proof membrane laid on blinded hardcore (measured separately) with welted laps (measured net-no allowance made for laps). | m2 | 25 | | |
| | | | | Shs. | |
| 1165 | <u>REFUSE COLLECTION AREA</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|--|------|----------|------|------------------|
| | <u>Plain Concrete (Class 15)</u> | | | | |
| A. | 50mm Blinding under foundations. | m2 | 12 | | |
| | <u>Vibrated reinforced concrete (Class 25)</u> | | | | |
| B. | Foundations | m3 | 3 | | |
| C. | 200mm Bed laid on damp proof membrane (measured separately) in bays not exceeding 50 square metre including formwork to edge of bays. | m2 | 25 | | |
| | <u>Ribbed bar steel reinforcement as before</u> | | | | |
| D. | Assorted bar reinforcement bars in foundations. | Kg. | 150 | | |
| E. | Steel wire fabric mesh reinforcement to B.S. 4483 Ref: A 193 and K.S. 02 - 18: 1976 in concrete bed (measured net, no allowance made for minimum 225mm laps) including tying and supporting as required. | m2 | 25 | | |
| | <u>Sawn formwork</u> | | | | |
| F. | Sides of foundations. | m2 | 10 | | |
| G. | Edge of bed 75- 150mm high. | m2 | 20 | | |
| H. | 200mm Approved load bearing (7N/mm ²) coral block walling in cement mortar (1:3). | m2 | 25 | | |
| I. | 15mm Cement and sand (1:4) external rendering to plinth finished smooth with a wood float. | m2 | 8 | | |
| J. | Prepare and apply one undercoat and two finishing coats of bituminous paint or other equal an approved water resistant paint on rendered plinth. | m2 | 8 | | |
| | | | | Shs. | |
| 1165 | <u>REFUSE COLLECTION AREA</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|---|------|----------|------|------------------|
| | <u>External Walls</u> | | | | |
| | <u>Precast concrete (class 25) bedded, jointed and pointed in gauged mortar.</u> | | | | |
| A. | 350 x 70mm Coping twice throated and once weathered and reinforced as necessary for handling and finished fair on all exposed surfaces. | m | 20 | | |
| | <u>Approved Coral stone walling</u> | | | | |
| B. | 200mm Walling with hoop iron reinforcement where required by the Engineer. | m2 | 42 | | |
| | <u>Pluvex No. 1 or other equal and approved horizontal bitumen damp proof course to B.S. 743 (measured net - no allowance made for laps)</u> | | | | |
| C. | 200mm Wide under coping. | m | 20 | | |
| D. | 200mm Wide under coping. | m | 20 | | |
| | <u>Hot-dipped galvanized mild steel gate</u> | | | | |
| E. | 3500 x 2100mm Double leaf gate comprising of 25 x 25 x 3mm square hollow section top, bottom and stiles and hinged on and including 50 x 50 x 4mm thick angle line frame complete with all necessary hinges, catches, bolts etc including oiling, easing and adjusting. | No. | 1 | | |
| | <u>The whole of the following work is to be executed by an approved Sub-Contractor.</u> | | | | |
| F. | Prepare, touch up primer and paint undercoat and two finishing coats of 'Crown Paints Solo' or other equal and approved oil paint on general surfaces or mild steel doors (both side measured flat overall) | m2 | 15 | | |
| | | | | Shs. | |
| 1165 | <u>REFUSE COLLECTION AREA</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|----------|---|------|----------|------|------------------|
| | <u>External Wall Finishes</u> | | | | |
| A. | Extra over hand chisel dressed stone walling for smooth face and pointing with flush neat horizontal joints formed with a steel rod as the work proceeds. | m2 | 42 | | |
| | <u>Internal Wall Finishes</u> | | | | |
| B. | 12mm Two coat internal lime plaster (cement, lime and riversand 1:2:9) on walls finished smooth to receive tiles (measured separately) | m2 | 29 | | |
| C. | 12mm Approved industrial quality porcelain wall tiles fixed to plastered walls with and including approved adhesive and jointed and flush pointed with grout to match tile. | m2 | 29 | | |
| | <u>Floor Finishes</u> | | | | |
| D. | 42mm Cement and Sand (1:3) bed and backing finished to receive industrial quality tiles (measured separately). | m2 | 22 | | |
| E. | 200mm Approved non-slip industrial quality porcelain wall tiles fixed to plastered floor with and including approved adhesive and jointed and flush pointed with grout to match tile. | m2 | 22 | | |
| | <u>Paved Areas</u> | | | | |
| F. | Excavate oversite to reduce levels commencing at existing ground level and not exceeding 1.50m deep. | m3 | 7 | | |
| G. | Extra over excavation for excavating in coral rock. | m3 | 1 | | |
| H. | Remove surplus excavated material from site. | m3 | 7 | | |
| | | | | Shs. | |
| 1165 | <u>REFUSE COLLECTION AREA</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | AMOUNT Shs./Cts. |
|---|--|------|----------|------|------------------|
| A. | 150mm Bed of selected hardcore, spread, levelled, well rammed and consolidated in 150mm layers | m2 | 24 | | |
| B. | Telvar 'W' or other equal and approved weed killer under paving. | m2 | 24 | | |
| C. | 50mm (Average) sand bed spread and well compacted to falls and crossfalls and cambers and finished to receive paving slabs (measured separately) | m2 | 24 | | |
| D. | 50mm washed aggregate precast concrete (Class 25) paving slabs size 600x600 on 50mm sand bed(measured separately) bedded jointed and pointed in cement mortar(1:3) and finished fair on all exposed surfaces | m2 | 24 | | |
| Shs. | | | | | |
| <u>BILL NO. 5</u> | | | | | |
| <u>REFUSE COLLECTION AREA</u> | | | | | |
| <u>COLLECTION</u> | | | | | |
| Brought forward from Page No. 5/1 | | | | | |
| " " " " " " 5/2 | | | | | |
| " " " " " " 5/3 | | | | | |
| " " " " " " 5/4 | | | | | |
| " " " " " " 5/5 | | | | | |
| Shs. | | | | | |
| <u>TOTAL AMOUNT FOR BILL NO. 5 CARRIED TO FINAL SUMMARY</u> | | | | | |
| Shs. | | | | | |
| 1165 | <u>REFUSE COLLECTION AREA</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>BILL NO. 6</u> <u>(ALL PROVISIONAL)</u> <u>HARD LANDSCAPE AREAS</u> <u>SECTION A</u> <u>MATATU INTERCHANGE PARKING AND</u> <u>DRIVEWAY</u> | | | | |
| A. | Excavate oversite to reduce level commencing at existing ground level not exceeding 1.50m deep. | m3 | 2,100 | | |
| B. | Extra over excavation for excavating in Coral | m3 | 240 | | |
| C. | Remove surplus excavated material from site. | m3 | 2,100 | | |
| D. | Approved murrum in making up levels, spread, levelled, watered and well rammed and consolidated in 150mm layers. | m3 | 1,200 | | |
| E. | Grade bottoms of excavations or surfaces of filling to falls and crossfalls including rolling and compacting to 95% MDD compaction. | m2 | 6,000 | | |
| F. | Tevlar 'W' or other equal and approved weed killer under driveways and parking. | m2 | 6,000 | | |
| G. | 300mm Bed of selected sub-grade material compacted in layers not exceeding 150mm thick to 95% MDD. | m2 | 6,000 | | |
| H. | 200mm Bed of approved gravel sub-base (minimum 30% CBR) or graded crushed stones. | m2 | 6,000 | | |
| I. | 50mm Bed of approved sand/stone dust blinding finished to receive paving (measured separately). | m2 | 6,000 | | |
| J. | 60mm Thick medium duty 'Bamburi Blox' or other equal and approved precast concrete paving in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | 3,200 | | |
| K. | Take delivery from store cabro and fix only including necessary compaction. | m2 | 2,800 | | |
| | | | | Shs. | |
| 1165 | <u>MATATU INTERCHANGE PARKING AND</u> <u>DRIVEWAY</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|--|------|----------|------|-----------|
| A. | 125 x 250mm Precast concrete (Class 20) kerb with one chamfered edge finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) on and including 325 x 100mm plain concrete (1:3:6) foundation haunched up on one side including all necessary excavation, formwork and soil disposal. | m | 800 | | |
| B. | 125 x 100mm Precast concrete (class 20) channel finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) laid on and including 375 x 100mm Plain concrete (1:3:6) foundation haunched up on both sides including all necessary excavation, formwork and soil disposal. | m | 800 | | |
| C. | Prepare and apply three coats of 'Crown Paints Solo' or other equal and approved yellow road marking enamel paint 100mm wide on surfaces of parking to be executed by an approved Sub-Contractor. | m | 400 | | |
| Shs. | | | | | |
| <u>SECTION A</u> | | | | | |
| <u>MATATU INTERCHANGE PARKING AND</u> | | | | | |
| <u>DRIVEWAY</u> | | | | | |
| <u>COLLECTION</u> | | | | | |
| Brought forward from Page No. 6/1 | | | | | |
| " " " " " 6/2 | | | | | |
| Shs. | | | | | |
| <u>TOTAL AMOUNT OF SECTION A CARRIED</u> | | | | | |
| <u>TO SUMMARY OF BILL NO. 6</u> | | | | | |
| 1165 | <u>MATATU INTERCHANGE PARKING AND</u> <u>DRIVEWAY</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>SECTION B</u> | | | | |
| | <u>PROMENADE</u> | | | | |
| A. | Excavate oversite to reduce level commencing at existing ground level not exceeding 1.50m deep. | m3 | 1,080 | | |
| B. | Extra over excavation for excavating in coral rock | m3 | 108 | | |
| C. | Remove surplus excavated material from site. | m3 | 1,080 | | |
| D. | Grade bottoms of excavations or surfaces of filling to falls and crossfalls including rolling and compacting to 95% MDD compaction. | m2 | 1,800 | | |
| E. | Tevlar 'W' or other equal and approved weed killer under driveways and parking. | m2 | 1,800 | | |
| F. | Approved murrum in making up levels, spread, levelled, watered and well rammed and consolidated in 150mm layers. | m3 | 540 | | |
| G. | 200mm Bed of selected sub-grade material compacted in layers not exceeding 150mm thick to 95% MDD. | m2 | 1,800 | | |
| H. | 50mm Bed of approved sand/stone dust blinding finished to receive paving (measured separately). | m2 | 1,800 | | |
| J. | 60mm Thick medium duty normal grey 'Bamburi Blox' or other equal and approved precast concrete quad paving in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | 1,260 | | |
| K. | Do. <u>but</u> with approved colour topping. | m2 | 540 | | |
| J. | 125 x 100mm Precast concrete (class 20) channel finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) laid on and including 375 x 100mm Plain concrete (1:3:6) foundation haunched up on both sides including all necessary excavation, formwork and soil disposal. | m | 720 | | |
| | <u>TOTAL AMOUNT OF PROMENADE</u> <u>CARRIED TO BILL NO. 6 SUMMARY</u> | | | Shs. | |
| 1165 | <u>PROMINADE</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| | <u>SECTION C</u> <u>BEACH FRONT SQUARE</u> <u>(ALL PROVISIONAL)</u> | | | | |
| A. | Excavate oversite to reduce level commencing at existing ground level not exceeding 1.50m deep. | m3 | 600 | | |
| B. | Extra over excavation for excavating in coral rock | m3 | 60 | | |
| C. | Remove surplus excavated material from site. | m3 | 600 | | |
| D. | Approved murrum in making up levels, spread, levelled, watered and well rammed and consolidated in 150mm layers. | m3 | 180 | | |
| E. | Grade bottoms of excavations or surfaces of filling to falls and crossfalls including rolling and compacting to 95% MDD compaction. | m2 | 2,000 | | |
| F. | Tevlar 'W' or other equal and approved weed killer under driveways and parking. | m2 | 2,000 | | |
| G. | 300mm Bed of selected sub-grade material compacted in layers not exceeding 150mm thick to 95% MDD. | m2 | 2,000 | | |
| H. | 150mm Bed of approved gravel sub-base (minimum 30% CBR) or graded crushed stones. | m2 | 2,000 | | |
| I. | 50mm Bed of approved sand/stone dust blinding finished to receive paving (measured separately). | m2 | 2,000 | | |
| J. | 60mm Thick medium duty 'Bamburi Blox' or other equal and approved natural grey quad paver blocks in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | 1,400 | | |
| K. | Do. <u>but</u> in approved red colour topping | m2 | 600 | | |
| L. | 125 x 250mm Precast concrete (Class 20) kerb with one chamfered edge finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) on and including 325 x 100mm plain concrete (1:3:6) foundation haunched up on one side including all necessary excavation, formwork and soil disposal. | m | 300 | | |
| 1165 | <u>BEACHFRONT SQUARE</u> <u>COLLECTION</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | <p>125 x 100mm Precast concrete (class 20) channel finished fair on all exposed surfaces bedded, jointed and pointed in cement mortar (1:3) laid on and including 375 x 100mm Plain concrete (1:3:6) foundation haunched up on both sides including all necessary excavation, formwork and soil disposal.</p> <p style="text-align: center;"><u>SECTION C</u></p> <p style="text-align: center;"><u>BEACHFRONT SQUARE</u></p> <p style="text-align: center;"><u>COLLECTION</u></p> <p style="text-align: center;">Brought forward from Page No. 6/4</p> <p style="text-align: center;">" " " " " 6/5</p> <p><u>TOTAL AMOUNT OF SECTION C CARRIED TO SUMMARY OF BILL NO. 6</u></p> | m | 300 | | |
| 1165 | <u>BEACHFRONT SQUARE COLLECTION</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| | <u>SECTION D</u> <u>NEW ACCESS ROAD</u> <u>(ALL PROVISIONAL)</u> | | | | |
| A. | Excavate oversite to reduce levels commencing at existing ground level not exceeding 1.50m deep. | m3 | 540 | | |
| B. | Extra over excavation for excavating in coral | m3 | 54 | | |
| C. | Remove surplus excavated material from site. | m3 | 540 | | |
| D. | Grade bottoms of excavations or surfaces of filling to falls and crossfalls including rolling and compacting to 95% MDD compaction. | m2 | 1,800 | | |
| E. | Tevlar 'W' or other equal and approved weed killer under driveways and parking. | m2 | 1,800 | | |
| F. | 150mm Bed of selected sub-grade material compacted in layers not exceeding 150mm thick to 95% MDD. | m2 | 1,800 | | |
| G. | 125mm Bed of gravel finish compacted to standard specifications for roads and to approval of the Civil Engineer (First layer). | m2 | 1,800 | | |
| H. | Do. (Second layer) | m2 | 1,800 | | |
| | <u>TOTAL AMOUNT OF SECTION D CARRIED TO SUMMARY OF BILL NO. 6</u> | | | | |
| | | | | Shs. | |
| 1165 | <u>NEW ACCESS ROAD</u> <u>COLLECTION</u> | | | | |

| ITEM No. | | Shs. Cts. | | | | | | | | | | | | | | | |
|----------------|---|-----------------|---------------|-----------------|----|---|-----|---|-----------|-----|---|-------------------|-----|---|-----------------|-----|--|
| | <p style="text-align: center;"><u>BILL NO. 6</u></p> <p style="text-align: center;"><u>HARD LANDSCAPE AREAS</u> <u>(ALL PROVISIONAL)</u></p> <p style="text-align: center;"><u>SUMMARY</u></p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;"><u>Section</u></th> <th style="text-align: left;"><u>Title.</u></th> <th style="text-align: left;"><u>Page No.</u></th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Matatu Interchange Parking and Driveway</td> <td>6/2</td> </tr> <tr> <td>B</td> <td>Promenade</td> <td>6/3</td> </tr> <tr> <td>C</td> <td>Beachfront Square</td> <td>6/5</td> </tr> <tr> <td>D</td> <td>New Access Road</td> <td>6/6</td> </tr> </tbody> </table> | <u>Section</u> | <u>Title.</u> | <u>Page No.</u> | A. | Matatu Interchange Parking and Driveway | 6/2 | B | Promenade | 6/3 | C | Beachfront Square | 6/5 | D | New Access Road | 6/6 | |
| <u>Section</u> | <u>Title.</u> | <u>Page No.</u> | | | | | | | | | | | | | | | |
| A. | Matatu Interchange Parking and Driveway | 6/2 | | | | | | | | | | | | | | | |
| B | Promenade | 6/3 | | | | | | | | | | | | | | | |
| C | Beachfront Square | 6/5 | | | | | | | | | | | | | | | |
| D | New Access Road | 6/6 | | | | | | | | | | | | | | | |
| | <p><u>TOTAL AMOUNT OF BILL NO. 6 CARRIED TO FINAL SUMMARY.</u></p> | SHS. | | | | | | | | | | | | | | | |
| 1165 | <p><u>BILL NO. 6</u> <u>SUMMARY</u></p> | | | | | | | | | | | | | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|---|--|------|----------|------|-----------|
| <u>BILL NO. 7</u> <u>STORMWATER DRAINAGE</u> <u>(ALL PROVISIONAL)</u> | | | | | |
| A. | Excavate trench in fill for 450mm diameter pipe not exceeding 1.50m deep and average 750mm deep, part return fill in and ram and remainder remove from site. | m | 90 | | |
| B. | Excavate trench in fill for 300mm diameter pipe not exceeding 1.50m deep and average 500mm deep, part return fill in and ram and remainder remove from site. | m | 89 | | |
| C. | Excavate trench in fill for 200mm diameter upvc pipe not exceeding 1.50m deep and average 500mm deep, part return fill in and ram and remainder remove from site. | m | 201 | | |
| D. | Excavate for 'V' section open invert block drain not exceeding 1.50m deep, average 800mm deep and 1100mm wide and cart away and trim sides to slope. | m | 200 | | |
| E. | 450mm Diameter precast concrete ogee jointed drain pipe to B.S. 556 laid and jointed in trench and bedded on and including 750mm wide x 200mm thick plain concrete (1:3:6) bed and surround all round with 150mm thick plain concrete (1:3:6) including all necessary formwork (culvert) | m | 60 | | |
| F. | Do. <u>but</u> laid on with and including approved granular fill soround. | m | 30 | | |
| 1165 | <u>STORMWATER DRAINAGE</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | 300mm Diameter precast concrete ogee jointed drain pipe to B.S. 556 laid and jointed in trench and bedded on and including 600mm wide x 200mm thick plain concrete (1:3:6) bed and surround all round with 150mm thick plain concrete (1:3:6) including all necessary formwork (culvert) | m | 29 | | |
| B. | Do. <u>but</u> laid on and with and including approved granular fill soround. | m | 60 | | |
| C. | Precast concrete (class 25) rainwater channel comprising 600mm long rectangular invert blocks each 600 x 300mm high with two top edges each twice splayed and 400mm wide x 200mm deep sinking on top, finished fair and reinforced as necessary for handling, bedded, jointed and pointed on and including 50mm bed of plain concrete (1:4:8) and with 100mm thick murrum backfilling to bottom and both sides. | m | 200 | | |
| D. | 75mm Precast concrete (class 25) side slabs size 600 x 225mm finished fair, bedded on and including 75mm murrum well compacted to sides and slopes of rainwater channel and pointed in cement mortar (1:3). | m2 | 270 | | |
| E. | 200mm Diameter Upvc drain pipe laid and jointed in trench. | m | 201 | | |
| F. | 150mm Plain concrete (1:3:6) bed 300mm wide under 200mm pipe and soround pipe with simillar concrete 150mm thick including all necessary formwork. | m | 50 | | |
| 1165 | <u>STORMWATER DRAINAGE</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|---|------|----------|------|-----------|
| A. | Inspection chamber size 900 x 900 x 1000mm deep internally with 150mm thick natural stone walls, 150mm reinforced concrete (class 20) base and cover slab complete with and including 600 x 600mm medium duty cast iron manhole cover and frame, plain concrete (1:3:6) benching and channels, 15mm waterproof cement and sand (1:5) rendering to walls and base including all necessary reinforcement, formwork, cutting existing slab, excavation, backfill and soil disposal. | No. | 6 | | |
| B. | Road gully size 450 x 450 x 600mm deep internally 50mm plain concrete (1:3:6) blinding with 150mm thick masonry walls, 150mm reinforced concrete (class 20) base and topping complete with and including 40 x 3mm flat galvanized mild steel grating cover at 40mm centres welded to 50 x 50 x 3mm mild steel angle frame, 15mm waterproof cement and sand (1:5) rendering to walls and base including all necessary reinforcement, formwork, excavation, backfill and soil disposal. | No. | 32 | | |
| <u>The following in 6No. Headwalls</u> | | | | | |
| C. | Excavate in fill for headwall not exceeding 1.50m deep. | m3 | 105 | | |
| D. | Return fill in and ram selected excavated material around headwall. | m3 | 42 | | |
| E. | Remove surplus excavated material from site. | m3 | 63 | | |
| <u>Vibrated reinforced concrete (class 25)</u> | | | | | |
| F. | 150mm Base slab. | m2 | 47 | | |
| G. | 150mm Head wall. | m2 | 40 | | |
| | | | | Shs. | |
| 1165 | <u>STORMWATER DRAINAGE</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | Steel wire fabric mesh reinforcement to B.S. 4483 Ref. A193 otherwise as before in base slab and headwall. | m2 | 87 | | |
| | <u>Sawn formwork</u> | | | | |
| B. | Edge of base 75 - 150mm high. | m2 | 70 | | |
| C. | Sides of headwall. | m2 | 80 | | |
| D. | Upper surfaces of wall sloping more than 15 degrees from the horizontal. | m2 | 5 | | |
| E. | Hole through 150mm reinforced concrete wall for 450mm diameter pipe and make good. | No. | 6 | | |
| | <u>French Drains</u> | | | | |
| F. | Excavate trench French drains commencing at existing ground level not exceeding 1.50m | m3 | 184 | | |
| G. | Extra over for excavation in coral rock. | m3 | 20 | | |
| H. | Remove surplus excavated materials from site | m2 | 184 | | |
| | <u>Selected fill material</u> | | | | |
| I. | 150mm Bed of top vegetation soil to approval. | m2 | 260 | | |
| J. | 20-60 Crushed aggregates laid to approval. | m3 | 115 | | |
| K. | 500 Guage approved polythene sheeting laid on coral base as a damp proof membrane (measured net-no allowance) | m2 | 320 | | |
| | | | | Shs. | |
| 1165 | <u>STORMWATER DRAINAGE</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|----------------------|---------------------|------|-----------|
| | <p><u>Pipe and geotextile membrane</u></p> <p>A. 150mm Diameter perforated Upvc pipe, laid at a minimum slope of 1:200 and 3/4 perforated using, 16mm diameter hole staggered about with and including approved geotextile membrane surround all to the entire satisfaction of the Civil Engineer.</p> <p>B. Allow for testing the whole of the stormwater drainage during the progress of the works and again on completion and leave in perfect working order to the satisfaction of the Architect.</p> | <p>m</p> <p>Item</p> | <p>440</p> <p>1</p> | | |
| | | | | Shs. | |
| | <p style="text-align: center;"><u>BILL NO 7</u></p> <p style="text-align: center;"><u>STORMWATER DRAINAGE</u></p> <p style="text-align: center;"><u>COLLECTION</u></p> <p>Brought forward from Page No. 7/1</p> <p>" " " " " 7/2</p> <p>" " " " " 7/3</p> <p>" " " " " 7/4</p> <p>" " " " " 7/5</p> | | | | |
| | <p><u>TOTAL AMOUNT OF BILL NO. 7 CARRIED TO FINAL SUMMARY</u></p> | | | Shs. | |
| 1165 | <p><u>STORMWATER DRAINAGE</u> <u>COLLECTION</u></p> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|---|------|----------|------|-----------|
| <u>BILL NO. 8</u> | | | | | |
| <u>FOUL DRAINAGE</u> <u>(ALL PROVISIONAL)</u> | | | | | |
| A. | Excavate trench for drain pipe exceeding 150mm diameter not exceeding 1.50m deep and average 600mm deep part return fill in and ram and remainder remove from site. | m | 150 | | |
| B. | Do. <u>but</u> average 1000mm deep. | m | 150 | | |
| C. | Do. <u>but</u> average 1500mm deep. | m | 100 | | |
| D. | Do. <u>but</u> average 2000mm deep. | m | 100 | | |
| E. | 160mm Diameter UPVC golden brown class 41 drain pipe laid and jointed in trench. | m | 350 | | |
| F. | 200mm Do. | m | 150 | | |
| G. | 150mm Plain concrete (1:3:6) bed 600mm wide under 160mm diameter pipe and surround pipe with simillar concrete 150mm thick including all necessary formwork. | m | 150 | | |
| H. | Do. <u>but</u> 700mm wide under 200mm diameter pipe. | m | 75 | | |
| I. | Oil interceptor overall size 5600 x 1600 x 2050mm deep in three interconnected compartments constructed of 200mm thick reinforced concrete (class 25) base and cover slab, 150mm reinforced concrete walls, 3No. openings for and including 600 x 450mm heavy duty covers and frames to BS 497, 100mm diameter PVC interconnecting Pipes grouted in concrete, 50mm diameter PVC vent pipe with anti-bat gauze discharging approximately 10m away as directed, 500 x 300 x 400mm galvanized perforated bucket with handle on and including an approved sand bed complete with and including all necessary excavations, cart away, backfill, formwork, reinforcement, waterproofing and finishes to the architect's approval. | No. | 2 | | |
| 1165 | <u>FOUL DRAINAGE</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|--|--|------|----------|------|-----------|
| A. | Soak pit overall size 1600mm diameter x 3500mm deep internally approved and selected hardcore filling with 150mm thick natural stone walls on 150mm reinforced concrete (class 20) cover slab and base blinded with 50mm plain concrete (1:3:6), 1No opening for and including 600 x 450mm heavy duty covers and frames to BS 497, 15mm waterproof cement and sand (1:5) rendering to walls including all necessary reinforcement, formwork, excavation, backfill and soil disposal. | No. | 4 | | |
| B. | Allow for testing the whole of the foul drainage during the progress of the works and again on completion and leave in perfect working order to the satisfaction of the Architect. | Item | 1 | | |
| <u>BILL NO. 8</u> | | | | | |
| <u>FOUL DRAINAGE</u> | | | | | |
| <u>COLLECTION</u> | | | | | |
| Brought forward from Page No. 8/1 | | | | | |
| " " " " " 8/2 | | | | | |
| <u>TOTAL AMOUNT OF BILL NO. 8 CARRIED TO FINAL SUMMARY</u> | | | | | |
| 1165 | <u>FOUL DRAINAGE</u> <u>COLLECTION</u> | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|-----|-----------|-------------|
| EI | <u>ABLUTION BLOCK INSTALLATIONS</u> | | | | |
| EI.1 | LIGHTING SYSTEM | | | | |
| EI.1.01 | Supply, install, Test and Commission 3No. X 1.5Sq. mm colour-coded Single Core Copper Cables to lighting points drawn in 20mm \varnothing concealed High Impact Heavy Gauge PVC conduits, complete with draw boxes, switch boxes and all other necessary accessories as detailed in Lighting Layout Contract Drawing. | No. | 66 | | |
| EI.1.02 | Supply, install, Test and Commission Lighting Control Switch Plates, complete with all other necessary accessories as detailed in Lighting Layout Contract Drawings for all the Floor Levels. | | | | |
| | i One Gang One Way Switch Plates | No. | 15 | | |
| | ii Motion Sensors | No. | 3 | | |
| EI.1.03 | Supply, install, Test and Commission the following Lighting Fittings, complete with lamps and all other necessary accessories as detailed in Lighting Layout Contract Drawings for all the Floor Levels. | | | | |
| | i 3.5 Watts LED Ceiling Recessed Light Fitting | No. | 15 | | |
| | ii Lighting Point Type LP | No. | 51 | | |
| EI.1 | TOTAL FOR E3.1 - LIGHTING INSTALLATIONS CARRIED FORWARD TO COLLECTION PAGE 9/4 | | | | |
| EI.2 | SMALL POWER POINTS | | | | |
| EI.2.01 | Supply, install, Test and Commission 3No. X 2.5Sq. mm colour-coded Single Core Copper Cables Radial Circuits drawn in 20mm \varnothing concealed High Impact Heavy Gauge PVC conduits, complete with switch boxes and all other necessary accessories - but excluding the power point face plates as detailed in Small Power Layout Contract Drawing. | No. | 6 | | |
| EI.2.02 | Supply, install, Test and Commission the following Power Point Accessories as detailed in Small Power Layout Contract Drawings for all Floor Levels. | | | | |
| | i 20 Amps Double Pole Switch with neon indicator. | No. | 6 | | |
| EI.2 | TOTAL FOR E3.2 - SMALL POWER INSTALLATIONS CARRIED FORWARD TO COLLECTION PAGE 9/4 | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|-----|-----------|-------------|
| E1 | <u>ABLUTION BLOCK INSTALLATIONS - Continued</u> | | | | |
| E1.3 | <u>CABLE WAYS & ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT</u> Please Refer To Lighting and Small Power Drawings | | | | |
| E1.3.01 | Supply, install, Test and Commission 3Core X 2.5Sq. mm PVC SWA PVC Copper Cable drawn in Ducts, complete with switch boxes and all other necessary accessories and 20 Amps Double Pole Switch face plates, for Drainage Pump as detailed in Small Power Layout Contract Drawing. | LM | 0 | | |
| E1.3.02 | Supply, install, Test and Commission 3Core X 2.5Sq. mm PVC SWA PVC Copper Cable drawn in Ducts, complete with switch boxes and all other necessary accessories and 20 Amps Double Pole Switch face plates, for Circulation Pump as detailed in Small Power Layout Contract Drawing. | LM | 0 | | |
| E1.3.03 | Supply, install, Test and Commission 3Core X 2.5Sq. mm PVC SWA PVC Copper Cable drawn in Ducts, complete with switch boxes and all other necessary accessories and 20 Amps Double Pole Switch face plates, for Solar Water Heating System as detailed in Small Power Layout Contract Drawing. | LM | 0 | | |
| E1.3.04 | Supply, install, Test and Commission 4Core X 2.5Sq. mm PVC SWA PVC Copper Cable drawn in Ducts, complete with switch boxes and all other necessary accessories and 20 Amps Isolator, for Booster Pump as detailed in Small Power Layout Contract Drawing. | LM | 0 | | |
| E1.3.05 | Supply & Install 20 Amp Isolators for Mechanical Equipment | NOS. | 0 | | |
| E1.3 | TOTAL FOR E1.3- CABLE WAYS & ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT CARRIED FORWARD TO COLLECTION PAGE 9/4 | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|--|------|-----|-----------|-------------|
| E1 | <u>ABLUTION BLOCK INSTALLATIONS - Continued</u> | | | | |
| E1.4 | <u>POWER RETICULATION SYSTEM</u> | | | | |
| | <u>METER BOARD</u> | | | | |
| E1.4.01 | Supply, install, connect-up complete, Test and Commission Meter Board complete with all accessories to Kenya Power Standards - Enclosure for KP&LC Meter | No | 3 | | |
| | <u>DISTRIBUTION BOARDS</u> | | | | |
| E1.4.02 | Supply, install, connect-up complete, Test and Commission 100 Amp 4 way TP/N MCB Distribution board complete with integral isolator and MCBs. | No | 3 | | |
| | <u>SUB MAIN CABLE</u> | | | | |
| E1.4.03 | Supply, draw in 32mm \emptyset High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 4Core X 25Sq. mm PVC SWA PVC Copper Cable from Authority Power Supply to the Main Distribution Board. | LM | 30 | | |
| | <u>EARTHING SYSTEM</u> | | | | |
| E1.4.04 | Supply, install, connect-up complete, Test and Commission, Distribution Boards Earthing Systems for the installations, to Kenya Power Standards. | No. | 3 | | |
| E1.4.05 | Supply, draw in 20mm \emptyset High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 1No. X 16Sq. mm copper earth cable from Earthing Points to respective connections. | LM | 30 | | |
| E1.4 | TOTAL FOR E3.4 - POWER RETICULATION SYSTEM CARRIED FORWARD TO COLLECTION PAGE 9/4 | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|------|--|------|-----|-----------------|--------------|
| E1 | <u>ABLUTION BLOCK INSTALLATIONS - Continued</u> | | | B/F | |
| | <u>COLLECTION PAGE</u> | | | <u>PAGE NO.</u> | <u>KSHS.</u> |
| E1.1 | TOTAL FOR E3.1 - LIGHTING INSTALLATIONS | | | 9/1 | |
| E1.2 | TOTAL FOR E3.2 - SMALL POWER INSTALLATIONS | | | 9/1 | |
| E1.3 | TOTAL FOR E3.3- CABLE WAYS & ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT | | | 9/2 | |
| E1.4 | TOTAL FOR E3.4 - POWER RETICULATION SYSTEM | | | 9/3 | |
| E1 | TOTAL E3 ABLUTION BLOCK INSTALLATIONS CARRIED TO SUMMARY (PAGE 9/11) | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|-----|-----------|-------------|
| EI2 | <u>GATEWAYS (1 No.) INSTALLATIONS</u> | | | | |
| E2.1 | LIGHTING SYSTEM | | | | |
| E2.1.01 | Supply, install, Test and Commission 3No. X 1.5Sq. mm colour-coded Single Core Copper Cables to lighting points drawn in 20mm \emptyset concealed High Impact Heavy Gauge PVC conduits, complete with draw boxes, switch boxes and all other necessary accessories as detailed in Lighting Layout Contract Drawing. | No. | 9 | | |
| E2.1.02 | Supply, install, Test and Commission Lighting Control Switch Plates, complete with all other necessary accessories as detailed in Lighting Layout Contract Drawings for all the Floor Levels. | | | | |
| i | One Gang One Way Switch Plates | No. | 3 | | |
| ii | Motion Sensors | No. | 2 | | |
| E2.1.03 | Supply, install, Test and Commission the following Lighting Fittings, complete with lamps and all other necessary accessories as detailed in Lighting Layout Contract Drawings for all the Floor Levels. | | | | |
| i | Lighting Point Type LP | No. | 18 | | |
| E2.1 | TOTAL FOR E4.1 - LIGHTING INSTALLATIONS CARRIED FORWARD TO COLLECTION PAGE 9/7 | | | | |
| E2.2 | SMALL POWER POINTS | | | | |
| E2.2.01 | Supply, install, Test and Commission 3No. X 2.5Sq. mm colour-coded Single Core Copper Cables Radial Circuits drawn in 20mm \emptyset concealed High Impact Heavy Gauge PVC conduits, complete with switch boxes and all other necessary accessories - but excluding the power point face plates as detailed in Small Power Layout Contract Drawing. | No. | 3 | | |
| E2.2.02 | Supply, install, Test and Commission the following Power Point Accessories as detailed in Small Power Layout Contract Drawings for all Floor Levels. | | | | |
| i | 13 Amps Twin Switched Socket Outlets. | No. | 3 | | |
| E2.2 | TOTAL FOR E4.2 - SMALL POWER INSTALLATIONS CARRIED FORWARD TO COLLECTION PAGE 9/7 | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|-----|-----------|-------------|
| E2 | <u>GATEWAYS (1 No.) INSTALLATIONS - Continued</u> | | | | |
| E2.3 | <u>POWER RETICULATION SYSTEM</u> | | | | |
| | <u>METER BOARD</u> | | | | |
| E2.3.01 | Supply, install, connect-up complete, Test and Commission Meter Board complete with all accessories to Kenya Power Standards - Enclosure for KP&LC Meter | No | 1 | | |
| E2.3.02 | <u>DISTRIBUTION BOARDS</u> Supply, install, connect-up complete, Test and Commission 100 Amp 4 way TP/N MCB Distribution board complete with integral isolator and MCBs. | No | 1 | | |
| E2.3.04 | <u>SUB MAIN CABLE</u> Supply, draw in 32mm \emptyset High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 4Core X 10Sq. mm PVC SWA PVC Copper Cable from Authority Power Supply to the Main Distribution Board. | LM | 20 | | |
| E2.3.05 | <u>EARTHING SYSTEM</u> Supply, install, connect-up complete, Test and Commission, Distribution Boards Earthing Systems for the installations, to Kenya Power Standards. | No. | 1 | | |
| E2.3.06 | Supply, draw in 20mm \emptyset High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 1No. X 16Sq. mm copper earth cable from Earthing Points to respective connections. | LM | 40 | | |
| E2.4 | TOTAL FOR E4.4 - POWER RETICULATION SYSTEM CARRIED FORWARD TO COLLECTION PAGE 9/7 | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|------|--|------|-----|-----------------|--------------|
| E2 | <u>GATEWAYS (1 No.) INSTALLATIONS - Continued</u> | | | B/F | |
| | <u>COLLECTION PAGE</u> | | | <u>PAGE NO.</u> | <u>KSHS.</u> |
| E2.1 | TOTAL FOR E4.1 - LIGHTING INSTALLATIONS | | | 9/5 | |
| E2.2 | TOTAL FOR E4.2 - SMALL POWER INSTALLATIONS | | | 9/5 | |
| E2.3 | TOTAL FOR E4.4 - POWER RETICULATION SYSTEM | | | 9/6 | |
| E2 | TOTAL E4 GATEWAYS (1 No.) CARRIED TO SUMMARY (PAGE 9/11) | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|-----|-----------|-------------|
| E3 | <u>TYPICAL CONTAINER KIOSKS (100No.) INSTALLATIONS</u> | | | | |
| E3.1 | <u>POWER RETICULATION SYSTEM</u> | | | | |
| E3.1.01 | Supply, draw in 32mmØ High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 4Core X 10Sq. mm PVC SWA PVC Copper Cable from Authority Power Supply complete with Power Tap Off Unit installed within each of the containers. | LM | 135 | | |
| E3.1.02 | <u>EARTHING SYSTEM</u> Supply, install, connect-up complete, Test and Commission, Distribution Boards Earthing Systems for the installations, to Kenya Power Standards. | No. | 100 | | |
| E3.1.03 | Supply, draw in 20mmØ High Impact Heavy Gauge PVC conduit, complete with all conduit accessories, connect-up complete, Test and Commission, 1No. X 16Sq. mm copper earth cable from Earthing Points to respective connections. | LM | 135 | | |
| E3 | TOTAL E3 TYPICAL CONTAINER KIOSKS (100No.) CARRIED TO SUMMARY (PAGE 9/11) | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|---|------|------|-----------|-------------|
| E4 | <u>STREET LIGHTING INSTALLATIONS</u> | | | | |
| E4.1.01 | Supply, draw in ducts (measured separately), Connect-up complete, Test and Commission, 2Core X 2.5Sq. mm PVC SWA PVC Copper Cable from the Control Panels to the Street Lighting Points as detailed in our contract drawing. | LM | 1000 | | |
| E4.1.02 | Supply, install with concrete base, connect-up complete, Test and Commission 8 Meter Marine Grade Hot -Dipped Galvanised Street Lighting Poles complete with armstrech bracket to match county government requirements and to approval | No | 21 | | |
| E4.1.03 | Supply, install, connect-up complete, Test and Commission 2.5Sq. Mm Twin with Earth Sheathed Copper Cables connecting Lighting fittings with the underground cable via slidlocks within the Poles. | LM | 60 | | |
| E4.1.04 | Supply, install, connect-up complete, Test and Commission 40W LED Street Light Fittings complete with fixing accessories and to approval | No | 21 | | |
| E4.1.05 | Supply, install, connect-up complete, Test and Commission, Street Light Earthing Systems for the installations. | No. | 2 | | |
| E4.1.06 | Supply, install, connect-up complete, Test and Commission, Street Light Control Systems (WEATHERPROOF FEEDER PILLARS) for the installations as detailed in our contract drawing. | No. | 5 | | |
| E4.1.07 | Supply, install, connect-up complete, Test and Commission, Feeder Pillars (WEATHERPROOF FEEDER PILLARS) for Power Supply to Container Kiosks the installations as detailed in our contract drawing. | No. | 5 | | |
| E4 | TOTAL E4 STREET LIGHTING INSTALLATIONS CARRIED TO SUMMARY (PAGE 9/11) | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|---------|--|------|------|-----------|-------------|
| E5 | <u>SERVICE DUCTS RETICULATION SYSTEM</u> | | | | |
| E5.1.01 | Supply, install with concrete surround, 2 X 150mmØ High Impact Heavy Gauge PVC Duct, for Underground High Voltage Power Distribution System. Existing overhead cables to be redirected into the ducts. | LM | 1200 | | |
| E5.1.02 | Supply, install with concrete surround, 2 X 100mmØ High Impact Heavy Gauge PVC Duct, for Underground LOW Voltage Power Distribution System. Existing overhead cables to be redirected into the ducts. | LM | 1200 | | |
| E5.1.03 | Supply, install with concrete surround, 2 X 100mmØ High Impact Heavy Gauge PVC Duct, for Underground EXTRA LOW Voltage (FIBRE) Distribution System. | LM | 1200 | | |
| E5.1.04 | Supply, install 600mm X 600mm Standard Manholes complete with weathertight covers, for HIGH Voltage Distribution System. | No | 19 | | |
| E5.1.05 | Supply, install 600mm X 600mm Standard Manholes complete with weathertight covers, for EXTRA LOW and LOW Voltage Distribution System. | No | 38 | | |
| E5.1.06 | Supply, install with concrete surround, 1 X 50mmØ High Impact Heavy Gauge PVC Duct, for Underground LOW Voltage Power and Extra Low Voltage Distribution System. Existing overhead cables to be redirected into the ducts. | LM | 200 | | |
| E5 | TOTAL E5 SERVICE DUCTS RETICULATION SYSTEM CARRIED TO SUMMARY (PAGE 9/11) | | | | |

BILL NO. 9

ELECTRICAL INSTALLATION WORKS (ALL PROVISIONAL)

| ITEM | DESCRIPTION | UNIT | QTY | RATE KSHS | AMOUNT KSHS |
|------|---|------|-----|--------------------|--------------|
| | <u>MAIN SUMMARY</u> | | | | <u>KSHS.</u> |
| 1 | SCHEDULE OF PRICES THE FROM SUMMARY PAGE | | | B/F FROM PAGE 9/11 | |
| 2 | ALLOW FOR PREPARATION OF WORKING DRAWINGS, AS-BUILT DRAWINGS, OPERATION, MAINTENANCE AND USER MANUALS | | | | |
| 3 | ALLOW FOR TESTING AND COMMISSIONING OF ELECTRICAL SYSTEMS | | | | |
| 4 | ALLOW FOR LIAISON WITH LOCAL POWER AUTHORITY FOR MAINS POWER CONNECTIONS | | | | |
| 5 | ALLOW FOR LIAISON WITH OTHER SPECIALIST FOR FINAL CONNECTIONS, TESTING & COMMISSIONING | | | | |
| | SUB-TOTAL | | | | |
| | <u>ADD</u> <u>PROVISIONAL SUMS</u> | | | | |
| 6 | SUM FOR METER CONNECTION BY KENYA POWER COMPANY | | | | |
| 7 | SUM FOR REROUTING OF EXISTING OVERHEAD POWER SYSTEM BY KENYA POWER COMPANY | | | | |
| 8 | SUM FOR SUPPLY OF LIGHTING FITTINGS | | | | |
| 9 | SUM FOR SUPPLY & INSTALLATION OF CCTV & STRUCTURED CABLING SYSTEM (Omitted) | | | | Nil |
| 10 | SUM FOR ELECTRICAL INSTALLATIONS FOR PUBLIC FACILICITIES & PLAYGROUND | | | | |
| 11 | SUM FOR ELECTRICAL INSTALLATIONS FOR SPORTS & ACTIVITIES AREA | | | | |
| 12 | SUM FOR ELECTRICAL INSTALLATIONS FOR EVENTS AREA (Omitted) | | | | Nil |
| 13 | SUM FOR ELECTRICAL INSTALLATIONS FORCOMMERCIAL FOOD MARKET | | | | |
| 14 | SUM FOR ELECTRICAL INSTALLATIONS FOR BEACHFRONT SQUARE | | | | |
| | | | | | |
| | TOTAL CARRIED TO FINAL SUMMARY | | | | |

BILL NO. 10**MECHANICAL INSTALLATIONS (ALL PROVISIONAL)**

| ITEM | DESCRIPTION | UNIT | QTY | RATE | AMOUNT |
|--|--|------|-----|------|--------|
| I | SANITARY FITTINGS (SUPPLY AND INSTALL Supply the following appliances including their support brackets, screws etc.and their connection to water supply, waste/soil drainage and electrical power supply:- | | | | |
| A | SQUAT TYPE WATER CLOSET Squatting water closet suite comprising of water closet bowl with top plate and integral foot threads, S-trap connector. All to be as "Duravit " or approved equivalent. | No | 5 | | |
| B | WATER CLOSET FLUSH VALVE Concealed water closet flush valve, with 3/4" stop valve. 6-9 lts, and having a Flow Pressure range of 1.2-5.0 bar . The Flush valve to comprise the following accessories: Stainless Steel Actuator plate, Fixing device with hidden fixing screws for flush pipes,Flush Valve connector to WC ,and flush pipe. All products to be as specified or equal and approved. | No. | 5 | | |
| C | DELAY ACTION PILLAR TAP Vandal-resistant delay action basin tap as Geberit self-closing tap type 26, with mixer and with Manual flush actuation .Flow duration setting of the tap independent of water pressure.Flow duration, adjustment setting in the range of 3-30 s.To be complete with 2 Reinforced braided hose, 3/8",2 check valves R 3/8, Tap aerator key and Fastening material and all necessary fittings and mounting accessories. | No. | 9 | | |
| D | URINAL TROUGH AND AUTOMATIC FLUSHING SYSTEM Complete set of a 3m long stainless steel urinal trough/channel with 25mm dia. heavy duty GI pipe with 50mm interval drip-holes, and with all necessary fittings fixed to the wall as per Architect's instructions complete with Urinal automatic flushing system with connections | No | 1 | | |
| E | SHOWER Shower combination: Single Lever Shower Mixer with basic three way set for concealed installation, complete with single lever mixer, and an overhead shower . As Hansgrohe Focus E2 Concealed shower or equal and approved. | No. | 4 | | |
| F | SOAP DISPENSER Wall-Mount Automatic IR Sensor Soap Dispenser Touch-free with capacity of about one litre having a sensor automatic mechanism complete with fixing screws. Allow for initial soap supply. As Mediclinics ref DJ0011C or approved equivalent | No | 0 | | |
| G | HAND DRIER Automatic hand drier in white colour, operating on an infra-red automatic sensing system with heating element safety cut-out complete with a 30 seconds safety timer,plastic rawl plugs and fixing screws. The hand drier to have a heating capacity of 1.65 kw and performance flow rate of 135cfm (3.82m3/min).It shall be as Mediclinics ref Optima # A99 or approved equivalent | No | 0 | | |
| H | ARABIC SHOWER TAP Arabic shower tap complete with all the mounting bracket, hose pipe, necessary connections and fittings. | No. | 5 | | |
| I | TOILET ROLL HOLDER Chromed brass, wall mounted toilet roll hansgrohe # 40523-000 or equal and approved . | No | 0 | | |
| J | ROBE HOOK Chrome plated robe hook mounted with concealed screws. To be as hansgrohe # #40511-000 or equal and approved. | No | 0 | | |
| TOTAL FOR SANITARY SUPPLY CARRIED FORWARD TO COLLECTION PAGE 10/6 | | | | | |

| ITEM | DESCRIPTION | UNIT | QTY | RATE | AMOUNT |
|----------|---|------|-----|------|--------|
| | BOREHOLE | | | | |
| A | | | | | |
| 1 | NEMA - Environmental Impact Assesment | LS | 1 | | |
| 2 | Hydrogeological Survey To undertake a hydrogeological survey and write up a detailed report | LS | 1 | | |
| 3 | Application & Permit fee for Authorisation to drill Borehole and follow ups | LS | 1 | | |
| | SUB TOTAL - A Carried to Collection Page 10/13 | | | | |
| B | | | | | |
| 1 | Mobilization, Setting Up, Demobilization and Shifting | | | | |
| 1a | Mobilization to the project area of all plant, materials, equipments and personnel, including demobilization at the end of the contract and removal | LS | 1 | | |
| 2 | Drilling, Installation, Development, Testing of production Borehole | | | | |
| 2a | 8" Dia. From ground level to 100 metres | M | 100 | | |
| 2b | As item 2.1a but beyond 100 metres | M | 100 | | |
| 2c | As item 2.1a but beyond 200 metres | M | 100 | | |
| 2d | As item 2.1a but beyond 300 metres | M | 100 | | |
| 2e | Beyond 300m | M | | | |
| 2.2 | Supply & Installation of 152mm dia, steel plain casing | M | 200 | | |
| 2.3 | Supply & Installation of 6" dia. Steel machine cut screen casing. | M | 100 | | |
| 2.4 | Water Supply for drilling & domestic purposes at site | LS | 1 | | |
| 2.5 | Supply and installation of Gravel Pack | TONS | 15 | | |
| 2.6 | Well development with SHMP and Drilling Foam before test pumping | HRS | 5 | | |
| 2.7 | Test pumping for 24 hrs and recovery measurements | LS | 1 | | |
| 3 | Surface Casing - Estimated for Loose Formation | | | | |
| 3.1 | Supply and Install and remove surface casing or | M | | | |
| 3.2 | Supply and install Permanent surface casing | M | 6 | | |
| 4 | Completion | | | | |
| 4.1 | Construct Concrete to slab and well head capping and lock | LS | 1 | | |
| 4.2 | Chemical analysis of water sample and borehole report | LS | 1 | | |
| 4.3 | Stand by time beyond control of contractor | HRS | | | |
| | ESTIMATED TOTAL - B (Drilling Cost) Carried to Collection Page 10/13 | | | | |
| | Grundfos stainless steel borehole pump model SP8A-73 coupled to a Grundfos Motor 15HP (3 Phase). The pump should be capable of pumping 5,000 per hour at 350m Head with the pumpset at a depth of no less than 260m below ground level. | NO | 1 | | |
| | 100mm2 x 4 core submersible borehole pump cable | LM | 265 | | |
| | Electrode cable 0.75mm2 x 1 core | LM | 530 | | |
| | Electrodes | PAIR | 1 | | |
| | Cable splicing kit with heat shrink | SET | 1 | | |
| | uPVC Dipper Pipes 1" | PCS | 44 | | |
| | Centralizer for borehole pipe in 12m intervals 6"x2" | NO | 15 | | |
| | GI Pipe Class B 2" | LM | 43 | | |
| | Peglar Socket 2" | LM | 46 | | |
| | GI Starter pipe 2" (2 Metres) | NO | 1 | | |
| | Borehole Surface Accessories. Borehole cover plate 6"x2", GI Plug, 2", GI Bend 2", Hex Nipples 2", Union Peglar 2", GI Tee 2", NRV 2" (Caleffi) | LS | 1 | | |
| | Installation of the above accessories to International Standards. | LS | 1 | | |
| | Electrical Items | | | | |
| | Junction Box complete with fittings | LS | 1 | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|--|------|----------|------|-----------|
| 1161 | <p style="text-align: center;"><u>BILL NO. 11</u></p> <p style="text-align: center;"><u>DAYWORKS</u></p> <p style="text-align: center;"><u>(ALL PROVISIONAL)</u></p> <p style="text-align: center;"><u>Labour</u></p> <p>A. Payment of labour authorised by the Architects to be employed on Dayworks will be the net amount of wages paid in respect of such labour, in accordance with the rates to be inserted below by the Contractor, plus the percentage addition also to be inserted by the Contractor.</p> <p>B. The rates inserted against each category of labour will be deemed to be the hourly wages paid to workmen and chargehands, working with their gangs, inclusive of allowances for housing, holidays with pay, annual leave, sick leave, safari allowance and all other allowances required by Government enactments concerning regulations of wages and conditions of employment.</p> <p>C. The percentage addition on net amount of wages defined above will be deemed to cover:-</p> <p>Supply, transport about the site, use, maintenance and removal of ordinary hand tools and equipment used in Dayworks (such as picks, shovels, barrows, ladders, buckets, trestles, stages, scaffolding, hoses, rubber boots, special clothing, tarpaulins, and all items of a like nature), insurance superintendence (including wages of foreman), water supply, artificial lighting overheads, head office, site staff and establishment charges profit, and all other liabilities and obligations whatsoever.</p> <p><u>DAYWORKS</u></p> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|-------|----------|------|-----------|
| | <u>Net Amount of Wages</u> | | | | |
| A. | Labourer. | Hours | 75 | | |
| B. | General tradesman, category learner. | Hours | 25 | | |
| C. | Do. <u>but</u> ungraded. | Hours | 25 | | |
| D. | Do. <u>but</u> Grade III trade tested. | Hours | 25 | | |
| E. | Do. <u>but</u> Grade II trade tested. | Hours | 25 | | |
| F. | Do. <u>but</u> Grade I grade tested. | Hours | 25 | | |
| G. | Light plant operator (compressors, mixers, tractors, rollers, etc.) | Hours | 25 | | |
| H. | Heavy plant operator (D7 tractors, graders, excavators, etc.). | Hours | 25 | | |
| I. | Junior headman. | Hours | 25 | | |
| J. | Senior headman. | Hours | 25 | | |
| | <u>Sub total of net amount of wages</u> | | | Shs. | |
| | Allow a percentage addition on net amount of wages to cover tools, insurances, etc. as defined above. | | % | | |
| | | | | Shs. | |
| 1165 | <u>DAYWORKS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|---------------------|-------------|-----------------|
| | <p><u>Materials</u></p> <p>A. Payment for materials authorised by the Architect to be used in Dayworks will be the approved net cost of supply and delivery to site of such materials, plus the percentage addition to be inserted below by the Contractor.</p> <p>B. The percentage addition on net cost of materials as defined above will be deemed to cover insurances, overheads, head office, site staff and establishment charges, profit, and all other liabilities and obligations whatsoever.</p> <p>C. Include the Provisional Sum of Shillings Five Thousand (Shs. 5,000/-) for the approved net cost of supply and delivery to site of materials to be used in Dayworks.</p> <p>D. Allow a percentage addition on net cost of materials to cover insurances, overhead charges, profit, etc., as defined above.</p> <p><u>Plant</u></p> <p>E. Payment for the use of heavy plant (such as compressed air equipment, concrete mixers, pumps, excavators and the like) authorised by the Architect to be used in Dayworks will be the approved net hire charges, plus the percentage addition to be inserted below by the Contractor.</p> | | <p>Sum</p> <p>%</p> | <p>Shs.</p> | <p>5,000.00</p> |
| 1165 | <u>DAYWORKS</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|-----------------------|--|------|----------|------|-----------|
| A. | The 'approval net hire charges' of heavy plant (covered by a Provisional Sum below) shall mean the approved invoiced hire charges including delivery to site, and subsequent removal, after deduction of trade discounts, but without deduction of cash discounts not exceeding 2 1/2% which shall be retained by the Contractor, or, in the case of use of the Contractor's own heavy plant, current hire charges plus justifiable charges for handling, delivery to and removal from the site. | | | | |
| B. | Include the Provisional Sum of Shillings Five Thousand (Shs. 5,000/-) for the approved net hire charges of heavy plant to be used in Dayworks. | | Sum | | 5,000.00 |
| C. | Allow a percentage addition on net hire charges of heavyplant to cover insurances, overhead charges, profit, etc. as defined above. | | % | | |
| <u>Direct Charges</u> | | | | | |
| D. | Payment for direct charges authorised by the Architect to be incurred in Dayworks will be the approved net cost of such direct charges plus the percentage addition to be inserted below by the Contractor. | | | | |
| 1165 | <u>DAYWORKS</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|-----------|
| A. | The 'approved net cost of direct charges' (covered by a Provisional Sum below) shall mean the approved invoiced cost of work executed by sub-contractors or specialists after deduction of trade discounts, but without deduction of cash discounts not exceeding 2 1/2% which shall be retained by the Contractor. | | | | |
| B. | The percentage addition on net cost of direct charges as defined above will be deemed to cover insurances, overheads, head office, site staff and establishment charges, profit, attendance and all other liabilities and obligations whatsoever. | | | | |
| C. | Include the Provisional Sum of Shillings Five Thousand (Shs. 5,000/-) for the approved net cost of direct charges incurred in Dayworks. | | Sum | | 5,000.00 |
| D. | Allow a percentage addition on net cost of direct charges to cover insurances, overhead charges, profit, etc., as defined above. | | % | | |
| 1165 | <u>DAYWORKS</u> | | | Shs. | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|-------------|---|------|----------|------|-----------|
| | <u>BILL NO 11</u> <u>DAYWORKS</u> <u>(ALL PROVISIONAL)</u> <u>COLLECTION</u> | | | | |
| | Brought forward from Page No. | | 11/1 | | |
| | " " " " " | | 11/2 | | |
| | " " " " " | | 11/3 | | |
| | " " " " " | | 11/4 | | |
| | " " " " " | | 11/5 | | |
| | <u>TOTAL AMOUNT OF BILL NO. 11</u> <u>CARRIED TO FINAL SUMMARY</u> | | | Shs. | |
| 1165 | <u>DAYWORKS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | QUANTITY | RATE | Shs./Cts. |
|----------|---|------|----------|------|---------------|
| | <u>BILL NO. 12</u> <u>PROVISIONAL SUMS</u> | | | | |
| | <u>Note:</u> See Appendix 'E' for preambles to Prime Cost and Provisional Sums | | | | |
| A. | Include the sum of shillings Six hundred thousand only (shs. 600,000/-) for signage. | | Sum | | 600,000.00 |
| B. | Include the sum of shillings nine million only (shs. 9,000,000/-) for soft landscaping and street furniture. | | Sum | | 9,000,000.00 |
| C. | Include the sum of shillings six hundred thousand only (shs. 600,000/-) for sculptures and artworks. | | Sum | | 600,000.00 |
| D. | Include the sum of shillings three million only (shs. 3,000,000/-) for builder's work in connection with external works specialist services. | | Sum | | 3,000,000.00 |
| E. | Include the sum of shillings five million only (shs. 5,000,000/-) for civil works in connection with water treatment plant. | | Sum | | 5,000,000.00 |
| F. | Include the sum of shillings one million five hundred thousand only (shs. 1,500,000/-) for refurbishment and restoration of existing structures | | Sum | | 1,500,000.00 |
| G. | Include the sum of shillings eleven million only (shs. 11,000,000/-) for kiosks. | | Sum | | 11,000,000.00 |
| H. | Include the sum of shillings two million only (shs. 2,000,000/-) for site clearance, demolitions and alterations. | | Sum | | 2,000,000.00 |
| I. | Include the sum of shillings one million two hundred thousand only (shs. 1,200,000/-) for sports facilities. | | Sum | | 1,200,000.00 |
| J. | Include the sum of shillings two million only (shs. 2,000,000/-) for works in respect to commercial food market. | | Sum | | 2,000,000.00 |
| K. | Include the sum of shillings seven million five hundred thousand only (Shs. 7,500,000/-) for reinforced concrete high level tank support. | | Sum | | 7,500,000.00 |
| L. | Include the sum of shillings eighteen million only (Shs. 18,000,000/-) for contingencies. | | Sum | | 18,000,000.00 |
| | <u>TOTAL AMOUNT OF BILL NO. 12</u> <u>CARRIED TO FINAL SUMMARY</u> | | | Shs. | |
| 1165 | <u>PROVISIONAL SUMS</u> <u>COLLECTION</u> | | | | |

| ITEM No. | DESCRIPTION | UNIT | RATE | Shs./Cts. |
|----------|--|------|------|-----------|
| 1165 | <p style="text-align: center;"><u>BILL NO. 13</u></p> <p style="text-align: center;"><u>SCHEDULE OF RATES</u></p> <p><u>At the discretion of the Architect additional works may be ordered whose valuation shall be based on the following schedule of rates</u></p> <p><u>Rates submitted should be inclusive of profits overheads and also the prevailing 16% VAT.</u></p> <p><u>The prices submitted should be fixed and valid for one year.</u></p> <p style="text-align: center;"><u>A. DEMOLITIONS AND ALTERATIONS</u></p> <p><u>Note: All rates for new works should include all necessary preparatory work to surfaces to receive new finishes, new doors and window frames and all work of a like nature whether stated in the item descriptions or not.</u></p> <p>A. Carefully into existing asphalt concrete slab prepare surfaces to receive new floor finishes (measured separately)</p> <p>B. Carefully hack out existing reinforced concrete plinth approximately 200mm thick and make good disturbed surfaces.</p> <p>C. Carefully remove existing floor tiles and make good backing screed to receive new floor finishes (measured separately)</p> <p>D. Carefully remove existing mild steel railing and balustrades approximately 1200mm high complete with and including all the members.</p> <p>E. Carefully remove existing precast concrete paving slabs complete with the sub-base and prepare surfaces to receive new paving slabs (measured separately)</p> <p>F. Carefully hack off existing painted plaster and prepare exposed surfaces to receive new wall finishes (measured separately)</p> <p>G. Carefully demolish existing 200mm Coral stone boundary wall complete with all foundations and make good all disturbed areas to match existing.</p> <p>H. Carefully remove existing precast concrete carbro paving complete with the sub-base and make good all disturbed areas to match existing. Store on site for re-use.</p> <p>I. Carefully demolish existing precast concrete kerb complete with and including the sub-base and make good all disturbed areas to match existing. Store on site for re-use.</p> <p><u>JOMO KENYATTA PUBLIC BEACH</u></p> <p><u>SCHEDULE OF RATES</u></p> | | | |
| | m2 | | | |
| | m2 | | | |
| | m2 | | | |
| | m | | | |
| | m2 | | | |
| | m2 | | | |
| | m2 | | | |
| | m2 | | | |
| | m2 | | | |

| ITEM No. | DESCRIPTION | UNIT | RATE | Shs./Cts. |
|---|---|------|------|-----------|
| <u>B. SITE CLEARANCE</u> | | | | |
| A. | Clear site of all existing shrubs and cart away arisings. | m2 | | |
| B. | Clear existing shrub hedge avaragely 2.5m high and cart away arisings. | m | | |
| <u>Cut down existing trees, shrubs, grab up all roots and hand over arisings to the client, fill in voids with approved selected material well rammed and consolidated.</u> | | | | |
| C. | Small tree not exceeding 600mm girth. | No. | | |
| D. | Tree 900 - 1200mm girth. | No. | | |
| E. | Tree 1200 - 1500mm girth. | No. | | |
| F. | Tree 1500 - 1800mm girth. | No. | | |
| G. | Tree 1800 - 2100mm girth. | No. | | |
| H. | Tree 2100 - 2400mm girth. | No. | | |
| I. | Tree 2400 - 2700mm girth. | No. | | |
| J. | Tree 2700 - 3000mm girth. | No. | | |
| <u>C. EXCAVATIONS</u> | | | | |
| K. | Excavate in compacted fill commencing at reduced level but not exceeding 1.50m deep. | m2 | | |
| L. | Do. <u>but</u> 1.50 - 3.00m. | m2 | | |
| <u>D. INTERNAL PARTITIONS</u> | | | | |
| M. | Supply, assemble and fix 10mm laminated glass partition in 100 x 50mm powder coated aluminium section frames and glazing beads to Architect's approval. | m2 | | |
| N. | Supply, assemble and fix 10mm toughened frameless glass partitions complete with approved fixing accessories to Architect's approval. | m2 | | |
| 1165 | <u>JOMO KENYATTA PUBLIC BEACH</u> <u>SCHEDULE OF RATES</u> | | | |

| ITEM No. | DESCRIPTION | UNIT | RATE | Shs./Cts. |
|--|---|------|------|-----------|
| A. | Approved decorative film fixed onto glass to approval (measured separately) | m2 | | |
| B. | Sparkle white sand blast film fixed onto glass to approval (measured separately) | m2 | | |
| <u>D. WINDOWS</u> | | | | |
| <p><u>Supply, assemble and fix the following purpose made powder coated aluminium windows in 4mm thick (minimum) approved sections complete with all necessary handles, levers or finger pulls and pins, catches and stays, complete with all necessary handles and approved small locking device where applicable fixed at pre-determined positions, including snap on glazing beads, building in lugs to jambs, plugging and screwing to head and cill and bedding frames in waterproof cement mortar and pointing in approved acrylic mastic and oiling, easing and adjusting. All windows have permanent ventilators with 40mm mosquito gauze panel cover.</u></p> | | | | |
| C. | Two pane window size 1800 x 1600mm in two sliding panes. | m2 | | |
| <u>E. FLOOR FINISHES</u> | | | | |
| D. | Supply and fix approved 8mm thick SAJ/RAK ceramic or other equal and approved ceramic floor tiles fixed on backing screed (measured separately) with an approved adhesive jointed and flush pointed with grouting to match tile. | m2 | | |
| E. | Do. <u>But</u> 10mm thick. Supply and fix approved 8mm thick SAJ Mosaic tiles or other equal and approved ceramic floor tiles fixed on backing screed (measured separately) with an approved adhesive jointed and flush pointed with grouting to match tile. | m2 | | |
| F. | Do. <u>But</u> 10mm thick. | m2 | | |
| G. | 8mm Thick granito floor tiles or other equal and approved fixed on floor screed (measured separately) with an approved adhesive jointed and flush pointed with coloured grout to match tiles. | m2 | | |
| 1165 | <u>JOMO KENYATTA PUBLIC BEACH</u> <u>SCHEDULE OF RATES</u> | | | |

| ITEM No. | DESCRIPTION | UNIT | RATE | Shs./Cts. |
|-----------------------------------|---|------|------|-----------|
| A | 20mm Regular sized mazeras stone paver including cement and sand (1:3) backing bedded, jointed and neat pointed joints as works proceeds including all necessary ties built or cast in to approval. | | | |
| B. | Take delivery and fix only floor tiles fixed on backing screed (measured separately) with an approved adhesive jointed and flush pointed with grouting to match tile (fixing adhesive by the Contractor). | m2 | | |
| C. | Supply and fix 'Britons' carpet tiles or any other equal and approved fixed on backing screed (measured separately) with an approved adhesive | m2 | | |
| D. | Take delivery and fix only 'Britons' carpet tiles or any other equal and approved fixed on backing screed (measured separately) with an approved adhesive (fixing adhesive by the Contractor). | m2 | | |
| E. | 100mm Thick hand dressed 'Nairobi Blue Stone' or other equal and approved paving in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | | |
| F. | 50mm Thick powerfloated monolithic screed to concrete surface with X-Tech Integral S floor hardener as manufactured by X-Calibur Construction Systems Inc. and locally supplied by Paveseal (K) Limited or other equal and approved laid strictly in accordance with the manufacturer's printed specifications (parking and driveways) | m2 | | |
| <u>F. CEILING FINISHES</u> | | | | |
| G. | 25mm MDF suspended ceiling on and including approved stainless steel frame structure suspended from existing concrete soffit to Architects approval. | m2 | | |
| H. | 9mm Thick butt jointed gypsum Rhino board suspended ceiling with skimmed screen joint filler fixed to and including heavy duty steel studwork branding at 600mm centres with rounded smooth compound sanded edges clad with silver metal laminate in accordance with manufacturer's printed specifications to the entire satisfaction of the Architect. | m2 | | |
| 1165 | <u>JOMO KENYATTA PUBLIC BEACH</u> <u>SCHEDULE OF RATES</u> | | | |

| ITEM No. | DESCRIPTION | UNIT | RATE | Shs./Cts. |
|---|---|------|------|-----------|
| A. | Armstrong minabord suspended ceiling comprising 600 x 600 x 15mm fine fisured laid in grid accoustic ceiling on and including tegular grid system complete with white perimeter, curved trim and wall angles where necesarry. | m2 | | |
| <u>G. REDECORATION</u> | | | | |
| B. | Rub and brush down existing wall decoration, prepare surfaces and apply two coats of approved marine quality paint to approval | m2 | | |
| C. | Carefully scrub and clean existing steel trowelled floor screed, prepare surfaces and apply approved paint to the entire satisfaction of the Architect. | m2 | | |
| D. | Rub and brush down existing ceiling decoration, prepare surfaces and apply two coats of approved silk vinyl emulsion paint on existing ceiling internally | m2 | | |
| <u>LANDSCAPE FINISHES & FURNITURE</u> | | | | |
| E. | 1000mm High x 200mm diameter Custom precast concrete bollards. | No. | | |
| F. | 900 x 600 x 600mm Custom precast concrete litter bins. | No. | | |
| G. | 900 x 600 x 600mm Custom precast concrete benches. | No. | | |
| H. | 60mm Thick medium duty normal grey 'Bamburi Blox' or other equal and approved precast concrete cobble paving in approved pattern laid on sand bed (measured separately) to falls, crossfalls, and cambers including necessary compaction. | m2 | | |
| I. | Do. <u>but</u> with approved colour topping. | m2 | | |
| 1165 | <u>JOMO KENYATTA PUBLIC BEACH</u> <u>SCHEDULE OF RATES</u> | | | |

| ITEM No. | | Shs. | Cts. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|-----------------|--------------|-----------------|---|---------------------------------------|------|---|------------------------------------|------|---|---|------|---|--|------|---|---|-----|---|---|-----|---|--|-----|---|--|-----|---|--|------|----|---|-------|----|-------------------------------------|------|----|-------------------|------|----|-------------------|------|--|--|
| | <u>PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN MOMBASA COUNTY</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <u>FINAL SUMMARY</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | <u>ESTIMATE AMOUNT INCLUSIVE OF 16% VAT CARRIED TO FORM OF TENDER</u> | Shs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Signature of Contractor.....</p> <p>Address</p> <p>.....</p> <p>.....</p> <p>Date</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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**SCHEDULE OF DRAWINGS USED FOR
THE BILLS OF QUANTITIES**

ARCHITECTURAL DRAWINGS

| <u>Drawing No.</u> | <u>Description</u> | <u>Scale</u> |
|---------------------------|---------------------------|---------------------|
| - | Jomo Kenyatta Site Plan | - |

ARCHITECTS SPECIFICATION

GENERAL

DISCREPANCIES IN DESCRIPTIONS

Descriptions of materials and workmanship contained in the Bills of Quantities measured items shall take precedence over descriptions contained in Appendices in the event of discrepancies between the two, unless the Architect shall otherwise direct.

DISCREPANCIES IN DRAWINGS

Drawings shall take precedence over the Bills of Quantities, for construction purposes, in the event of discrepancies between the two, and the Architect must be notified immediately any such discrepancy becomes apparent.

TESTS AND SAMPLES

Unless otherwise described in the Bills of Quantities, the Contractor will be responsible for all the costs involved in testing materials as described hereinafter. He will also be responsible for all the costs involved in supplying samples of materials or workmanship as required hereinafter to the satisfaction of the Architect. The cost of replacing materials fixed or placed in position which do not comply with the required test results or approved samples shall be borne solely by the Contractor.

KENYA STANDARDS

All materials and goods supplied for incorporation in the works must comply with any relevant current standards issued by the Kenya Bureau of Standards. Where these are not established or are unclear the latest British Standards and Codes of Practice shall be applied.

EXCAVATION AND EARTHWORKS

SITE CLEARANCE

See Structural Engineers Specification.

GRUBBING

See Structural Engineers Specification.

EXCAVATION

See Structural Engineers Specification

WATER IN EXCAVATIONS

The Contractor shall excavate sumps, cut drains, provide and place all necessary materials and provide and work pumps, plant and apparatus for dealing with any water which may find its way into the excavation from any source whatsoever.

The responsibility for draining away, pumping, or otherwise removing water from the excavations shall rest with the Contractor throughout the duration of the Contract, but methods employed shall be subject to the agreement of the Architect.

Provision has been made in the Preliminaries and General Conditions of these Bills of Quantities for the Contractor to insert a price against this item.

HARD ROCK

See Structural Engineers Specification

FOUNDATION EXCAVATIONS

See Structural Engineers Specification.

SURPLUS SOIL DISPOSAL

See Structural Engineers Specification.

TOP SOIL FOR SPREADING

See Structural Engineers Specification.

FILLING UNDER SURFACE BED IN BUILDINGS

See Structural Engineers Specification.

FILLING OBTAINED FROM THE EXCAVATIONS

See Structural Engineers Specification.

MATERIALS FOUND IN EXCAVATIONS

See Structural Engineers Specification.

CONCRETE WORK

See Structural Engineers Specification.

WALLING

CEMENT

All cement used for making mortar shall be Portland Cement complying with B.S. 12.

SAND

All sand used for making mortar shall be clean well graded silicone sand of good sharp quality equal to samples which shall be approved by the Architect. It shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substance, sieved through a fine sieve and washed if so directed by the Architect.

LIME

Lime for mortar shall be non-hydraulic or semi-hydraulic quick lime or hydrated lime in accordance with B.S. 890, Class B.

Quick lime shall be run to putty immediately after delivery to site in a pit dug on the site or in approved containers. The water to be first run into the pit or container and the lime to be added until it is completely submerged and stirred until all lumps are disintegrated and the resulting mild-lime shall then be run through a 3mm square mesh sieve and run into a pit or other container and kept clean and moist for not less than 4 weeks before use.

Hydrated lime shall be added to water in a clean receptacle thoroughly mixed to the consistency of thick cream and allowed to stand and be kept clean and moist for not less than 16 hours before use.

CEMENT MORTAR

The cement mortar (1:3) shall be composed of 42.5 kgs. of Portland Cement to 0.085 cubic metres of sand. The cement mortar (1:6) shall be composed of 42.5 kgs of Portland Cement to 0.17 cubic metres of sand measured in specially prepared gauge boxes and thoroughly mixed in an approved mechanical mixer or mixed dry on clean and approved mixing platforms with water added afterwards until all parts are completely incorporated and brought to a proper consistency. The use or retempering of wholly or partly set mortar will not be allowed.

Foundation walling up to ground floor slab 1 part cement to 6 parts sand.

GAUGED LIME MORTAR

Gauged lime mortar shall be composed of 2 parts by volume of lime putty to 12 parts by volume of sand measured in specially prepared gauge boxes and mixed dry on clean and approved mixing platforms with water added afterwards until all parts are thoroughly incorporated and brought to a proper consistency.

The mortar shall be mixed 7 to 10 days before it is required for use and shall be stacked in a neat heap well smoothed off, covered with wet sacks and allowed to mature.

Immediately before use 1 part by volume of Portland Cement shall be added to 9 parts by volume of lime mortar, the whole being remixed with the addition of extra water until all parts are completely incorporated and brought to a proper consistency.

The gauged mortar must be used within 45 minutes of being mixed and the use or retempering of wholly or partially set mortar will not be allowed.

Above ground floor slab 1 part cement to 3 parts lime to 15 parts sand.

CONCRETE BLOCKS

Concrete blocks shall be hollow or solid as required and shall be hard, true to size and shape with sharp arrises in accordance with B.S. 2028 type 'A'. They are to be obtained from an approved manufacturer and shall be equal in every respect to a sample to be deposited with and approved by the Architect. Blocks must be cured at least 4 weeks before delivery to site and the Contractor is to order his entire stocks as soon as the Contract is signed. Before bulk delivery commences and thereafter, if the Architect so directs, the Contractor shall dispatch twelve sample blocks to the M.O.W. Materials Testing Laboratory. Should tests indicate that the blocks do not comply with the Specification, the batch from which they were taken shall forthwith be removed and re-executed or otherwise rectified at the Contractor's expense. Blocks shall be generally 390mm long, 190mm high and of the thicknesses required for the walling to be built. Blocks of other sizes will, however, be required to form proper bondings at corners, around openings, etc. and the like positions and the Contractor must make or cut blocks to all the varying sizes required for these purposes.

LOAD BEARING CONCRETE BLOCKS

Blocks described as load bearing shall have the minimum compressive strengths specified for each block, determined and tested in accordance with the appropriate B.S. and to the entire satisfaction of the Architect. Blocks of the various strengths shall be differentiated by means of an approved colour code marking.

COLOURED CONCRETE BLOCKS

Concrete blocks described as coloured shall contain colouring pigment mixed integrally with the materials to produce the required tint or shade. The mix of

materials contained in the blocks is to be adjusted as and if necessary to maintain the materials to produce the required tint or shade. The mix of materials contained in the blocks is to be adjusted as and necessary to maintain the specifications of strength etc. Unless otherwise described blocks are to be laid jointed and pointed in mortar containing pigment mixed integrally to produce a tint or shade matching that of the blocks. The mix of materials contained in the mortar is to be adjusted as and if necessary to maintain the specifications of strength, etc.

HOLLOW CLAY BLOCKS

Hollow clay blocks are to be hard, well burnt, true to size and shape with sharp arises and keyed faces and joints in accordance with B.S. 1190 Type 'A'. They are to be equal in every respect with a sample to be deposited with and approved by the Architect. The hollow clay blocks are to be bedded and jointed in gauged mortar.

FAIR FACED CONCRETE BLOCKWORK

Fair faced concrete blockwork shall be built in ordinary blocks selected for their uniformity and appearance and shall be free from holes or any other deformities and shall have clean, sharp arises. The blocks shall be built in mortar as described and raked out and pointed with a neat flush joint as the work proceeds, unless otherwise stated. All arises shall be plumb and square, and all joints properly bonded and true to line.

STONE WALLING

The stone for walling shall be sound and hard throughout free from all defects and shall be obtained from a quarry approved by the Architect. Samples shall be submitted for approval and, if approved, shall be regarded as the standard for the work generally. All stone rejected by the Architect shall be removed immediately from the site. Stones shall be laid on their natural beds and properly lapped and bonded and thoroughly wetted before laying and again after laying for at least three days. Stones shall be chisel dressed into true rectangular blocks with each surface even and at right angles to all adjoining surfaces and shall generally be not less than 390mm long, 190mm high and of the thickness required for the walling to be built. Extra over for fair face shall mean 'fine or medium butched chisel dressed' to an even surface, built with a fair face and raked out and pointed with a neat recessed joint as the work proceeds. All arrises shall be plumb and square and all joints properly bonded and true to line. Fine or medium butched chisel dressed walling shall be in regular courses.

If required by the Bills of Quantities, coloured stone walling and fair face dressings shall be as described below:-

- 1) Fine butched stone shall be either chisel dressed or machine dressed - dress the external face of each stone to the finest face practically obtainable and finish to a fine rubbed plane surface.
- 2) Medium butched chisel dressed stone - chisel dress the external face of each stone so that chisel marks are approximately the same width, with ridges between adjacent marks approximately in the same plane.
- 3) Quarry faced stone - do not work the external face of each stone.
- 4) Random rubble stone facing - stones of random shape, colour and size as facing to backing wall.
- 5) Random squared medium butched chisel dressed stone - stones of random shape, colour, size and thickness squared and dressed as before described.

- 6) Stone walling of approved colour - walling to be built using grey and mixed blue and grey coloured stones.
- 7) Stone walling of variegated colours - walling to be built using multi colour stone approved by the Architect and mixed in proportions approved by the Architect.
- 8) Machine dressed stone facing shall be 25mm or 50mm thick as required by the Architect. Machine rotary blade cut stones facing on backing wall.

The finished mortar joint for fine or medium butched chisel dressed stonework is to be 10mm wide and generally 5mm back from the face of the stone. Where directed by the Architect the mortar will be coloured to match the stones.

Stone walling described as load bearing shall have a minimum crushing strength of 10 Newtons per square mm.

On completion all stonework is to be scrubbed down with a wire brush.

BRICK FACINGS

Brick facings shall be of hand scratched bricks size 65mm high x 65mm deep x 230mm long as manufactured by Clayworks Ltd., P.O. Box 48202, Nairobi, with 10mm horizontal joints only raked out 10mm deep as the work proceeds. Wall ties shall be 18 gauge butterfly shaped galvanised mild steel wire staggered at 450mm centres vertically and 900mm centres horizontally. Supports at heads shall be with approved steel angles. Strict supervision of quality will be maintained by the Architect and all work will be in accordance with a sample panel to be approved by the Architect prior to the start of facing works.

WALLING GENERALLY

The Contractor shall provide proper setting out rods and set out all work on same for courses, openings, heights, etc., and shall build the walls, piers, etc., to the widths, depths and heights indicated on the drawings.

Concrete blocks shall be thoroughly wet before being laid and shall be kept wet during that day. Where unfinished work is continued, the completed walling shall be wetted before laying mortar.

All walls throughout the work shall be carried up evenly in 200mm courses, no part being carried up more than 1m higher at one time than any other part, and in such cases the jointing shall be made in long steps so as to prevent cracks arising, and all walls shall be levelled round at each stage. All faces of walls to be plastered are to have all the joints raked out as key for plaster.

Alternate courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining wall. All walling shall be built up entirely solid in blocks, without voids. All perpend, reveals and angles of the walling shall be built strictly true and square and all walling shall be flushed up and grouted solid as the work proceeds.

All putlog holes shall not be less than one course deep and carefully filled with a block cut to fit size of opening with beds and joints filled with mortar well tamped in after scaffolding is removed and if in fair faced wall to match facings.

All walling 150mm thick and under is to be reinforced with one layer of 25mm x 16 B.W.G. hoop iron built into every second course well lapped at joints and intersections and carried at least 115mm into abutting walls at junctions.

Where concrete and stone walling are bonded together at intersections or heading joints the horizontal cement mortar beds shall not exceed 15mm thickness and vertical joints are to be staggered.

DAMP PROOF COURSES

The damp proof course is to consist of a 25mm screed of cement and sand (1:2) laid over the area of the walls and finished to a level surface and covered with and including an approved fibre based bituminous damp proof course weighing not less than 2.7 kgs. per square metre and lapped 225mm at all joints and intersections. All walls are to be carefully cleaned and wetted before the screed is laid.

OTHER TRADES

Close co-operation with electrical and plumbing Sub-Contractors must be maintained from the beginning of the job to avoid chases being cut in hollow block or 100mm solid block work or across any fair faced work. If necessary, conduits should be run down the jambs of the door openings behind the door frame and taken to the switch position through a horizontal joint in the masonry.

ROOFING

SCREEDS

Roof screeds where specified shall be as described in 'Floor, Wall and Ceiling Finishes'.

GUARANTEE

The Contractor and the Roofing Sub-Contractor are to leave all the roofs complete and watertight, unmarked with cement or bitumen particularly flashings and external finishes and with joints in straight and even lines.

The Contractor must submit to the Employer a ten year guarantee for the roof coverings against leakage. If a Sub-Contractor is to execute the roofing the Contractor is responsible for obtaining this guarantee for them for submission to the Employer.

ALUMINIUM EMBOSSED CAP SHEET ROOF COVERING

The cap sheet covering shall be Cabro 42 S.W.G. aluminium embossed cap sheet covering with underlayers of saturated felt, as manufactured by Cabroworks Ltd., P.O. Box 98567, Mombasa, and laid by an approved Sub-Contractor in strict accordance with the manufacturer's printed instructions.

MASTIC ASPHALT ROOFING

All asphalt roofing shall be manufactured and applied in accordance with B.S. 988 Mastic Asphalt for Roofing (Limestone Aggregate). Proportions of component ingredients shall be generally within the limits laid down in the B.S. but the ratio of bitumen to Lake asphalt shall be appropriate for use in tropical climates. The asphalt shall be applied in two coats each of 10mm thickness laid to the falls formed in the screeds, by an approved Sub-Contractor.

The first coat of all horizontal work shall be laid on a single layer of black sheathing felt complying with B.S. 747, Table 4A (i) laid and lapped in accordance with the manufacturer's instructions. Rates for asphalt shall include for underlay.

All vertical surfaces, tops of parapets, gutter sides and bottoms shall be finished with one coat of bituminous aluminium paint. All other surfaces shall have a 12mm layer of black trap chippings graded from 6 - 12mm, laid loose.

MASTIC ASPHALT TANKING

All asphalt tanking shall be manufactured and applied in accordance with B.S. 1097 by an approved Sub-Contractor.

ASBESTOS CEMENT SHEETING

Asbestos cement roof sheeting and accessories shall be as manufactured by Kenya Asbestos Cement Co. Ltd., P.O. Box 90662, Mombasa, and fixed strictly in accordance with their printed instructions and generally in accordance with International Standard 459.

The sheeting will be fixed to steel purlins with galvanised hook bolts and patent P.V.C. combined capping, rubber washer and metal nut.

Holes shall be drilled through the ridges of corrugations not in the hollows.

Ridges and other accessories shall be fixed to timber purlins as above described.

Fixed bolts and screws shall comply with B.S. 1494.

Side laps shall be minimum one and a half corrugations and end laps shall be as specified.

GALVANISED CORRUGATED IRON SHEETING

Roof sheeting and accessories shall be pre-painted galvanised steel as manufactured by Galsheet Kenya Ltd., P.O. Box 78162, Nairobi, and fixed strictly in accordance with their printed instructions and generally in accordance with international standards.

ROOFING TILES

The roofing tiles shall be as specified, of approved quality and manufacture, uniform in size, shape and colour, free from twist or other defects to be obtained from an approved manufacturer, supplied and fixed in accordance with the manufacturers specifications and recommendations.

The ridge and hip shall be socketed tiles of approved quality, shape and manufacture, to match the roofing tiles in colour with rebated joints and free from twist and other defects.

The roofing tiles shall be hung on timber/concrete battens and shall be laid to accurate gauge and each roof shall be set out to take an exact number of tiles without cutting.

Hip and ridge tiles to be bedded and jointed in cement mortar (1:4) and pointed at joints and ends and intersections in coloured cement to match colour of tiles. All angles and intersections shall be neatly cut and rubbed to form a close joint.

CARPENTRY, JOINERY AND IRONMONGERY

QUALITY OF TIMBER

The qualities of timber stated hereinafter are to be in accordance with the Grading Rules (Third Edition) dated 8th April, 1959, approved by the Forest Department of Kenya.

All timber described as 'Sawn Podocarpus' shall be Second (Select) Grade Sawn Podocarpus Gracilior.

All timber described as 'Sawn Cypress' shall be Second Grade Sawn Cupressus.

All timber described as 'Wrot Cypress' shall be First (Prime) Grade Wrot Cupressus.

All timber described as 'Wrot Cedar' shall be First (Prime) Grade Wrot Red Cedar (Juniperus Procera).

All timber described as 'Wrot Meru Oak' shall be First (Prime Grade Wrot Meru Oak).

All timber described as 'Wrot Camphor' shall be First (Prime) Grade Wrot Camphor specially selected for straight grain and colouring. No joinery work is to be put in hand until the Architect has seen and approved the colour and grain of the timber.

Where hardwood is specified it shall be Mvuli, Mahogany, Mninga, Camphor, Rosewood, Blackwood or Meru Oak as selected by the Architect at the letting of the contract and all tenders will be deemed to have allowed for this.

When employed for carpentry work the above timbers shall be well seasoned to a moisture content not exceeding 18% of the dry weight.

When employed for joinery work the above timbers shall be well seasoned to a moisture content not exceeding 6% of the dry weight.

GENERALLY

All timber for permanent work in the buildings shall before use, be dry and be approved by the Architect for quality in accordance with the foregoing specification for its respective grade. All structural timber shall be in accordance with C. P. 112.

All Carpenter's work shall be left with sawn surfaces unless particularly specified to be wrot. Scantlings and boarding shall be accurately sawn and shall be left uniform in width and thickness throughout. All Carpenter's work shall be accurately set out together and securely fixed in the best possible manner with properly made joints. Provide all brads, nails, screws, bolts, etc. as necessary. Nails shall comply with B.S. 1202 and bolts with B.S. 916.

Knotting shall comply with B.S. 1336

Variations from specified dimensions of scantling shall not exceed the tolerance stated in the aforementioned Grading Rules. Boards 25mm thick or less shall hold up to the specified sizes. All timber shall be as long as possible and practicable to eliminate joints.

Ends of timbers required to be built into walls shall have 12mm space between same and walling. All ends of timbers to be strapped with hoop iron and primed.

All Joiner's work shall be wrot unless otherwise specified.

All mouldings shall be accurately run and finished and all arrises shall be slightly rounded. Framed work shall be cut out, properly tenoned, shouldered, etc., and framed together as soon after the commencement of the works as is practicable but should not be wedged up until required for fixing in position and any portions that warp, get in winding, develop shakes or other defects shall be replaced with new. As soon as required for fixing in position the framing shall be glued together with best quality glue and properly wedged or pinned, etc., as described.

Unless otherwise described oval or round brads will be used for fixing all face work, all heads shall be properly punched in. Where described as peltated work shall be countersunk screwed and the screw heads covered with timber pellets to match the adjacent timber.

Should any of the Carpenter's or Joiner's work shrink, warp, wind or develop any other defects within six months after the completion of the works, the same shall be removed and new fixed in its place together with all other work which may be affected thereby, all at the Contractor's cost and expense.

INSECT DAMAGE

All timber, whether graded or ungraded, and including shuttering, scaffolding and the like shall be free of live borer beetle or other insect attack when brought upon the site. The Contractor shall be responsible up to the end of the maintenance period for executing at his own cost all work necessary to eradicate insect attack to timber which becomes evident including the replacement of timbers attacked or suspected of being attacked, notwithstanding that the timber concerned may have been inspected and passed as fit for use.

DIMENSIONS

(a) Timber not specified to be wrought shall be as from the saw and full to the nominal dimensions stated. No undersizes shall be permitted but oversize to the following tolerances may be allowed:-

- (i) 1.5mm oversize on dimensions up to 25mm
- (ii) 3mm oversize on dimensions up to 50mm
- (iii) 6mm oversize on dimensions over 50mm.

(b) Where 'nominal' dimensions are stated for wrought timber a tolerance of 3mm shall be allowed for each wrought face.

Before putting in hand any joinery work, whether built-in or fixed later, the joiner is to ascertain and check on site all dimensions which affect or govern the joinery work.

PRESERVATION OF TIMBER

All timber described as impregnated shall be vacuum pressure impregnated with Tanalith or Celcure preservative in accordance with Specification No. 1/56 (Buildings) for the Vacuum/Pressure Impregnation of Timber with Hickson's 'Tanalith' wood preservative issued by Hickson's Timber Impregnation Co. (G.B.) Ltd., or other approved source. Where timber is cut or bored after impregnation the exposed surfaces are to be liberally swabbed with Wolmanol.

SPECIES OF TIMBER

Only those timbers specified in these Bills of Quantities are to be used for the works, unless alternatives are authorised by the Architect.

SEASONING OF TIMBER

All carpentry timbers are to be seasoned to a moisture content of not more than 18% of the dry weight. All joinery timbers are to be seasoned to a moisture content of not more than 6% of the dry weight. The Contractor is to make available on site a meter for testing moisture content of all timber delivered.

PREPARATION AND PROTECTION OF TIMBER

(a) All timber necessary for the works is to be purchased immediately the Contract is signed, and when delivered is to be open stacked for such further seasoning as may be necessary. Preparation of the timber is to be commenced simultaneously with the commencement of the works generally.

(b) All timber and assembled woodwork is to be protected from the weather and stored in such a way as to prevent attack by decay, fungi, termites or other insects.

CLEARING UP

The Contractor is to clear up and destroy or remove all cut-ends, shavings and other woodwaste from all parts of the buildings and the site generally as the work progresses and at the conclusion of the works.

TIMBER IN MASONRY, ETC.

Ends of timber built into walls shall be thoroughly brush treated with creosote or other approved preservatives and clean air space maintained around the timbers where they adjoin the walls.

PRIMING WOODWORK

All woodwork which is to be painted or hidden from view, backs of door frames, etc. are to be primed and painted one coat before fixing. Allow for touching up priming during progress of works.

JOINTING

(a) All joints must be made as specified or detailed and the execution of all jointing shall be to the satisfaction of the Architect.

(b) Joining surfaces of all connections exposed to the weather are to be thickly primed except where glueing is specified. Surfaces are to be in good contact over the whole area of the joint before fastenings are applied.

(c) No nails, screws or bolts are to be placed in any end split. If splitting is likely or is encountered in the course of the work, holes for nails are to be pre-bored at diameters not exceeding 4/5ths of the diameter of the nails. Clenched nails must be bent at right angles to the grain. Lead holes are to be bored for all screws.

(d) Where the use of bolts and washers are specified the holes are to be bored from both sides of the timber and are to be a diameter $D + D/16$ where D is the diameter of the bolt. Nuts must be brought up tight but care is to be taken to avoid crushing of the timber under the washers.

(e) 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, sprigs, etc., are to be punched and puttied.

(f) 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. All glued joints shall be crosstongued or otherwise reinforced.

(g) Glues 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 can be guaranteed, casin or organic glues may be used.

JOINERY

(a) All joinery shall be accurately set out on boards to full size for the information and guidance of artisans with all joints, ironwork and other works connected therewith fully delineated. This setting out shall be submitted to the Architect and approved before the work is commenced.

(b) All joinery shall be executed with workmanship of the best quality in strict accordance with the detailed drawings. All mouldings, shall be accurately and truly run and all work planed, sand-papered and finished to the approval of the Architect.

(c) All framed work shall be cut out, properly tenoned, shouldered etc., and framed together as soon after the commencement of the building as is practicable but shall not be wedged up until the building is ready for fixing the same and any portions that warp, wind, develop shakes or other defects shall be replaced with new. As soon as required for fixing in the building the framing shall be glued together and properly wedged or pinned, etc., as directed.

(d) Should any of the joinery shrink, warp, wind or develop any other defects within the maintenance period specified in the Contract the same shall be removed and

new fixed in its place together with all other work which may be affected thereby. All at the Contractor's expense.

TOLERANCE

Reasonable tolerance shall be provided at all connections between joinery works and the building carcass, so that any irregularities, settlement or other movements shall be adequately allowed for.

SCRIBING

All cornices, architraves, frames and other joinery works shall be accurately scribed to fit the contour of any irregular surfaces against which they may be required to form a close butt connection. In particular, architraves are to be cut to fit against side walls and maintain proper mitres at top corners.

SHRINKAGE

The arrangement, jointing and fixing of all joinery shall be such that shrinkage in any part and in any direction shall be compensated for and not impair the strength or appearance of the work or cause damage to adjacent structures

VENEERS

All veneers are to be specially selected for grain and colouring and no veneered work shall be put in hand until the Architect has approved the sample of grain and colour.

NATURAL FINISH

When natural finish is specified, the timber in adjacent pieces shall be matched and uniform or symmetrical in colour and grain. The surface finish is to be as specified.

FLUSH DOORS

Flush doors shall be 3mm plywood faced doors with solid or semi-solid cores, in accordance with B.S. 459 Part 2, obtained from a manufacturer approved by the Architect and equal in every respect to a sample to be submitted to and approved by the Architect. Doors shall be lipped with hardwood strips on all edges and shall be finished for painting on both faces unless otherwise stated. Plywood for use on external doors shall be of exterior grade as described later.

The proportion of solid area in semi-solid doors shall not be less than 50% of the total and shall be evenly distributed throughout the door.

CHIPBOARD

Chipboard shall comply in all respects with B.S. 2604 for medium density resin bonded wood chipboard and shall be veneered or not as shown on the drawings and as described in the Bills of Quantities. Chipboard of non-British origin shall comply with the tests enumerated in the said B.S. and samples shall be submitted to the Architect for this purpose and for his approval.

BLOCKBOARD

Blockboard is to be of approved quality, solid and glued throughout. Where described as faced it shall be faced with an approved veneer of the timber specified.

PLYWOOD

Plywood shall be in accordance with B.S. 1455 and shall be of second grade and that for use externally shall be of external grade conforming at least to Clause 138 of the B.S.

HARDBOARD

Hardboard shall be oil-tempered or otherwise as specified of the thicknesses specified and is to be glued and fixed with the special hardboard nails supplied by the manufacturer. Sheeting is to be wetted the day before fixing. All sawn edges to be carefully sandpapered.

SOFTBOARD

The softboard is to be of approved quality and manufacture, fixed with galvanised clout nails or an approved adhesive as necessary, or both as specified.

PLASTIC LAMINATE

Plastic laminate shall be as manufactured by Formica Ltd. or other equal and approved and shall be worked and fixed strictly in accordance with the manufacturer's instructions with the adhesive recommended by the manufacturer. Colours shall be selected by the Architect from samples to be submitted early in the Contract.

PLUGS

All plugs described as fixing for joinery etc., shall be approved plugs such as Rawlplugs or Philplugs set into holes drilled in masonry in accordance with the manufacturer's instruction. No wooden plugs are to be used.

PROTECT JOINERY

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

SITE DIMENSIONS

Before putting in hand any joinery work, whether to be built in with the carcass or fixed later, the joiner is to ascertain and check all dimensions on the site which affect or govern joinery work.

BILLS OF QUANTITIES DIMENSIONS

All wrot timber dimensions given in the Bills of Quantities are finished sizes unless otherwise stated.

IRONMONGERY

The Contractor is to check consignments of ironmongery upon receipt and store them in safe keeping until required for fixing.

All ironmongery shall be fitted and fixed in accordance with the manufacturer's instructions. Rates for fixing are to include for all cutting, sinking, boring, morticing and fitting in hardwood or softwood and for supplying all necessary and matching screws. Rates for door furniture shall also include for fixing before painting, removal during painting operations and afterwards fixing and for labelling all keys with door references and handing to the Architect upon completion.

All locks, springs and other items of ironmongery with movable parts shall be properly tested, cleaned and adjusted where necessary and left in perfect working order upon completion of the works by the Contractor who shall include for this in his prices for fixing.

GENERALLY

All pencil marks are to be removed before oiling or varnishing joinery work. Leave all joinery work perfect and clean without nail holes; clean up all waste and protect finished work from staining or damage. Oil all locks and adjust to give a perfect fit and leave clean.

METAL WORK

GENERALLY

All materials shall be of the best of their respective kinds and conform at least to the relevant B.S. where such exists. All work shall be carried out strictly as directed and approved by the Architect before fixing.

WELDING

Welding shall comply with the provisions of B.S. 538.

MILD STEEL

Shall be of approved manufacture complying with the requirements of B.S. 15. Welding to comply with the requirements of B.S. 538, 938 and 1856. Screws, bolts, washers, etc., to comply with the requirements of B.S. 916 and 1494.

GALVANISED STEEL SHEET

Shall be of approved manufacture, free from all defects and shall hold up to the gauge specified. Galvanising shall be to B.S. 729 Part 7.

BOLTS AND SET SCREWS

All bolts to be the best screw bolts with hexagonal heads and nuts and round washers.

Set screws to be similar but with circular flat slotted head for screwing or with round countersunk slotted head, similar to a wood screw, the threaded end suitable for screwing into tapped steel to the required depth.

ALUMINIUM

Aluminium sheet shall comply with the requirements of B.S. 1470 and be suitable for the purpose required.

Extruded aluminium sections shall be obtained from an approved source and be equal to samples to be submitted to and approved by the Architect. The surface finish shall be matt.

HOOP IRON.

Provide 25mm wide 24 gauge hoop iron reinforcement and anchors to be laid where specified under masonry, and anchored in ring beams.

PRICING INFORMATION

Prices for all welded work shall include for preparing, welding and grinding to a smooth finish.

FLOOR, WALL AND CEILING FINISHES

GENERALLY

The whole of the plasterwork and other wall, floor and ceiling finishes shall be executed to the entire satisfaction of the Architect and any work rejected shall be

taken down and re-executed by the Contractor at his own expense. All scaffolding, temporary rules and screeds, tools or special appliances required shall be furnished by the Contractor.

CEMENT

Shall be as described in 'Walling'

LIME

Shall be as described in 'Walling'

SAND

Shall be as described in 'Walling'

WATER

Shall be as described in Structural Engineers Specification.

WORKMANSHIP

All concrete beds or slabs shall be thoroughly brushed, cleaned, hacked if necessary and well wetted and flushed over with a cement and sand (1:1) grout immediately before screeds or pavings are laid.

Screeds and cement pavings shall be laid in accordance with the relevant B.S. Code of Practice and in alternate bays generally not exceeding 3m x 3m with neat butt joints and shall be damp cured with sand or sawdust and kept damp for at least 7 days after laying.

Adequate time intervals must be left between successive coats in two coat work in order that the drying shrinkage of the under-coat may be substantially complete. All internal and external angles shall be pencil rounded.

BOARD MARKED FINISH

Board marked finish is to be provided where shown on the drawings and shall be priced against the formwork item of 'Extra over formwork for board marked finish'.

The shuttering boards shall be heavily grained knotty cypress, or similar and approved, well seasoned and free of wind and shakes. The boards shall be in 100mm widths fixed vertically or horizontally as directed. The edges shall be butt jointed to maintain a flat surface. Unless otherwise approved, boards shall have a maximum of four uses and between each use shall be carefully cleaned from adhering grout and lightly oiled with an approved non-staining mould oil.

Every care and attention shall be paid to obtaining and maintaining throughout the course of the works a satisfactory visual appearance, free from blow holes, hungry patches and other blemishes and uniform in colour and texture.

Construction joints shall be as shown on the drawings or otherwise the pour each day shall be as directed by the Engineer.

Samples panels will be required for approval of the Engineer before work commences.

Protective covering is to be applied as necessary where finished concrete is liable to damage or staining.

CEMENT AND SAND PAVING.

Cement and sand paving shall be composed of one part cement to one part sand to three parts of 6 - 3mm gauge black trap grit, applied in two coats to the thickness

shown on the drawings. The Contractor shall allow for finishing surfaces perfectly smooth and hard with a steel trowel and dead level or to true falls if so desired.

SCREEDS AND BACKINGS

Screeds and backings shall be composed of one part of cement to three parts of sand unless otherwise specified in the Bills of Quantities by volume and shall be trowelled hard and smooth to the texture required by the finish to be applied.

WATERPROOFING AGENT

Screeds and pavings described as incorporating waterproofing agent shall have Lillington's No. 1 Metallic Liquid or similar mixed in. Mixing and application shall be strictly in accordance with the manufacturer's instructions.

BONDING LIQUID

The bonding liquid shall be Sealocrete Sealobond high P.V.A. content brushed on. Surfaces to be treated shall be thoroughly cleaned down and be free from all loose material, dust, mould, oil, grease and any other foreign matter. The bonding liquid shall be allowed to dry before screeds and renderings are applied. All mixing and application shall be carried out strictly in accordance with the recommendations of the manufacturers, Sealocrete Products Ltd.

HARDENING AGENT

Screeds and pavings described as incorporating hardening agent shall incorporate Sealocrete Double Strength Premix Plus S.R.A. mixed with the gauging water at the rate of 2.3 litres of Sealocrete to every 50 kgms. of cement. Mixing and application shall be carried out strictly in accordance with the recommendations of the manufacturers, Sealocrete Products Ltd.

TERRAZZO AND GRANOLITHIC WORK

The whole of the terrazzo and granolithic work is to be carried out by a specialist Sub-Contractor who is to be specifically approved by the Architect and the Contractor will be required to make arrangements for the execution of this work and bear all expenses incurred. No change in the rates for this work inserted by the Contractor in these Bills of Quantities will be allowed.

The materials used and method of construction for terrazzo work are to be in accordance with the B.S. Code of Practice C.P. 204/1951.

The surface finish to terrazzo or granolithic is to be brushed, ground or polished as specified. These textures are to comply with samples approved by the Architect.

The terrazzo topping is to be 20mm thick with imported white cement and 12mm marble aggregate, rolled and trowelled to a dense even surface and rubbed down at completion to a grit finished surface free from holes and blemishes. Colours shall be as selected by the Architect. The paving is to be laid in squares divided by plastic strips anchored securely in the screed and having their top edges truly level with the finished floor surface. The terrazzo work is to be laid and finished complete to the approval of the Architect. The screed between the terrazzo topping and the concrete floor is to be cement and sand (1:3) laid by the Sub-Contractor.

The granolithic topping is to be 15mm thick and shall consist of one part coloured cement to two parts aggregate to 6mm gauge mixed with 15% fine dust. Aggregate is to be 70% black trap and remainder approved local coloured stone. Colours shall be as selected by the Architect. Paving is to be rolled and trowelled to a dense even surface and rubbed down at completion to a grit finished surface free from holes and blemishes. The paving is to be laid in squares divided by plastic strips anchored

securely in the screed and having their top edges level with the finished floor surface. The granolithic work is to be laid and polished complete to the approval of the Architect. The screed between the granolithic topping and the concrete floor is to be cement and sand (1:3), laid by the Sub-Contractor.

The Contractor is to twice scrub the topping with soap and water before twice wax polishing and handing over.

MARBLE

Marble floor paving or wall cladding shall be compact and dense with a density of 2700 Kg/m³ as manufactured by Athi River Mining Ltd., P.O. Box 41908, Nairobi or other equal and approved, fixed in accordance with BS CP 298:1972 and manufacturer's instructions all to the Architect's approval. For floor paving, marble must be hardwearing and non-slip.

The marble supplier shall prepare fully dimensioned drawings from details supplied by the Architect and from site survey. Key numbers of each store shall be shown, together with details of all metal anchorages. No marble shall be fixed/laid until these drawings are approved by the Architect and the Contractor and local authority if necessary.

Exposed surfaces shall be finished in accordance with an approved sample.

Cramp holes and mortices shall be carefully drilled or cut to avoid stunning or fracture of the material adjacent to the hole or mortice.

The fixing cramps shall be adequately inset into the supporting background, preferably with under cut dowel holes and grouted in (1:3) cement/sand mortar, or other equal and approved epoxy/polyester resin mortars. A cavity between cladding and backing of 20mm minimum should be maintained except where dabs of weak mortar or lime putty are required to position the slabs. The back of slabs shall be coated with "shellac" or other equal and approved paint.

Metal anchorage shall be made from suitable non-ferrous metal and shall be of such size and dimension adequate to support loads imposed on them.

The length and height dimensions of individual dimension of slabs shall be ± 1 mm of the specified sizes. Thickness shall be within 3mm from that specified except on the exposed ends.

Internal wall cladding shall be fixed with tight joints and external cladding shall have 3mm joints. All joints to be filled with coloured cement and sand mortar to match marble. Paving shall be bedded solid on cement and sand screed.

The whole of marble work is to be executed by an approved Sub-Contractor.

QUARRY TILES

Where indicated lay approved clay quarry tiles bedded in cement. Joints to be 10mm wide and slightly recessed pointed in pigmented cement colour to match colour of quarry tiles to the approval of the Architect. Quarry tiles are to be laid as skirtings to these areas. Cement must not be smeared over the face of the tiles which must be selected for variety of colour and evenness of size.

VINYL ASBESTOS FLOOR TILES

Vinyl asbestos floor tiles shall be of the thickness specified as manufactured by Dunlop Kenya Ltd., or other equal and approved, and of colours to be selected by the Architect and shall be bedded in suitable mastic to a square pattern.

The whole of the floor tiling is to be executed by an approved Sub-Contractor.

Screeds must be perfectly smooth level clean and dry before laying commences and tiling must be laid strictly in accordance with the manufacturer's instructions. Tiles shall comply with B.S. 3260 and 3261 respectively. Prices shall include for giving the floor coverings two coats of an approved emulsion wax floor polish or other approved protective coating.

PARQUETRY

Parquetry is to be 8mm thick on building paper or similar backing bedded in hot bituminous mastic. After laying remove backing paper, sand to a smooth surface and finish with three coats of Polyurethane matt clear sealer.

The whole of the parquetry is to be executed by an approved Sub-Contractor.

Screeds must be perfectly smooth level clean and dry before laying commences and parquetry must be laid strictly in accordance with the manufacturer's instructions.

DIVIDING STRIPS

Dividing strips shall be 3mm thick and of a similar height as the paving in which they are embedded. Strips shall be cut to lengths and embedded in the pavings to form margins or bays to a detailed pattern or between differing floor finishes.

Prices for dividing strips are to include all necessary cutting required to ensure a flush level surface with the paving.

NON-SLIP POLISHED PAVINGS

Where pavings are described as non-slip they shall have carborundum dust sprinkled evenly over the surface at the rate of one kilogram per square metre lightly trowelled in whilst still green.

LIGHTWEIGHT SCREEDS

Lightweight screeds shall be composed of cement, sand and approved lightweight vermiculite (1:4:8) finished with a minimum 12mm thickness of cement and sand (1:5) laid whilst the base course is still green and trowelled smooth to the satisfaction of the roofing or flooring Sub-Contractor. Alternatively an approved pumice aggregate screed may be used to the approval of the Architect.

The Architect reserves the right to delete the lightweight screeds from the Contractor's work and to order their execution by a Nominated Sub-Contractor. No claim for loss of profit will be entertained in this eventuality.

DUST PROOFING COMPOUND

Concrete surfaces to be dust proofed shall have two coats of Sealocrete Concrete Surface Dressing applied in accordance with the manufacturer's instructions.

PLASTERING AND RENDERING GENERALLY

All surfaces to be plastered or rendered shall be brushed clean and be well wetted before plaster is applied. All plaster and rendering shall be kept continuously damp for seven days after application. All arrises shall be finished true and slightly rounded except where otherwise stated, and shall be run at the same time as the adjoining plaster. No partially or wholly set plaster or rendering will be allowed to be used or re-mixed.

The Contractor shall prepare samples of the plastering and rendering as directed until the quality, texture and finish required is obtained and approved by the Architect after which all plastering executed in the work shall conform to the respective approved samples.

The Contractor shall cut out and make good all cracks, blisters and other defects and leave the whole of the work perfect on completion. When making good defects, the plaster or rendering shall be cut out to a rectangular shape with edges undercut to form dovetailed key, and all finished flush with face of surrounding plaster or rendering.

Rates for plastering and rendering are to include for raking out joints of walling or hacking concrete to form a key. Instead of hacking the Contractor will be permitted to treat concrete surfaces, at his own expense, with bonding fluid, such as 'Plastaweld' manufactured by I. Manger and Son Ltd., or other equal and approved applied in strict accordance with the manufacturer's printed instructions.

INTERNAL PLASTER

Internal plaster shall be applied in two coats as follows, overall 12mm thick unless otherwise described:-

(a) 9mm First coat consisting of cement, and sand (1:4) well scratched, wetted and keyed to receive finishing coat.

(b) 3mm Finishing coat consisting of cement and lime putty (1:5) skim coat finished with a steel trowel to a smooth and even surface. Adequate time intervals must be left between successive coats in order that the drying shrinkage of the under coat may be substantially complete. All internal and external angles shall be pencil rounded.

EXTERNAL RENDERING

External rendering shall consist of cement and sand (1:8) applied in one coat and finished with a wood float as specified. Unless otherwise described rendering is to be 12mm thick applied in one coat. Rendering described as 20mm thick or over shall be applied in two coats.

TYROLEAN RENDER

Tyrolean render shall be composed of Colocrete or Snowcrete coloured or white cement and a special aggregate supplied as Cullamix and mixed in the proportion of two and a quarter to two and a half parts Cullamix to one part water applied with an approved hand operated machine. A finished thickness of 6mm should be obtained in stages until the crisp texture is obtained completely obliterating the background surface and as approved by the Architect. An equivalent made-up mixture with an approved aggregate similar to Cullamix may be used with the Architect's approval.

JOINTS

At junctions of structure frame and panel walling, cut through the entire thickness of plaster with a trowel leaving a gap of not more than 1mm width.

CRACKS AND DEFECTS

The Contractor shall cut out and make good all cracks, blisters and other defects and leave the whole of the plastering and rendering perfect at completion. When making good defects the plaster shall be cut out to a rectangular shape with edges undercut, to form dovetailed key, and all finished flush with the face of the surrounding plaster.

BAGGING

All internal and/or external surfaces specified as bagged are to be treated with a complete covering of 1:4 liquid cement/sand wash thoroughly rubbed in with an old sack to fill all cavities.

CERAMIC TILES

Ceramic tiles shall be from an approved manufacturer, and shall conform with the requirements of B.S. 1281. Tiles shall be of standard quality and unless otherwise specifically described shall be size 200 x 250 x 6mm thick for walls and 200 x 200 x 8mm thick for floors. Tiles shall be laid with continuous 2mm wide straight joints with plastic spacers and internal angles shall be butt jointed. Plastic edge beads shall be used at all external angles and at edges of panels. Tiles shall be well soaked in water, bedded in approved tile adhesive, pointed in white cement, and cleaned and polished on completion.

SAMPLES

The Contractor shall without charge prepare samples of work as directed until the quality, texture and finish required are obtained and approved by the Architect, after which all work executed shall conform to respective approved samples.

APPROVED SUB-CONTRACTORS

The Contractor shall state on the form provided and included as a tender document, the names of the Sub-Contractors he proposes to employ, and he shall not employ any other Sub-Contractors for the work without the written permission of the Architect.

PRICING INFORMATION

Prices for paving, beds and screeds shall include for the preparation of the concrete floor and painting with cement grout, as described; for any extra thickness consequent upon the concrete floor not being finished to true levels; and for laying over electrical conduits including reinforcing as necessary to the approval of the Architect.

Prices for plastering and rendering shall include for the preparation of the surfaces including raking out joints of brickwork or blockwork and hacking surfaces of concrete to form key, and for any extra thickness or dubbing out consequent upon any irregularities or inaccuracies in the surfaces to be covered.

Prices for terrazzo and granolithic work shall include for beds and backings, executing in the colours selected by the Architect, laying to panels and designs as may be directed, and for polishing at completion. Dividing strips forming panels and designs will be measured and paid for separately.

Prices for external finishings shall include for executing work at any height above ground and for any necessary additional scaffolding, ladders, cradles, etc.

If required by the Architect, or if indicated on the drawings prices for internal plastering and external rendering shall include for forming a fair splayed edge at all junctions with fair faced concrete surfaces and for forming 12mm wide grooves with fair splayed edges at junctions of walls with structural members and at soffits of slabs etc. Prices shall also include for V-grooves or rounded grooves, not exceeding 12mm wide, in external rendering to form decorative panels.

Prices for beds and backings are to allow for a true and even finish with a steel float, which is to be scraped clean by the Contractor before receiving the finish, to the satisfaction of the finishing Sub-Contractor.

PROTECTING FLOOR FINISHINGS

The Contractor is to allow for protecting all floor and staircase finishings after laying, whether executed by himself or a Sub-Contractor and will be held responsible for

any damage to the finishings after laying. All floors are to be cleaned on completion of the building before handing over.

GENERALLY

Protect all fittings, joinery and finishings from plaster and other finishings and clean up all marks on completion.

GLAZING

GENERALLY

All glass shall be of approved manufacture in accordance with B.S. 952, and free from flaws, bubbles, specks, and other imperfections cut to size to fit the opening for which it is required with not more than 1.6mm tolerance all round. All glass to be delivered in proper containers with maker's name, guarantee, type of glass and thickness or weight of glass attached to the outside of the container.

The clear sheet glass shall be Ordinary Glazing (O.Q.) quality sheet glass.

The obscured glass shall be of a pattern approved after the Contractor has submitted samples to the Architect at the beginning of the Contract.

Tempered glass shall be of the thicknesses specified.

The putty for glazing shall be tropical putty of approved manufacture suitable for glazing to metal or wood frames as hereinafter specified.

All putty shall be delivered on site in the original manufacturer's sealed cans or drums. The putty is to be removed from the drum well kneaded with the minimum of linseed oil and left for 24 hours before using.

The rebates and backs of handle brackets to metal windows shall be painted one coat before puttying. Before glazing the rebates of all windows shall be adequately back puttied.

Within 14 days the putty must dry and harden without wrinkling of the surface or caking and shall adhere satisfactorily to the surface of the glass and the frame.

The washleather strip shall be approved by the Architect and shall be cut to fit the exact line of bead.

The wires of Georgian wired glass, in adjacent panes, are to align both ways.

PRICING INFORMATION

Prices for glass shall include for all cutting and glazing to frames as described.

PAINTING AND DECORATING

GENERALLY

The whole of the work shall be executed to the entire satisfaction of the Architect, and all work rejected is to be re-executed by the Contractor at his own expense. Subject to the foregoing, the methods of application adopted i.e. brush, spray, roller, etc. are at the discretion of the Contractor, unless otherwise described.

All paints shall be Grade A in accordance with the Ministry of Works approved paint list.

Sumps and drains shall not be used for the disposal of waste or dirty water.

MAINTENANCE

The Contractor shall make good after other trades have carried out maintenance work. In cases where the defective work is not caused by, or the responsibility of, the Contractor, or his Sub-Contractors, he should make arrangements for payment with the party concerned. Where cracks have been made good, apply two coats to the new filling and one coat to the whole wall in which the crack has appeared.

MATERIALS

Any deviation from the materials and makes specified must be approved in writing by the Architect to whom application must be made before decoration starts.

IRONMONGERY

All ironmongery already fixed is to be removed before painting doors and refixed on completion of the finishing coat. If any paint should get on to ironmongery, it must be removed with chemical solvents and not scratched off.

APPROVED SUB-CONTRACTORS

The Contractor shall arrange for the painting and decorating work to be executed by an approved Sub-Contractor. The Contractor shall state on the form provided and included as a tender document the name of the Sub-Contractor he proposes to employ and he shall not employ any other Sub-Contractor for the work without the written permission of the Architect.

MIXING

All materials shall be delivered on site intact in the original containers and shall be mixed and applied strictly in accordance with the manufacturer's printed instructions. No addition will be allowed to be made locally without the express permission of the Architect.

COLOURS

The priming, undercoats, and finishing coats shall each be of differing tints, the priming and undercoats shall be the correct brands and tints to suit the respective finishing coats, in accordance with the manufacturer's instructions. All finishing coats shall be of the colour and type specified by the Architect.

The Contractor will be required to paint trial panels and will be required to adjust tints as necessary.

AREAS TO BE READY FOR PAINTING ETC.

Before the painting or decorating is started the Contractor shall arrange that all other trades have been completed and other tradesmen removed from the vicinity of the area to be painted. All plaster, mortar, concrete, oil or stains of any kind shall be removed by the Contractor from work to be decorated before painting commences.

PREPARATION

Plastered and rendered surfaces to be decorated shall be allowed to dry for a minimum of four weeks before decoration commences.

Plaster finished with a steel trowel and fair face concrete surfaces shall be well rubbed down filled and made good as necessary and thoroughly cleaned down immediately before decoration is applied.

Plaster finished with a wood float or other rough textured surface of a similar nature shall be made good as necessary and thoroughly brushed clean immediately before decoration is applied.

Insulating board or similar surfaces shall be filled and made good as necessary and lightly brushed down to remove all dirt, dust and loose particles.

Metal work to be painted shall be scaled clean and thoroughly wire brushed.

Woodwork to be painted shall be well rubbed down. All knots shall be covered with good knotting before priming and all defects shall be filled with hard stopping after priming. Plywood shall be brush filled over the entire surface

Woodwork to receive finishes other than paint shall have all stains and pencil marks removed, be well rubbed down and have all defects levelled up with hard stopping of a colour to match the adjoining surface.

Woodwork to be clear varnished shall be well rubbed down and the varnish is to be applied with a chamois leather pad, rubbed back with fine graded steelwool between coats and afterwards buffed up to produce an approved finish.

All woodwork to be varnished is to have all pencil and other marks removed and surfaces smoothed down prior to application.

PAINTS

All paints used should be obtained from one of the following manufacturers after obtaining the Architect's approval and of the product specification hereinafter described.

- a) Robbialac
- b) Crown Paints
- c) Dulux Paints
- d) Sadolins

PLASTIC EMULSION PAINTS

Plastic emulsion paint for internal and external application shall be of a manufacture approved by the Architect.

BITUMINOUS SOLUTION

Bituminous solution for use on coated pipes shall be obtained from a manufacturer approved by the Architect.

PRIMERS

Unprimed steelwork shall be primed with a Red Lead Primer.

Galvanised steelwork shall be treated with a mordant solution and primed with a Zinc Chromate Primer.

Woodwork shall be primed with a Pink Wood Primer.

UNDERCOATING

The undercoat for use under enamel finishing coats shall be an approved undercoat.

PRODUCT SPECIFICATION FOR PAINTS

Product specification for paints shall be in accordance with the composition requirements and may be required to be tested by the M.O.W. Materials Testing Branch.

| | 1st Quality Emulsion Paint | 2nd Quality Emulsion Paint | 1st Quality Alkyd Gloss Paint |
|--|--|--|---|
| Non-volatile(B.S Content3900 B2) | Must not exceed 50% by weight | Not more than 60% by weight | Less than 50% by weight |
| Pigment Volume Concentration | Not more than 5% | Not more than 70% | Less than 25% |
| Resin type | Vinyl Acetate/ Acrylic Ester Copolymer | Vinyl Acetate/ Acrylic Ester Copolymer | Long Oil Alkyd minimum oil length not less than 60% |
| Opacity requirement (contrast ratio to B.S. 3900 D4) | Not less than 80% | Not less than 70% | Not less than 90% |
| Pigment/ Binder Ratio | Not more than 2.25:1 | Not more than 2.75:1 | Not more 2.25:1 |

PRICING INFORMATION

The numbers of coats stated in the descriptions in these Bills of Quantities shall be applied in addition to any primers, stoppers, fillers, sealers, knotting, stopping, etc. required. The Contractor's prices shall be deemed to include for supplying and applying all such preparatory materials as may be required by the Standard Specification as recommended by the manufacturer of the finishing coat for the particular surface to be covered. The Contractor's prices shall further include for all other preparatory.

STRUCTURAL ENGINEERS SPECIFICATION

GENERAL

ARCHITECT OR ENGINEER

Where the word 'Engineer' is used in these descriptions of Materials and Workmanship, it shall in all appropriate cases be used and construed as the 'Structural Engineer'. For this purpose the Engineer shall be deemed vested with the duties of and be the representative of the Architect.

DISCREPANCIES IN DESCRIPTIONS

Descriptions of materials and workmanship contained in the Bills of Quantities measured items shall take precedence over descriptions contained in Appendices in the event of discrepancies between the two, unless the Engineer shall otherwise direct.

TESTS AND SAMPLES

Unless otherwise described in the Bills of Quantities, the Contractor will be responsible for all the costs involved in testing materials as described hereinafter. He will also be responsible for all the costs involved in supplying samples of materials or workmanship as required hereinafter to the satisfaction of the Engineer. The cost of replacing materials fixed or placed in position which do not comply with the required test results or approved samples shall be borne solely by the Contractor. Samples of materials shall be submitted as soon as possible after the Contract is let. No deliveries in bulk shall be made until the samples are approved by the Engineer.

STANDARDS

All materials and goods supplied for incorporation in the works must comply with any relevant standards issued by the Kenya Bureau of Standards or by the British Standard Institution.

EXCAVATION AND EARTHWORK

SITE CLEARANCE

Site clearance shall include the cutting down of all trees, stumps, bushes, vegetation and rubbish, burning the debris arising in approved locations, and carting remaining material to a tip provided by the Contractor.

GRUBBING

Grubbing up roots etc. shall include the following and disposal shall be as described under the foregoing clause :-

1. Stumps and roots of large trees shall be completely removed.
2. Stumps and roots of small trees, bushes or other vegetation shall be completely removed to a depth of at least 600mm below formation.
3. Smaller stumps and roots of vegetation up to 25mm thick shall be completely removed to a depth of 230mm below formation.
4. Fine roots shall be removed to as great depth as is practicable by hand.

Except where the area of grubbing is to be excavated, all resulting holes shall be filled up solid with approved material compacted to the same relative density as the surrounding material.

EXCAVATION

The Contractor is advised to visit the site and ascertain the nature of the ground to be excavated and he shall price accordingly and no claim will be allowed for want of knowledge in this respect.

Rates for excavation shall include for excavation in soil, earth, black cotton, sandy soil, murrum, tuff, soft rock, boulders or whatever other subsoil is encountered, except hard rock as defined below.

HARD ROCK

Any rock or other hard materials encountered in excavating to the required depths which in the opinion of the Architect or Engineer can only be removed by wedges, compressed air or other special plant, or explosives shall be paid for as an extra and the price shall include for trimming and levelling. No blasting will be allowed without prior permission. Material which can be removed by pick or traxcavator, ripper or similar mechanical plant will not be classed as rock.

FOUNDATION EXCAVATIONS

(a) The foundation trenches and column bases shall be excavated to the widths and depths of the concrete foundations shown on the drawings or to such widths and depths as the Engineer may instruct after examination of the excavations. Quantities of all excavations shall be measured and valued by the Quantity Surveyor and any difference between such measurements and the measurements herein given shall be dealt with as a variation of the Contract. If, however, the Contractor excavates to any greater depths than shown in the drawings or as instructed by the Engineer, then he shall at his own expense fill in such extra depth of excavation with concrete as specified for the foundations, to the satisfaction of the Engineer. The Contractor shall not be paid for the cost of any excavation executed deeper or wider than shown on the drawings or instructed by the Engineer nor for the cost of back filling such excavation or disposing of surplus.

(b) The Contractor shall report to the Engineer when secure bottoms have been obtained to the excavations and are ready to receive the foundation concrete. Any concrete or other work put in before the excavations have been inspected and approved by the Engineer shall, if so directed, be removed and new work substituted in accordance with the specification after excavations have been approved, all at the Contractor's expense.

(c) The bottoms of all foundation trenches and column bases shall be trimmed square and level. The Contractor shall form such steps on bottoms of foundation trenches as the Engineer may consider necessary in such positions and to such depths as he may direct.

SURPLUS SOIL DISPOSAL

Excavated material not required for subsequent refilling shall be removed to areas off site which will be approved by the Architect.

TOP SOIL FOR SPREADING

Where required in the Bills of Quantities, top soil required for subsequent spreading over finished work shall be especially selected and shall be dumped in special heaps as

indicated by the Architect. Such top soil shall be reasonably free from vegetation to the satisfaction of the Architect, and shall be compacted as little as possible in the heaps.

FILLING UNDER SURFACE BEDS IN BUILDINGS

Murram Filling

Murram for filling as base course shall be from an approved source and of the highest quality. It shall be laid in layers not less than 150mm thick and not greater than 230mm thick prior to compaction. Water will be applied to O.M.C. and each layer will be thoroughly compacted by at least 8 passes of a 10 tonne smooth wheeled roller or a 2 tonne vibrating roller until all movement ceases and 100% M.D.D. is obtained.

Hardcore Filling

Hardcore filling shall be crushed rock, broken brick, broken concrete or other approved hard granular materials broken to pass not greater than a 150mm ring or to be 75% of the finished thickness of the layers being compacted whichever is the less and graded so that it can be easily and thoroughly compacted by rolling. The filling is to be laid in layers each of a consolidated thickness not exceeding 230mm. Where rolling by 10 tonne smooth wheeled roller or 2 tonne vibrating roller is impossible, compaction shall be by hand or mechanical tampers. Each layer shall be compacted by at least 8 passes of the roller.

The top surface of the hardcore shall be levelled or graded to falls as required and blinded with similar material broken to 25mm gauge and surfaced with stone dust and well wetted before consolidation by the roller. The surface so obtained shall be to the Engineer's approval.

MATERIALS FOUND IN EXCAVATIONS

All materials classified as rock may, if approved by the Architect or Engineer be used as hardcore filling and the measured quantities of imported filling will be adjusted accordingly; all rock so used must be broken to the required size as before described before being used.

No sand, aggregate, murram or other material found in the excavations is to be used in the works without the written permission of the Engineer.

FILLING OBTAINED FROM THE EXCAVATIONS

Filling obtained from surplus excavated materials is to be free from all weeds, roots, vegetable soil or other unstable materials and is to be filled in layers each of not more than 230mm finished thickness. Each layer to be well wetted and consolidated as described herein.

INSECTICIDE TREATMENT

Where described, the top surface of filling shall be treated with Gladiator Pesticide (manufactured by Dow Agrosciences Ltd.) to be applied by Rentokil Ltd., P.O. Box 44360, Nairobi, or other equal and approved firm, in accordance with the manufacturer's instructions and subject to a twenty year guarantee to the satisfaction of the Architect.

DIOTHENE SHEETING

Diothene sheeting shall be produced by an approved manufacturer. Joints in sheeting shall be treble folded with a 150mm fold and taped at 300mm intervals with 50mm wide black plastic adhesive tapes. The sheeting shall not be stretched but shall be laid with sufficient wrinkles to permit shrinkage up to 15%.

CONCRETE WORK

ARCHITECT/ENGINEER

For the purpose of the concrete structure the Structural Engineer shall be deemed vested with the duties of and be the representative of the Architect.

CODE OF PRACTICE

All workmanship, materials, tests and performances in connection with the reinforced concrete work are to be in conformity with the latest edition of the appropriate British Standards where not inconsistent with these specifications.

SUPERVISION

A competent person approved by the Engineer shall be employed by the Contractor whose duty will be to supervise all stages in the preparation and placing of the concrete. All cubes shall be made and site tests carried out under his direct supervision, in consultation with the Engineer.

CONTRACTOR'S PLANT, EQUIPMENT AND CONSTRUCTION PROCEDURES

Not less than 30 days prior to the installation of the Contractor's plant and equipment for processing, handling, transporting and storing and proportioning ingredients, and for mixing, transporting and placing concrete, the Contractor shall submit drawings for approval by the Engineer, showing proposed general plant arrangement, together with a general description of the equipment he proposes to use.

After completion of installation, the operation of the plant and equipment shall be subject to the approval of the Engineer.

Where these specifications, the Bills of Quantities or the drawings require specific procedures to be followed, such requirements are not to be construed as prohibiting use by the Contractor of alternative procedures if it can be demonstrated to the satisfaction of the Engineer, that equal results will be obtained by the use of such alternatives.

Approval of plant and equipment or their operation, or of any construction procedure, shall not operate to waive or modify any provisions or requirements contained in these specifications governing the quality of the materials or of the finished work.

LEVELS AND FOUNDATIONS

The foundations of the work shall be carried down to depths as may be directed by the Engineer and they must be cut as nearly to the size of the concrete as possible and the vacant spaces between the concrete and solid ground excepting where otherwise shown must be carefully filled in as directed by the Engineer.

All temporary timbering shall be removed but should any timber be left in or should any other work be done beyond that specified, it will be at the Contractor's own cost.

TOLERANCES

On all setting out dimensions of 6m and over a maximum non-accumulative tolerance of plus or minus 6mm will be allowed. On all setting out dimensions under 6m a maximum non-accumulative tolerance of plus or minus 3mm will be allowed. On the cross sectional

dimensions of structural members, unless otherwise required by the drawings, a maximum tolerance of plus or minus 3mm will be permitted.

The top surface of concrete floor slabs and beams shall be within 6 mm of the normal level and line shown on the drawings. Columns shall be truly plumb and non-accumulative tolerance of 3 mm in each storey and not more than 12 mm out of plumb in their full height will be permitted. The Contractor shall be responsible for the cost of all corrective measures required by the Engineer to rectify work which is not constructed within the tolerances set out above.

MATERIALS GENERALLY

All materials which have been damaged, contaminated or have deteriorated or do not comply in any way with the requirements of these specifications shall be rejected and shall be removed immediately from the site at the Contractor's own expense. No materials shall be stored or stacked on suspended floors without the Engineer's prior approval.

SAMPLES AND TESTING

Every facility shall be provided to enable the Engineer to obtain samples and carry out tests on the materials and construction. If these tests show that any of the materials or construction do not comply with the requirements of these specifications, the Contractor will be responsible for the costs of the tests and the replacement of defective materials and/or construction.

CEMENT

Cement unless otherwise specified shall be Portland Cement of a brand approved by the Engineer and shall comply with the requirements of B.S. 12, and a manufacturer's certificate of test in accordance with B.S. 12 shall be supplied for each consignment delivered to the site. Provided that the approval of the Engineer is obtained, the cement may vary from B.S. 12 in that up to 10% of the total weight may be reactive volcanic ash and the quantity of insoluble residue may exceed that specified by B.S. 12.

Should the Contractor require to use cement of the rapid hardening variety, he shall obtain the approval of the Engineer and also obtain any instructions regarding modifications to these specification caused thereby. Any additional cost that may be caused by the use of rapid hardening cement shall be at the Contractor's expense.

Cement may be delivered to the site either in bags or in bulk.

If delivered in bags each bag shall be properly sealed and marked with the manufacturer's name and on the site is to be stored in a weatherproof shed of adequate dimensions with a raised floor. Each consignment shall be kept separate and marked so that it may be used in the sequence in which it is received. Any bag found to contain cement which has set or partly set, shall be completely discarded and not used in the works. Bags shall not be stored more than 1.50 metres in height.

If delivered in bulk the cement shall be stored in a weatherproof silo either provided by the cement supplier or by the Contractor but in either case the silo shall be to the approval of the Engineer.

AGGREGATES

Aggregates shall conform with the requirements of B.S. 882 and the sources and types of all aggregates are to be approved in all respects by the Engineer before work commences.

The grading of fine aggregates shall be within the limits set out in B.S. 882 and as later specified and the grading, once approved, shall be adhered to throughout the works and siliceous sand of good, sharp, hard quality and shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substances. It shall be graded within the limits of Zone F or M of Table 2 of B.S. 882. Sea sand will not be accepted.

Coarse aggregate for concrete Classes '30', '25', and '20' shall be black trap, Mazeras, or similar basaltic stone to the approval of the Engineer and coral aggregate will not be accepted. It shall be hard, clean and of good shape, free from dust, decomposed stone, clay, earthy matter, foreign substances or friable thin elongated or laminated pieces. It shall be graded within the limits of Table 1 of B.S. 882 for its respective nominal size.

If in the opinion of the Engineer the aggregate meets with the above requirements but is dirty or adulterated in any manner it shall be screened and/or washed with clean water if he so directs at the Contractor's expense,

Aggregates shall be delivered to the site in their prescribed sizes or gradings and shall be stockpiled on paved areas or boarded platforms in separate units to avoid intermixing. On no account shall aggregates be stockpiled on the ground.

The Engineer shall be entitled to require a certificate from an approved testing laboratory in connection with each source of fine and coarse aggregate showing that materials comply with the specification.

WATER

The water used for mixing concrete shall be from an approved source, clean, fresh and free from harmful matter, and comply with B.S. 3148.

EXPANSION JOINT FILLER

Expansion joint filler shall be 'Flexcell' as manufactured by Expandite Ltd., or 'Resilex' as manufactured by Evomatics Ltd. or equal and approved.

JOINT SEALER

Sealers shall be 'Pli-astic' or 'Seelastic' as described, both manufactured by Expandite Ltd., applied in accordance with the manufacturer's printed instructions and prices shall include for temporary battens or fillets and afterwards withdrawing to form grooves as necessary.

'Seelastic' shall be applied by gun and where more than 12mm deep shall include filling the groove with loose packing yarn to within 1mm from outer face.

'Pli-astic' shall be Grade 88 and applied hot. With the Engineer's prior approval 'Polevomastic' fillers of the appropriate grade as manufactured by Evomatics Ltd. may be substituted for 'Seelastic' and 'Pli-astic'.

CONCRETE STRENGTHS

Classes '30', '25', and '20' concrete shall have the minimum strengths as given by works cube tests shown here below.

Classes lower than those given shall be of the following nominal mixes and may be measured by volume or weight. No cube tests will be required for these classes.

| | | |
|---|------------------|------------------|
| Nominal mix by volume | 1:3:6 (Class 15) | 1:4:8 (Class 10) |
| Cubic m. fine aggregate per 50Kg. bag of cement | 0.12 | 0.16 |
| Cubic m. coarse aggregate per 50Kg. bag of cement | 0.24 | 0.32 |
| Max. size of coarse aggregate | 40mm | 40mm |

MEASURED PROPORTIONS OF CONCRETE

Cement

The quantity of cement shall be measured by weight. Where delivered in bags, each batch of concrete is to use one or more whole bags of cement.

- Aggregate
- (i) For Classes '30', '25', and '20' concrete shall be measured by weight in a weigh batching machine as described hereafter.
 - (ii) For lower Classes concrete, aggregates may be measured by weight or by volume. Where by volume, approved gauge boxes of such a size as will give the correct proportions shall be used.

WEIGH BATCHING MACHINE

Weigh batching machines shall be of an approved type and shall be properly maintained and checked for accuracy at regular intervals.

CONCRETE CLASSES - '30', '25', and '20'

The weights of fine and coarse aggregate to be used in concrete classes '30', '25', and '20' shall be limited in accordance with the table below. The proportions of fine to coarse aggregate and cement which the Contractor proposes to use for the mix specified shall first be approved by the Engineer. The Contractor will then be required to prepare preliminary test cubes and have these cubes tested as described for work cube tests. The test results should be submitted to the Engineer in sufficient time for further tests to be carried out should they prove unsatisfactory. Cube strengths in the preliminary tests must show crushing strengths of at least 25% higher than the strengths specified for work cube tests. If the Contractor is unable to produce specified cube strengths, he will be required at his own cost to increase the cement of the mix until satisfactory results are produced.

| Age | Minimum Crushing Strengths | | |
|---------|----------------------------|------------------------|------------------------|
| | Class 30 | Class 25 | Class 20 |
| 7 days | 21.0 N/mm ² | 17.5 N/mm ² | 14.0 N/mm ² |
| 28 days | 31.0 N/mm ² | 26.5 N/mm ² | 21.0 N/mm ² |

The average strength obtained from cube tests shall be 10% higher than the minimum strength shown above.

The Engineer may require at any time during the Contract the proportions of fine to coarse aggregate to be altered in order to produce a mix of greater strength or improved workability and providing that the total proportions of aggregate to cement remain unchanged, no claim for additional cost will be considered.

Concrete shall be poured to the classes as follows:-

The mixes given below e.g. 1:3:6 shall mean concrete composed by volume one part Portland cement, three parts sand or fine aggregate and six parts of coarse aggregate. All other compositions shall be interpreted in a like manner.

| | |
|--|------------------------------------|
| Class '30' concrete 1:1 ¹ / ₂ :2 | using 5mm to 20mm coarse aggregate |
| Class '25' concrete 1:1 ¹ / ₂ :3 | using 5mm to 20mm coarse aggregate |
| Class '20' concrete 1:2:4 | using 5mm to 20mm coarse aggregate |

Unless otherwise specified concrete shall be used as follows:-

| | |
|---|---------------------|
| High stress reinforced concrete | CLASSES '30' |
| Normal reinforced concrete | CLASSES '25' & '20' |
| Reinforced concrete member of thickness 75mm or less | CLASSES '20' |
| Surface beds, threshold, concrete surface channels and mass concrete fill | Concrete 1:3:6 mix |
| Concrete benching to cupboards and fittings and filling where described | Concrete 1:4:8 mix |

MINIMUM CEMENT CONTENT - CLASSES '30', '25', and '20'

The minimum cement content by weight shall be limited to :-

| Mix. | '30' | '25' | '20' | 1:3:6 | 1:4:8 |
|---|------|------|------|-------|-------|
| Minimum cement content (kg/m ³) | 300 | 300 | 260 | 220 | 150 |

WATERPROOF CONCRETE

Where 'waterproof concrete' is specified, the system may be an approved surface applied product, or waterproofing additives of a type approved in writing by the Engineer are to be added to the mixing water strictly in accordance with the manufacturer's instructions. Not more than 25 litres of water per 50Kg. bag of cement are to be used unless otherwise approved by the Engineer.

WATER BAR

Water bar shall be P.V.C. water bar as manufactured by Expandite Limited, or other approved type and shall be provided in width and at the positions indicated on the drawings.

Joints shall be heat welded in accordance with the manufacturer's instructions and where the water bar is to be fixed vertically, metal clips as manufactured by the supplier of the water bar or of other approved design shall be provided to suspend the water bar from the reinforcement.

Where waterproof concrete is used the Contractor shall adhere strictly to the position and type of construction joints as detailed on the drawings. Any deviation from this procedure or the provision of additional construction joints will require the prior approval of the Engineer and any additional water bar so required will be at the Contractor's expense.

Formwork shall be designed with sufficient timber formers and blocking pieces to support the water bar and to ensure that it is not displaced during concreting. In the case of horizontal joints in vertical walling and similar members the formwork shall be so constructed as to permit the starter or upstand of concrete surrounding the lower half of the water bar to be poured in the same operation as the slab or other concrete from which it springs. Formwork to walls or similar members where water bar is positioned at the base of the lift shall have sufficient openings not less than 300mm square at approximately

150mm to 300mm above the level of the water bar to permit checking that the water bar is correctly positioned and not displaced during concreting.

No concreting will be permitted to portions where upstand starters form an integral part until the formwork to the starter has been fixed and approved.

SEALOCRETE SUPERCOAT WATERPROOFER

Where specified 'Sealocrete Supercoat Waterproofer' shall be applied to concrete or blockwork surfaces strictly in accordance with the manufacturer's instructions. The surfaces must be well wire-brushed to remove dirt, efflorescence, adhering mortar and all foreign matter. It shall then be cleaned with fresh water. When absolutely dry a generous coat of Sealocrete Supercoat shall be applied by brush or spray gun. Surfaces so treated shall be protected from damage or staining as described elsewhere.

TESTING EQUIPMENT

The Contractor shall provide the following equipment for carrying out control tests on the site :-

- (a) Straight edges 3.00m and 1.20m long for testing the accuracy of the finished concrete;
- (b) A glass graduated cylinder for use in the silt test for organic impurities in the sand;
- (c) Slump test apparatus;
- (d) Four 150mm steel cube moulds with base plates and tamping rods to B.S. 1881.

WORK CUBE TESTS

Work cubes are to be made at intervals such that one set of four cubes shall represent no more than 50m³ of concrete in the works or as required by the Engineer and the Contractor shall provide a continuous record of the concrete work. The cubes shall be made in approved 150mm moulds in strict accordance with the British Standards.

Four cubes shall be made on each occasion, from each batch, the concrete being taken from the point of deposit.

Each cube shall be marked with a distinguishing number (numbers to run consecutively) and the date, and a record shall be kept on site giving the following particulars :-

- (a) Cube No.
- (b) Date made.
- (c) Location in work.
- (d) 7-day Test
Date
Strength required
- (e) 28-day Test
Date
Strength required

Cubes shall be forwarded, carriage paid, to an approved Testing Authority, in time to be tested, two at 7 days and one at 28 days and the fourth at the discretion of the Engineer. No cube shall be despatched within 3 days of casting.

Copies of all work cube test results shall be forwarded to the Engineer and one shall be retained on the site.

If the strengths required above are not attained, and maintained throughout the carrying out of the Contract, the Contractor will be required to increase the proportion of cement and/or substitute better aggregates so as to give concrete which does comply with the requirements of the Contract. The Contractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength as ascertained by work cube tests.

The Contractor must allow in his rates for concrete test cubes for all expenses in connection with the preparation and conveyance to the Testing Laboratory of test cubes and no claim in respect of his not so doing will be allowed.

MIXING AND PLACING OF CONCRETE

The concrete shall be mixed only in approved power driven mixers of a type and capacity suitable for the work, and in any event not smaller than 0.33 cu.m. capacity.

The mixer shall be equipped with an accurate water measuring device. All materials shall be thoroughly mixed dry before the water is added and the mixing of each batch shall continue for a period of not less than two minutes after the water has been added and until there is a uniform distribution of the materials and the mass is uniform in colour.

The entire contents of the mixed drum shall be discharged before recharging. The volume of mixed materials shall not exceed the rated capacity of the mixer. Whenever the mixer is started, 10% extra cement shall be added to the first batch and no extra payment will be made on this account.

As a check on concrete consistency slump tests may be carried out and shall be in accordance with B.S. 1881. The Contractor shall provide the necessary apparatus and allow for the costs of such tests. The slump of the concrete made with the specified water content, using dry materials, shall be determined and the water to be added under wet conditions shall be so reduced as to give approximately the same slump. Slump shall be 75 ± 25 mm, unless otherwise instructed by the Engineer.

The concrete shall be mixed as near to the place where it is required as is practicable, and only as much as is required for a specified section of the work shall be mixed at one time, such section being commenced and finished in one operation without delay. All concrete must be efficiently handled and used in the works within twenty (20) minutes of mixing. It shall be discharged from the mixer direct either into receptacles or barrows and shall be distributed by approved means which do not cause separation or otherwise impair the quality of the concrete. Approved mechanical means of handling will be encouraged, but the use of chutes or pumping for placing concrete is subject to the prior approval of the Engineer.

Concrete shall be placed from a height not exceeding 1.5m directly into its permanent position and shall not be worked along the shutters to that position. Unless otherwise approved, concrete shall be placed in a single operation to the full thickness of slabs, beams and similar members, and shall be placed in horizontal layers not exceeding 1.4m deep in walls or similar members.

Concrete in columns may be placed to a height of 4.00m with careful placing and vibration and satisfactory results. Where the height of the column exceeds 4.00m suitable openings must be left in the shutters so that this maximum lift is not exceeded.

Concrete shall be placed continuously until completion of the part of the work between construction joints as specified hereinafter or of a part of approved extent. At the completion of a specified or approved part a construction joint of the form and in the positions hereinafter specified shall be made. If stopping of concreting be unavoidable elsewhere, a construction joint shall be made where the work is stopped. A record of all such joints must be made by the Contractor and a copy supplied to the Engineer.

Any accumulation of set concrete on the reinforcement shall be removed by wire brushing before further concrete is placed.

The Contractor shall provide runways for concreting to the satisfaction of the Engineer. Under no circumstances will the runways be allowed to rest on the reinforcement.

Care shall be taken that the concrete is not disturbed or subjected to the vibrations and shocks during the setting period.

Mixing machines, platforms and barrows shall be clean before commencing mixing and be cleaned on every cessation of work.

Where concrete is laid on hardcore or other absorbent materials, the base shall be suitably and sufficiently wetted before the concrete is deposited.

COMPACTION

At all times during which concrete is being placed, the Contractor shall provide adequate trained and experienced labour to ensure that the concrete is compacted in the forms to the satisfaction of the Engineer.

Concrete shall not be placed at a rate greater than will permit satisfactory compaction nor to a depth greater than 450mm before it is compacted.

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuous tamping, spading, slicing and vibration. Vibration is required for all concrete of classes '30', '25' and '20'

Care shall be taken to fill every part of the forms, to work the concrete under and around the reinforcement without displacing it and to avoid disturbing recently placed concrete which has begun to set.

Any water accumulating on the surface of newly placed concrete shall be removed and no further concrete shall be placed thereon until such water be removed.

Internal vibrators shall have a frequency of not less than 7,000 cycles per minute and shall have a rotating eccentric weight of at least 0.7Kg., with an eccentricity of not more than 12mm. Such vibrators shall visibly affect the concrete within a radius of 230mm from the vibrator.

Internal vibrators shall not be inserted between layers of reinforcement less than one and a half times the diameter of the vibrators apart. Contact between vibrators and reinforcement and vibrators and formwork shall be avoided.

Internal vibrators shall be inserted vertically into the concrete wherever possible at not more than 500 mm centres and shall constantly be moved from place to place. No internal vibrator shall be permitted to remain in any one position for more than ten seconds and it shall be withdrawn very slowly from the concrete.

In consolidating each layer of concrete the vibrating head shall be allowed to penetrate and re-vibrate the concrete in the upper portion of the underlying layer. In the area where newly placed concrete in each layer joins previously placed concrete more than usual vibration

shall be performed, the vibrator penetrating deeply at close intervals along these contacts. Layers of concrete shall not be placed until layers previously placed have been vibrated thoroughly as specified.

Vibrators shall not be used to move concrete from place to place in the formwork.

At least one internal vibrator shall be operated for every three cubic metres of concrete placed per hour and at least one spare vibrator shall be maintained on site in case of break-down during concreting operations.

External formwork vibrators shall be of the high frequency low amplitude type applied with the principal direction of vibration in the horizontal plane. They shall be attached directly to the forms at not more than 1224mm centres.

In addition to internal and external vibration the upper surface of suspended floor slabs shall be levelled with a tamping or vibrating screed prior to finishing. Vibrating elements shall be of the low frequency high amplitude type operating at a speed of not less than 3,000 r.p.m.

CONSTRUCTION JOINTS

Construction joints shall be permitted only at the positions pre-determined on the drawings or as instructed on the site by the Engineer. In general they shall be perpendicular to the lines of principal stress and shall be located at points of minimum shear, viz. vertically at, or near, mid-spans of slabs, ribs and beams.

Suspended concrete slabs are generally to be cast using alternate bay construction in bays not exceeding 13 metres in length. No two adjacent bays are to be cast within a minimum period of 48 hours of each other. The joints between adjacent bays are to be in positions agreed with the Engineer.

Under no circumstances shall concrete be allowed to tail-off, but it shall be deposited against stopping-off boards.

Before placing new concrete against concrete already hardened, the face of the old concrete shall be thoroughly hacked, roughened and cleaned, and laitance and loose material removed therefrom, and immediately before placing the new concrete the surface shall be saturated with water and covered with a coat of mortar at least twenty five mm in thickness composed of cement and fine aggregate in the proportions used in the concrete.

CURING AND PROTECTION

Care must be taken that no concrete is allowed to become prematurely dry and the fresh concrete must be carefully protected within two hours of placing from rain, sun and wind by means of hessian sacking, polythene sheeting, or other approved means. This protective layer and the concrete itself must be kept continuously wet for at least seven days after the concrete has been placed. The Contractor must allow for the complete coverage of all fresh concrete for a period of 7 days. Hessian or polythene sheeting shall be in the maximum widths obtainable and shall be secured against wind. The Contractor will not be permitted to use old cement bags, hession or other material in small pieces.

Concrete in foundations and other underground work shall be protected from admixture with falling earth during and after placing.

Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or damage to the concrete members. Where directed

by the Engineer props may be required to be left in position under slabs and other members for greater period than those specified hereafter.

FAULTY CONCRETE

Any concrete which fails to comply with these specifications, or which shows signs of setting before it is placed shall be taken out and removed from the site. Where concrete is found to be defective after it has set, the concrete shall be cut out and replaced in accordance with the Engineer's instructions. On no account shall any faulty, honeycombed, or otherwise defective concrete be repaired or patched until the Engineer has made an inspection and issued instructions for the repair. The whole of the cost whatsoever, which may be occasioned by the need to remove faulty concrete shall be borne by the Contractor.

ROD REINFORCEMENT

The steel reinforcement shall be mild steel or high tensile steel as detailed on drawings or schedules and comply with the latest requirements of the following British Standards :-

Hot rolled bars for the reinforcement of to B.S. 4449 (metric units)
concrete

Cold worked steel for the reinforcement of to B.S. 4461 (metric units)
concrete

Hard drawn steel wire to B.S. 4482 (metric units)

It shall be in metric sizes as detailed on the drawings.

The Contractor shall submit a test certificate of the rollings. Reinforcement shall be stored on racks above ground level. All reinforcement shall be free from loose mill scale or rust, grease, paint or other substances likely to reduce the bond between the steel and concrete.

FABRIC REINFORCEMENT

To be electrically cross-welded wire mesh reinforcement to B.S. 4483 and of the size and weight specified

FIXING ROD REINFORCEMENT

Reinforcement shall be accurately bent to the shapes and dimensions shown on the drawings and schedules and in accordance with B.S. 4466. Reinforcement must be cut and bent cold and no welded joints will be permitted unless so detailed.

Reinforcement shall be accurately placed in position as shown on the drawings and, before and during concreting, shall be secured against displacement by using No. 18 S.W.G. annealed binding wire or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers to ensure the correct position and cover.

No concreting shall be commenced until the Engineer has inspected the reinforcement in position and until his approval has been obtained and the Contractor shall give two clear days' notice of his intention to concrete.

The Contractor is responsible for maintaining the reinforcement in its correct position, according to the drawings, before and during concreting. During concreting a competent steel fixer must be in attendance on the concretors to adjust and correct the positions of any reinforcement which may be displaced. The vibrators are not to come into contact with the reinforcement.

Where reinforcement projects from a concreted section of the structure and this reinforcement is expected to remain exposed for some time, it is to be coated with a cement grout to prevent rust staining on the finished concrete. This grout is to be brushed off the reinforcement prior to the continuation of concreting.

POSITION AND CORRECTNESS OF REINFORCEMENT

Irrespective of whether any inspection and/or approval of the fixing of the reinforcement has been carried out as above, it shall be the Contractor's sole responsibility to ensure that the reinforcement complies with the details on the drawings or schedules and is fixed exactly in the positions shown therein and in the positions to give the prescribed cover. The Contractor will be held entirely responsible for any failing or defect in any portion of the reinforced concrete structure and including any consequent delay, claims, third party claims, etc., where it is shown that the reinforcement has been incorrectly positioned or is incorrect in size or quantity with respect to the detailed drawings or schedules.

SPACING BLOCKS

Spacing blocks of approved size and shape made of concrete similar to that used in the surrounding construction and fixed to the reinforcement or formwork by No. 18 S.W.G. wires set into the spacer blocks, or other approved means, shall be provided where necessary to ensure that the requisite cover is obtained. The Contractor is to include for providing sufficient such spacer blocks in his prices for steel reinforcement where a supplier has been nominated. Where composite blocks or other forms of rib construction are used, spacer blocks are to be provided as shown on the drawings. These will generally consist of concrete blocks as described above made to fit the width of the rib less 3mm tolerance and with single or double grooves (depending on the number of reinforcement bars used per rib) in the top surface with wire ties at each groove.

CONCRETE COVER TO REINFORCEMENT

Unless otherwise directed the concrete cover to rod reinforcement over main bars in any face shall be :-

| | |
|-------------------|------|
| Foundations | 50mm |
| Columns and walls | 40mm |
| Beams | 25mm |
| Slabs | 15mm |

FIXING FABRIC REINFORCEMENT

The fabric shall be free from scale, rust, grease or other substance likely to reduce the bond between the steel and the concrete and shall be laid with minimum 300mm laps and bound with No. 18 S.W.G. annealed iron wire.

In all ground slabs, unless otherwise specified a single layer of square mesh steel fabric shall be placed at a depth of 50mm below the top surface of the concrete. The fabric shall comply in all respects with B.S. 4483 and be of the size and weight specified or shown on the drawings.

The fabric shall extend to within 75mm of the expansion joints and shall have laps of at least 230mm at all joints in the fabric at junctions with reinforced concrete beams or other members. It shall be placed on top of the first layer of concrete as previously described and sufficient wire ties shall be provided to ensure that the fabric is held down securely.

FIXTURES AND INDENTATIONS IN CONCRETE

No openings, chases, holes or other voids shall be formed in the concrete without the prior approval of the Engineer. Details of any fixtures to be permanently built into the concrete including the proposed position of all electrical conduits 25mm and over in diameter shall be submitted to the Engineer for his approval before being placed.

CHASES, HOLES, ETC. IN CONCRETE

The Contractor shall be responsible for the co-ordination with the Electrical and other Sub-Contractors for incorporating electrical conduit, pipes, fixing blocks, chases, holes and the like in concrete members as required and must ensure that adequate notice is given to such Sub-Contractors informing them when concrete members incorporating the above are to be poured. The Contractor shall submit full details of these items to the Engineer for approval before the work is put in hand. All fixing blocks, chases, holes, etc., to be left in the concrete shall be accurately set out and cast with the concrete.

POSITION OF ELECTRICAL CONDUIT

Unless otherwise instructed by the Engineer all electrical conduit to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and columns and between the top and bottom steel layers in slabs and similar members.

The proposed position of all electrical conduits 25mm and over in diameter which are to be enclosed in the concrete shall be shown accurately on a plan to be submitted to the Engineer, whose approval shall be obtained before any such conduit is placed.

FORMWORK

The method and system of formwork which the Contractor proposes to use shall be approved by the Engineer before construction commences. Formwork shall be substantially and rigidly constructed of timber or steel or precast concrete or other approved material.

All timber for formwork shall be good sound clean sawn well-seasoned timber, free from warps and loose knots and of scantlings sufficiently strong for their purpose.

CONSTRUCTION OF FORMWORK

All formwork shall be of sufficient thickness and with joints close enough to prevent undue leakage of liquid from the concrete and fixed to proper alignment, level and plumb and supported on sufficiently strong bearers, shores, braces, plates, etc. properly held together by bolts or other fastenings to prevent displacement, vibration or movement by the weight of materials, men and plant on same and so wedged and clamped as to permit of easing and removal of the formwork without jarring the concrete. Where formwork is supported on previously constructed portions of the reinforced concrete structural frame, the Contractor shall be in consultation with the Engineer to ensure that the supporting concrete structure is capable of carrying the load and/or sufficiently propped from lower floors or portions of the frame to permit the load to be temporarily carried during construction.

Soffits shall be erected with an upward camber of 10mm for each 4000mm of each horizontal span or as directed by the Engineer.

Great care shall be taken to make and maintain all joints in the formwork as tight as possible, to prevent the leakage of grout during vibration. All faulty joints shall be caulked to the Engineer's approval before concreting.

The formwork shall be sufficiently rigid to ensure that no distortion or bulging occurs under the effects of vibration. If at any time the formwork is insufficiently rigid or in any way

defective the Contractor shall strengthen or improve such formwork as the Engineer may direct.

The Contractor's attention is drawn to the various surface textures and applied finishes required and the faces of formwork next to the concrete must be of such material and construction and be sufficiently true to provide a concrete surface which will in each case permit the specified surface treatment or applied finish.

All surfaces which will be in contact with concrete shall be oiled or greased to prevent adhesion of mortar. Oil or grease shall be of a non-staining mineral type applied as a thin film before the reinforcement is placed. Surplus moisture shall be removed from the forms prior to placing of the concrete.

Temporary openings shall be provided at the base of columns, wall and beam forms and at any other points where necessary to facilitate cleaning and inspection immediately before the pouring of concrete. Before the concrete is placed the shuttering shall be trued-up and any water accumulated therein shall be removed. All sawdust, chips, nails and other debris shall be washed out or otherwise removed from within the framework. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete the formwork shall be well wetted and inspection openings shall be closed. The erection, easing, striking and removing of all formwork must be done under personal supervision of a competent foreman, and any damage occurring through faulty formwork or its incorrect removal shall be made good by the Contractor at his own expense.

After removal of formwork, all projections, fins, etc., on the concrete surface shall be chipped off, and made good to the requirements of the Engineer. Any voids or honeycombing shall be treated as described in 'Faulty Concrete'.

STRIPPING FORMWORK

All formwork shall be removed without undue vibration or shock and without damage to the concrete. No formwork shall be removed without the prior consent of the Engineer and the minimum periods that shall elapse between the placing of the concrete and the striking of the formwork will be as follows:-

| | |
|---|---------|
| Beam sides, walls and inclined columns (unloaded) | 2 days |
| Slab horizontal soffits (props left under) | 4 days |
| Beam soffits (props left under) | 10 days |

Removal of props (subject to 7 days concrete cube strength being satisfactory) to :-

| | |
|-------|---------|
| Slabs | 10 days |
| Beams | 14 days |

If the Contractor wishes to take advantage of the shorter stripping times permitted for beam and slab soffits when props are left in place, he must so design his formwork that sufficient props as agreed with the Engineer can remain in their original position without being moved in any way until expiry of the minimum time for removal of props. Stripping and re-propping will not be permitted.

The above times may be reduced in certain circumstances, at the discretion of the Engineer provided an approved method is adopted at the Contractor's expense to ensure that the required concrete strength is attained before the forms are stripped.

Solid strips in composite slab shall be considered as beams. The tops of retaining walls shall be adequately supported with stout raking props at intervals required by Engineer. These props are not to be removed until 7 days after casting of the floor slab.

FAIR FACE

Where fair face is specified the concrete shall be brought perfectly true smooth and even by rubbing with carborundum stone dipped in cement grout. Such work must be commenced within one hour of removing the formwork and be actively and rapidly pursued until completed, the object being to complete the finish as soon as possible after the removal of the shuttering. On no account may such work be postponed to a later stage in the Contract. Fair face surfaces shall be clean, smooth, even, true to form and free from all board marks joint marks, honeycombing, pitting, etc. The Contractor is permitted at his own expense to provide smooth lining to the forms which will achieve the required finish without rubbing down. All rubbed down work must be lightly washed with plain cold water at the completion of the Contract, and not before the cement grout used in the finish is at least four weeks old after initial mixing

BUSH HAMMERED FINISH

The concrete surface prior to the tooling of this finish shall resemble in all respects that produced as 'Fair Face' above. Particular care is required to achieve complete compaction of the concrete.

The bush-hammering shall be carried out using approved tools and shall produce an even, tooled appearance. All arrises, projections, etc., shall remain true and sharp and no rounding off of edges shall be permitted. The Contractor is to take care that no reinforcement is exposed and that in any case no tooling penetrates the concrete surface by more than 10mm.

The Contractor shall, prior to any bush-hammering taking place, provide a sample measuring 1.00m square to the Engineer indicating the standard of bush-hammering to be achieved. This when approved by the Engineer will form the standard for the entire works. Any surface not complying with this standard shall be removed or made good to the Engineer's satisfaction at the Contractor's expense.

TAMPED FINISH

Areas so specified shall be finished at the time of casting with a tamped finish to the Engineer's approval produced by an edge board. Board marks are to be made to a true pattern and will generally be at right angles to the traffic flow. Haphazard or diagonal tamping will not be accepted.

WROT LINED FORMWORK

The shuttering shall be constructed of wrot tongued and grooved boarding, plywood or blockboard lined with approved laminated plastic sheeting to produce a concrete surface with truly flat surface completely free from all air bubbles, joint marks, honeycomb and other pitting and blemishes to the approval of the Engineer.

Should the Contractor desire to use alternative materials he should submit his proposals to the Engineer for approval.

Should the Contractor fail to obtain approval and the Architect subsequently rejects the work, the Contractor will at his own expense carry out all work necessary to attain the approval of the same.

BOARD MARKED FINISH

Where so directed or measured the finish shall be that of a board marked pattern in panels, the boards shall be arranged vertically or horizontally and of widths and sizes all as detailed on the drawings. All exposed concrete will be left unpainted and therefore every care and attention shall be paid to obtain a satisfactory visual appearance and the maintenance of the same throughout the building operation. The finished surfaces shall be free from blow holes, hungry patches and other blemishes, and a sample panel is to be provided and approved by the Engineer before work commences.

Unless otherwise specified, the formwork shall be rip sawn softwood to the Engineer's approval and shall have a sufficiently strong grain to impart a corresponding pattern to the concrete surface. Unless otherwise approved it shall have four uses only and shall be carefully cleaned from adhering grout after each use. It shall be lightly oiled with approved no-staining oil.

CHISEL DRESSED FINISH

Where specified a chisel dressed finish is to be carried out on any grade of concrete but not until it is at least 30 days old. The surfaces are to be fully chisel dressed to remove a maximum of 12mm (average 9mm) of the surface to expose the aggregate without excessive cracking or breaking thereon.

Where the drawings show details of arrises of columns, beams, etc., these are to be pre-formed with timber fillets set in the formwork and care must be taken in working up to those to preserve a clean line. For vertical surfaces of walls and columns, particular care must be taken to remove all sharp projections. For beam soffits this requirements is not necessary.

All chisel dressed surfaces are to have the margin chisel dressed by hand for a minimum width of 75mm commencing from the fillet edge. Thereafter mechanical chisel dressing may be used but the Contractor must ensure that a uniform texture and even plane surface is achieved. The use of pointed steel tools for both hand and mechanical chisel dressing is essential. Upon completion the surfaces are to be thoroughly wire brushed and washed down and protected during the course of construction from damage, dirt, cement grout, etc.

PRECAST CONCRETE

Unless otherwise approved by the Engineer, all precast concrete construction shall be carried out on the site and shall conform to the requirements given elsewhere.

The maximum size of coarse aggregate in precast concrete shall not exceed 20mm except for thicknesses less than 75mm where it shall not exceed 12mm.

The compaction of precast concrete shall conform with requirements given elsewhere in these Specifications except for thin slabs where use of immersion type vibrators is not practicable. The concrete in these slabs may be consolidated on a vibrating table or by any other methods approved by the Engineer.

Steam curing of precast concrete will be permitted. The procedure for steam curing shall be subject to the approval of the Engineer.

The precast work shall be made under cover and shall remain under the same for seven days. During this period and for a further seven days the concrete shall be shielded by sacking or other approved material kept constantly wet. It shall then be stacked in the open

for at least a further seven days to season before being set in position. Where steam curing is used these times may be reduced to the approval of the Engineer.

Precast concrete units shall be constructed in individual forms. The method of handling the precast concrete units after casting, during curing and during transport and erection shall be subject to the approval of the Engineer. Providing that such approval shall not relieve the Contractor of responsibility for damage to precast concrete units resulting from careless handling.

Repair of damage to the precast concrete units, except for minor abrasions of the edges which will not impair the installation and/or appearance of the units will not be permitted and the damaged units shall be replaced by the Contractor at his own expense.

Moulds for 'Fair Face' precast work are to be made of metal or are to have metal or plywood linings or are to be other approved moulds which will produce a smooth dense fair face to the finished concrete suitable to receive a painted finish direct and free from all shutter marks, holes, pinnacles, etc. In his prices for such precast work the Contractor shall include for all rubbing down to produce the finish required, to the satisfaction and approval of the Engineer.

The precast units shall be installed to the lines, grades and dimensions shown on the drawings or as directed by Engineer.

COMPOSITE FLOOR OR ROOF SLABS

Concrete hollow blocks for used in the composite floor slabs are to be of the sizes required as shown on the drawings and with 30mm wall thickness and are to be of adequate strength to support the concrete during placing and consolidation by vibration. Blocks are to be manufactured in accordance with the procedure specified in B.S. 2028 and to be of a mix not weaker than 1:4:8 cement : sand : aggregate using maximum size aggregate.

Concrete blocks are to be cured for at least 28 days before use on the site. During the first seven days of curing, blocks are to be kept permanently damp and protected from exposure to sun and wind.

Concrete blocks are to be well wetted before the pouring of concrete.

COMPOSITE FLOOR CONSTRUCTION

The hollow block floor construction is generally to be as shown on the Engineer's drawings.

Care shall be taken in placing blocks to ensure that they are set out in accordance with the details shown on the drawings and that they run truly in line without encroaching on the width of the insitu ribs.

The open ends of hollow blocks, if adjacent to concrete to be placed insitu, are to be plugged or stopped to prevent the concrete from flowing into the void and the Contractor is to include for this in his prices.

The Contractor should note that slip tiles are not to be used to the soffit of ribs and he is to take this into consideration in pricing the items of formwork to the soffit of hollow block floor construction.

Before concreting is carried out the blocks are to be thoroughly wetted.

Care should be taken during concreting that the width of ribs between the rows of blocks and the solid insitu concrete shown on the drawings adjacent to supporting beams is not encroached upon by the blocks.

It is essential that the concrete topping be poured at the same time as the ribs between hollow blocks.

Reinforcement shall be positioned accurately with required cover in accordance with the drawings and using the particular spacing blocks with wire ties as previously described. Spacer blocks shall be provided in ribs at not more than 1.2m centres. Care must be taken during concreting that the reinforcement is not displaced.

Where holes for services, etc. occur, the necessary holes or pockets shall be accommodated by the replacing of a hollow block by insitu concrete or the widening of a rib all in accordance with the Engineer's instructions.

Prices for holes, etc. through hollow block construction are to include the re-arrangement or substitution of the hollow block with solid concrete in addition to the actual formation of the hole.

CONCRETE SURFACE BEDS

Concrete for surface beds shall be Grade '20'.

Before placing concrete and where specified or shown on the drawings a layer of 500 gauge polythene or diothene sheeting shall be laid on the base course. Minimum 300mm laps shall be provided at all joints.

The concrete shall be placed as soon as possible after being mixed. In transporting the concrete, adequate precautions shall be taken to avoid damage to the prepared base. The concrete shall be spread to such a thickness that when compacted it shall have the finished thickness as specified or shown on the drawings. A layer of concrete 50mm less than the finished thickness shall first be spread and struck off at the correct level to receive the top fabric reinforcement.

The top layer shall then be added. Not more than 30 minutes shall elapse between spreading the bottom layer. The Contractor shall be responsible for maintaining the reinforcement in its correct position during the placing and compaction of the concrete.

The compaction and finishing of the concrete shall be effected by immersion vibrators and a hand or mechanical tamper weighing not less than 10Kg per meter run and having a tamping edge shod with a steel strip 75mm wide fixed to the tamper by countersunk screws. Immersion vibrator with 'spade' attachments will be permitted. Compaction shall be continued until a dense, sealed surface finish is achieved. Over-compaction causing an excessive amount of fines to be brought to the surface shall be avoided.

The surface of the concrete shall be finished to the surface texture specified to the levels, falls and crossfalls, as directed or shown on the drawings and shall be subject to the following tolerance :-

The level shall be within or - 6mm of the levels specified.

The falls shall be within 10% of the falls specified.

The smoothness shall be such that departure from a 3.000m straight edge laid in any direction shall not exceed 3mm.

Minor irregularities shall be made good by the use of a steel float but in no circumstances shall mortar be used to make good the surface.

As soon as the surface has been finished, it shall be protected against too rapid drying by means of damp hessian, polythene sheeting or other approved means placed carefully on the surface and kept damp and in position for 7 days and the concrete shall be kept wet for

further 21 days. The most critical period is the first 24 hours after placing and curing during that time shall be very thorough. The Contractor is to obtain the Engineer's approval to the material and method he proposes to use for curing and no concreting will be permitted until sufficient such material is on site.

Forms shall not be removed from freshly placed concrete until it is at least 24 hours old. Care shall be taken that in their removal no damage is done to the concrete, but should any damage occur the Contractor shall be responsible for making it good.

EXPANSION JOINTS IN CONCRETE SURFACE BEDS

Expansion joints shall be positioned and constructed as shown on the drawings. The joints in the surface beds shall be absolutely square and true to line and position.

All joints in surface beds shall be formed to the patterns and shapes to coincide exactly with the joints in the surface finish or as otherwise indicated on the drawings. Formwork shall be manufactured from steel of heavy angle section and be to the Engineer's approval. The Contractor shall submit drawings of the forms he intends to use and obtain the Engineer's approval before fabrication. Panels shall be poured in alternate bays as agreed with the Engineer. No construction joints other than those indicated on the drawings shall be submitted.

NOTES CONCERNING MEASUREMENT AND PRICING

The Contractor must allow for all costs incurred during the progress of the Contract for complying with the provisions concerning the preparation and use of graded mixes.

Prices for concrete shall include for mixing and depositing as described or indicated and for hoisting and depositing at the various levels required throughout the building, and shall also include for forming or hacking a satisfactory key for all faces receiving asphalt and plaster work. Prices for slabs shall also include for levelling off the surface as described under 'Compaction', and all temporary formwork to form construction joints at bay edges.

Prices for reinforced concrete shall, in addition, include for filling into, between or on formwork and thoroughly compacting between and around rods or fabric reinforcement and for forming all additional construction joints between varying mixes. Where described as vibrated, prices must include for fully vibrating as described.

Formwork (use and waste only) is measured net to the actual face of the concrete to be supported and the prices for formwork shall include for extra material at joints, extra labour and waste for narrow widths, small quantities, overlaps, passing at angles, straight cutting and waste, splayed edges, notchings, etc., and for fixing at the various levels including battens, struts, and supports and for bolting, wedging, easing, striking and removal. Prices for linear items such as boxings shall include for angles and ends. Strutting has been measured at varying levels to soffits only and prices for other items must include for strutting at any level.

Prices for steel rod reinforcement shall include for cutting to lengths and all labour in bending and cranking, forming hooked ends, handling, hoisting and fixing in position and for providing all necessary tying wire and supports. Prices for fabric reinforcement shall include for all straight cutting and waste, handling, hoisting and fixing in position, providing all necessary tying wire, and supports and all extra material in laps.

Prices of all precast concrete shall include for all moulds, finishings as described, handling reinforcement, hoisting and fixing at the required levels, bedding, jointing and pointing in

cement and sand (1:5) mortar, also for casting or cutting to the exact lengths required and any waste resulting from such cutting. The sizes of weathered or moulded items stated are extreme sizes.

Prices for suspended hollow tile composite floor and roof slabs must be 'all inclusive' to include for concrete hollow tiles, in situ concrete ribs, concrete topping, concrete filling to open ends of hollow concrete tiles.

Concrete in main beams has been measured to the full width thereof and for full depth to top of slab level and composite slabs are measured separately, the net area between same. No adjustment will be made in these measurements for any projection of ribs, reinforcement, etc., into main beams or floors etc., to obtain bearings, which are deemed to be covered in the Contractor's rates.

Prices for expansion joints shall include for cutting to size and all temporary supports and prices for expansion joint sealers shall include for all temporary battens or fillets required to form the necessary grooves.

STRUCTURAL STEELWORK

APPROVED SUB-CONTRACTOR

The whole of the structural steelwork is to be executed by a specialist Sub-Contractor who is to be specifically approved by the Engineer and the Contractor will be required to make arrangements for the execution of this work and bear all expenses incurred. No change in the rates for this work inserted by the Contractor in these Bills of Quantities will be allowed

ARCHITECT/ENGINEER

For the purpose of the steel structure the Structural Engineer shall be deemed vested with the duties of and be the representative of the Architect.

QUALITY OF MATERIAL AND WORKMANSHIP

The quality of all materials and workmanship used in the execution of the works shall comply with the requirements of current relevant British Standard and Codes of Practice, including all the latest amendments.

BRITISH STANDARDS AND CODES OF PRACTICE

| | |
|-----------------------------|---|
| B.S. 4360..... | Weldable Structural Steels |
| B.S. 5950 | The use of Structural Steel inBuilding. |
| B.S. 4 (Part 1) | Hot Rolled Sections |
| B.S.4848 (Part2)..... | Hot Rolled Hollow Sections. |
| B.S. 2994 & 1449 | Cold Formed Steel Sections |
| B.S. 5135 | General Requirements for the Metal Arc Welding of Structural Steel Tubes to B.S. 6222,(B.S. 5125 will be considered to apply to the requirements for weldingofhotrolled hollow sections to B.S. 4848 Part 2). |
| B.S. 6323 Parts 1 - 8 | SteelTubesfor Mechanical, Structural & General Engineering Purposes. |
| B.S. 1856 | General Requirements for the Metal Arc Welding of Mild Steel. |
| B.S. 639 | Covered Electrodes for the Metal Arc Welding of Mild Steel |

TESTS

The Engineer may at any time require any materials to be tested in accordance with the requirements of the Standards listed above. The cost of all successful tests shall be borne by the Employer. The Contractor shall, if required by the Engineer, promptly supply at his own expense test pieces. The costs of tests on materials failing to comply with these Standards shall be borne by the Contractor. If in the opinion of the Engineer, faulty material and/or workmanship has been used in the works, the Contractor may be directed to dismantle and cut out the parts concerned and remove them for examination and testing. The cost of dismantling, cutting out and making good to the approval of the Engineer shall be borne by the Contractor.

FABRICATION

The standard of work and the general procedure to be followed during fabrication shall be in accordance with B.S. 449. The Contractor must ascertain all dimensions on the site prior to commencement of fabrication.

(a) Cutting & Bending - All members, plates, brackets, etc., shall be neatly and accurately sheared, sawn, or profiled to the required shape as shown on the drawings. Where steel is oxy-cut to shape, care shall be taken to preserve the full finished sizes required.

If members or plates are bent or set, the bends or sets shall be correctly made to the radii or angles specified without leaving hammer marks. The materials may be heated to permit this. Material that has been heated should be annealed to approval.

(b) Punching & Drilling - Holes for black bolts shall be drilled or punched 2mm larger in diameter than the bolt size. Holes for high tensile friction grip bolts shall be drilled or sub-punched and reamed to 2mm larger in diameter than the specified bolt size. All drilled holes shall be parallel sided and shall be drilled with the axis of the holes perpendicular to the surface. Badly drilled holes shall either be reamed out to approval and larger bolts fitted or otherwise as directed. All rough arrises shall be ground off. Holes for bolts in material thicker than 15mm must be drilled. When holes are drilled in one operation through two or more thicknesses of material, the parts shall be separated after drilling and all burrs removed before assembly. Holes for bolts shall not be formed by a gas cutting process. Holes formed or enlarged by oxy-cutting will not be accepted and must be filled to approval by electric welding and re-drilling.

(c) Bolting - All bolts used shall be of such length that at least one full thread is exposed beyond the nut after the nut has been tightened. Where a nut or bolt head would bear on an inclined surface, a bevelled washer of the correct shape shall be interposed between the two surfaces. Bevelled washers shall not be allowed to get out of position during fabrication and erection and for this purpose may be spot welded to the steel surface. Bevelled washers for use with high tensile bolts shall not be welded.

(i) Black Bolts, Nuts and Washers

Black bolts shall comply with the requirements of B.S. 916. (B.S.W. Threads).

(ii) Close Tolerance Bolts

Close tolerance bolts shall conform to B.S. 916.

(iii) High Strength Friction Grip Bolts

(a) General grade bolts to B.S. 3692.

(b) Load indicating bolts manufactured by G.K.N. Ltd. or any other approved manufacturer.

(c) High tensile bolts to B.S. 4395.

(iv) Rawlbolts

Rawlbolts shall be those manufactured by Rawlplug Company Ltd or any other approved manufacturer.

(v) Washers

Washers to B.S. 4320.

Washers for high strength friction grip bolts shall be appropriate to the type and quality of the bolt specified.

(vi) Rivets

The steel used for rivets shall be in accordance with B.S. 4360 and in the case of high tensile steel rivets shall be so manufactured that they can be driven and the heads formed and the physical properties not impaired.

(d) Pressed Steel Sections

Pressed or cold rolled steel purlins and girders shall be to the sizes indicated on the drawings and shall be formed from approved steel strip with a minimum yield strength of 175N/mm².

The sections shall be manufactured straight and free from twist. The tolerance away from straightness shall not be greater than 2mm for every 2000mm in length along any folded edge.

(e) Electric Welding

All welding shall be carried out in strict accordance with the requirements of B.S. 5135 and B.S. 2624 as appropriate and electrodes shall comply with B.S. 639. Only approved and certified welders shall be used

Fusion faces shall be free from irregularities such as tears, fins, etc., which would interfere with the deposition of weld metal.

Fusion faces shall be smooth and uniform and shall be free from loose scale, slag, rust, grease, paint and other deleterious material.

All welds shall be of approved type and finished size as specified. Welding shall be carried out in such sequence that minimum distortion of the parts welded results.

Preparation of edges for welding shall be carried out by planing or machine flame cutting. Manual flame cutting will not be permitted.

Parts to be welded shall be maintained in their correct relative positions during welding, preferably by jigs.

Multi-run welds shall be carried out with each run closely following the previous run but allowing sufficient time for the proper removal of slag.

The Contractor shall ensure that each run is inspected and any unsatisfactory weld cut out and remade to approval.

Welds in material 25mm or greater in thickness shall be made by the Argon arc or similar approved process, and special precautions shall be taken to prevent weld cracking.

Unless otherwise specified, the minimum size of fillet shall be 6mm.

On completion, welds shall present a smooth and regular finish. Weld metal shall be solid throughout with complete fusion between weld metal and parent metal and between successive runs throughout the joint

Defects shall be cut out and made good to approval in sound weld metal.

The external faces of butt welds are to be ground smooth on completion to the approval of the Engineer.

SHOP AND FIELD CONNECTIONS

(a) Rolled Sections

All shop connections shall be electric welded or bolted with high tensile bolts.

No bolts used shall be less than 12mm diameter and no weld less than 40mm in length. At least two bolts shall be used in connections transmitting loads unless otherwise indicated by the Engineer.

No weld of length less than four times the nominal fillet size shall be deemed capable of carrying load.

Beam to column connections not detailed shall be on 'Standard' top and bottom cleat connections with the load carried on the bottom cleat. 'Standard' web connections shall be used for connecting beams to beams.

Field connections shall be as detailed, i.e. bolted with high tensile or black bolts in drilled holes. Black bolts in punched holes will only be permitted for connections carrying a designed load or for connections to timber members.

(b) Structural Hollow Sections

Hollow sections shall be connected by electric welding unless specified otherwise.

The designs of welds shall be in accordance with Clause 6.6 of B.S. 5950.

Butt welds in tension members will not be permitted unless the prior approval of the Engineer in writing has first been obtained.

Butt welds where permitted, shall be made with the fusion surfaces of the ends of each member properly prepared and the member properly aligned.

ASSEMBLY

(a) Trusses and Portal frames

Trusses and portal frames shall be carefully set out to the dimensions shown on the drawings.

Where it is required that trusses be cambered, such camber shall be provided by bending the bottom chord to an arc of a circle.

Notwithstanding any dimensioned spacing of purlin cleats, the Contractor shall ensure that purlin cleat spacing is satisfactory for the available stock lengths of roof sheeting. However, the Engineer's approval must first be obtained before any alteration is made in purlin spacing or sheeting sizes.

Splices in portal and other frames shall be made where shown on the details or where directed by the Engineer.

(b) Boxed Members

Abutting edges of boxed members shall be connected and sealed with a continuous weld to exclude the entrance of moisture. Where specified such welds shall be ground flush to approval.

(c) Shop Assembly

Assembly of units in the shop prior to transporting to the site must be inspected by the Engineer before painting. The assembled work shall be laid out in the shop or yard such that all parts are accessible for inspection and testing.

The Contractor shall furnish all facilities for inspection and testing of the works and must notify the Engineer on every occasion materials are ready for inspection.

(d) Marking

All members of the structures to be site assembled shall be marked in accordance with the shop details and marking plans submitted to the Engineer for approval.

ERECTION

(a) Site Dimensions

Erection shall not commence unless and until accurate site dimensions have been taken by the Contractor. No claims will be considered should site dimensions differ from those on the drawings. Any modifications to the structural steel required in order to comply with site dimensions shall be made on the ground to the Engineer's approval before erection is commenced.

(b) Safety

All erection shall be carried out by competent and experienced personnel and the Contractor shall take every care to safeguard members of the public, workmen, and adjoining property against injury and/or damage. The Contractor shall be held responsible for all damage caused to the structure, workmen, or other property during erection.

All gear used shall be of adequate strength and shall comply with all current Regulations.

During erection the work shall at all times be adequately bolted, guyed and/or braced to make the structure secure.

(c) Storage and handling

Steel members shall be stored, handled and erected in such a manner that no member shall be subjected to excessive stresses which could have adverse effect on the properties of the steel. If, in the opinion of the Engineer, the steelwork has been subjected to such treatment, the Contractor shall remove the member from the site and replace it at his own expense.

(d) Erection Notes

No member or part of a member which has been bent or distorted shall be erected in that condition. All straightening shall be done on the ground.

Stanchions shall be wedged to line and level on steel or cast iron wedges and checked by the Engineer. After acceptance, stanchion bases shall be grouted to approval before wedges are removed. Unless otherwise shown on the drawings, all stanchions shall be left truly vertical and correct to line and level. Beams, girders, etc., shall be erected level unless otherwise shown, and correctly positioned.

Trusses and open web joists shall be carefully handled at all times and during erection shall be lifted at such points and in such a manner as will preclude any possibility of damage from excessive stresses.

Packing plates, shims, washers or similar adjusting pieces found necessary to accommodate tolerances in structural site dimensions shall be provided and fixed to the approval of the Engineer.

Immediately after erection, each truss shall be made secure by purlins, bracing or guys to approval of the Engineer.

Bracing shall be fixed in position as soon as dependent portion of the work is completed.

(e) Tightening and Testing High Tensile Friction Grip Bolts

Before assembly, the contact surfaces, including those adjacent to the washers, shall be descaled, and be free from dirt, oil, loose scale, burrs, paint (except priming paint), pits and other defects that would prevent proper seating of the parts.

Bolts shall be fixed with approved hardened flat or tapered washers as required between the bolt and nut and the softer mild steel.

When bearing faces of the bolted parts have a slope of more than 1 in 20 with respect to a plane normal to the bolt axis, square smooth bevelled washers shall be used to compensate for the lack of parallelism.

All bolts shall be tightened by the 'Turn of Nut' method and as approved by the Engineer to achieve in all bolts a minimum tension equal to the proof load.

(f) Grouting

Unless otherwise detailed on the drawings, a space of not less than 40mm shall be provided between undersides of column base plates and footings, and between all beams and roof truss bearings and concrete pads.

After each column, beam or roof truss has been wedged up to a line and level and fixed in position to approval, the space between footing or pad and the underside of the column base plate or steel member shall be grouted with a mixture of one part of Portland cement and one part of approved washed sand (1:1).

The Portland cement and sand shall be thoroughly mixed together with sufficient water to produce a mixture of 'damp earth' consistency and shall be used within twenty minutes of mixing. The caulking mixture shall be packed tight into the space between baseplate and foundation and protected from damage until it sets.

PAINTING

(a) Paints

All paints are to be obtained from suppliers approved in writing by the Engineer.

Paints are to be delivered to the site or to the Contractor's fabrication site in the original containers as supplied by the manufacturer with seals unbroken and are to be used in strict accordance with the manufacturer's instructions. Manufacturer's representatives are to be free to visit the site and inspect materials for laboratory analysis.

Paints are not to be thinned unless instructed by the Engineer. No external painting is to be carried out during rain or when rain is likely to occur before the paint has had time to dry. All surfaces are to be dry and free from moisture during painting.

(b) Preparation for Painting

All structural steel shall be thoroughly scraped and wire brushed to remove mill scale and rust. Dirt, grease and oil shall be washed off with white spirit and the steel allowed to dry.

(c) Application

A first coat of Red Lead Graphite Primer or other approved primer shall be applied after fabrication of the works has been completed. A minimum of 24 hours shall elapse before the steel is moved from its position after painting has been completed.

After delivery to site, the steel shall be carefully examined and all areas where the priming coat has been damaged and/or where rust has developed shall be washed with white spirit and wire brushed as necessary and a further priming coat as for the first coat applied to completely cover the damaged areas.

During erection, surfaces of steel which are to be in contact shall be painted with one further coat of primer as previously described and the surfaces brought together whilst the paint is still wet.

After erection, paint a second and finishing coat of 'Oil Company Aluminium Paint 368/36' or other finishing paint of standard as for steelwork. Welds shall not be painted over until they have been deslagged, inspected and approved.

Steel purlins and side rails shall generally be painted as for steelwork when the following specification shall be used.

1st Coat - Red Oxide Zinc Chromate Primer or other approved primer

2nd Coat - Robbialac 'Oil Company Aluminium Paint 368/36' or other equal and approved Aluminium Paint

The interior of mild steel gutters shall be prepared as previously described and painted with 2 coats of Robbialac Epilac Coal Tar Epoxy Paint or other approved paint.

PRICES, MEASUREMENTS AND PAYMENT

Prices quoted by the Contractor shall be based on the calculated weights of steel, and shall include for manufacture, painting, and supply, all as described in the Bills of Quantities, specified, and shown on the drawings, including the cost of delivery to the site or other agreed place or places and the supply of all bolts, rivets, plugs, gussets, cleats, to complete the erection of the works.

Prices shall include for erection, (all labour, scaffolding, and other erection equipment necessary) and cover the cost of additional prime coat painting as previously specified. The prices shall also include for lining up, levelling and plumbing but not for grouting up of the bases.

The basis for payment for steelwork shall be the calculated steel weights of the structure. Any variation from the original design on which the tender was based, which results in either an increase or decrease in calculated weight of the structure as completed, shall result in the appropriate additions or deductions to the submitted tender totals.

Any written instruction from the Engineer which may result in additional work over and above that for which the Contractor quoted will be considered as extras and shall be paid for on the basis of calculated additional steel weights.

EXTERNAL WORKS SPECIFICATION

ARCHITECT OF ENGINEER

Whenever the word 'Engineer' is used in these descriptions of materials and workmanship, it shall, where appropriate, be read and construed as the 'Architect', Landscape Architect or, as the 'Civil Engineer' in which instance the Landscape Architect or Engineer shall be deemed vested with the duties of and be the representative of the Architect.

DISCREPANCIES IN DESCRIPTIONS

Descriptions of materials and workmanship contained in the Bills of Quantities measured items shall take precedence over descriptions contained in appendices in the event of discrepancies between the two, unless the Engineer shall otherwise direct.

TESTS AND SAMPLES

Unless otherwise described in the Bills of Quantities, the Contractor will be responsible for the costs involved in testing materials as described hereinafter. He will also be responsible for all the costs involved in supplying samples of materials or workmanship as required hereinafter to the satisfaction of the Engineer. The cost of replacing materials fixed or placed in position which do not comply with the required test results or approved samples shall be borne solely by the Contractor.

KENYA STANDARDS

All materials and goods supplied for incorporation in the works must comply with any relevant current standards issued by the Kenya Bureau of Standards.

GENERAL

The provisions of other sections of this Specification shall, where appropriate, apply to this section. The works shall be executed in accordance with consultant drawings and designs.

CONCRETE PIPES

Concrete pipes and fittings shall conform to B.S. 556 and shall have ogee or spigot and socket joints as specified in the drawings or as directed by the Engineer.

PVC SOIL SYSTEM

The Contractor shall supply and fix PVC soil pipes and fittings as indicated in the drawings. Pipes and fittings shall be in accordance with the relevant BS including BS 4514 and fixed to the

manufacturer's specifications and any other particular specifications that may be issued by the Engineer during the construction period.

EXCAVATION

The excavation shall be made true and even to falls, the bottom being trimmed to the correct levels and well rammed. The minimum width of the trench at the bottom shall be the external width of the pipe plus 300mm. Wherever soft places in excavated areas are encountered, the Contractor shall excavate such soil to a hard foundation and replace with hard filling before any drains are laid. Any trenches excavated in error to a greater depth than required shall be backfilled to the required level with hard filling at the Contractor's own expense.

DRAIN RUNS

Surface water drains are to be to the diameters and of the materials as shown on the drawings, laid in straight lines and with uniform falls to the levels indicated. No alterations to the sizes, falls and runs shown on the drawings are to be made without previous consent.

JOINTING CONCRETE PIPES

Joints are to be made with best quality gaskin dipped in cement grout immediately prior to use, caulked in, and finished off to not more than one third the depth of the socket.

Pipe runs are to be laid dry and jointed in one operation with cement and sand (1:2) trowelled to a smooth face at an angle of 45 degrees to the pipes, and properly cored as the work proceeds.

Where an approved proprietary spigot and socket pipe is used, joints shall be made in accordance with the manufacturer's instructions.

BACKFILLING

No backfilling shall be carried out until drains, manholes and chambers etc., have been tested and approved. The whole of the backfilling shall be properly consolidated and shall be put back in 250mm layers. No mechanical rammers may be used until at least 600mm of consolidated material has been returned over the pipes. Only approved material may be used for backfilling. Where pipes are unprotected by concrete haunching, the first operation in filling shall be to handpack and tamp selected fine material around the lower half of the pipes to buttress them to the sides of the trench.

In the case of pitch fibre and plastic pipes, the first filling shall completely cover the pipe and shall be of material free from stones or hard material which would be retained on a 25mm sieve.

TESTING NEW DRAINS

All surface water drains will be tested to 1500mm head of water. No drains are to be covered in or further proceeded with until such test has been made, repeated as necessary, and passed by the Architect and Local Authority.

After passing the test the head of water is to be maintained until the concrete bed, haunching or covering is complete. Immediately prior to completion of the Contract the main and branch drains shall be tested by passing through them a ball or disc 6mm less in diameter than the bore of the pipe, and the water test repeated, as required by the Architect and Local Authority.

PROTECTION OF WORK

The drains are to be laid to suit the general progress of the building work and at such times and in such a manner as to be adequately protected against damage and deterioration. The whole of the work is to be maintained and handed over in a sound and clean condition on completion of the Contract.

INVERT BLOCK DRAINS

Precast concrete invert blocks and side slabs shall be formed of concrete (Grade 20) to the dimensions shown on the drawings. Each course of side slabs required in the Bills of Quantities shall be interpreted as one complete row of side slabs to one side of the channel concerned. Drains should not normally be laid to a radius of less than 10 times the actual width of the drain.

Invert block drains shall be constructed in the positions and to the levels and dimensions shown on the drawings and laid to true line and even fall. Where underfilling is required it shall be in 100mm maximum thickness layers of compacted gravel. The earth sides to such channels shall be neatly finished to a slope of 1 to 1 or such other slope as the Architect may direct.

Invert blocks and side slabs shall be laid on a 75mm minimum thickness of compacted gravel and be neatly jointed with cement mortar (1:3) as the work proceeds. The rates included in the Bills of Quantities shall include for excavation, gravel bedding, providing, laying and jointing invert blocks, refilling and disposal of surplus all as specified and all in-situ connections in concrete of the appropriate Grade specified.

On completion, all drains, manholes, etc. shall be flushed from end to end with water and left clean and free from obstructions and deleterious matter.

ROAD GULLIES

Gullies shall be masonry gullies constructed from 225mm building stone and rendered internally. The rates included in the Bills of Quantities shall include for excavation, provision of all materials, making junctions with connections to main drains, accurate setting of frames to line and level, refilling and disposal of surplus materials.

Concrete filled gully grating of size shown on the drawings shall be used as the cover.

KERBS, CHANNELS AND QUADRANTS

Precast concrete kerbs channels and quadrants shall be bedded and jointed in 12mm thick cement mortar (1:3) on concrete (1:3:6 - 40mm) foundation of dimensions shown on the drawings. Immediately after being laid, the kerbs and quadrants shall be haunched on back face to half their height in concrete (1:3:6 - 40mm) to the dimensions shown on the drawings.

The exposed face of kerbs and quadrants shall be not less than 100mm nor more than 105mm above the channel of the road except where it is necessary to provide an artificial fall in the channel. The exposed surfaces of the kerbs, channels and quadrants shall conform to the required gradients and curves in vertical plane and to the required plan.

Kerbs, channels and quadrants shall conform to the requirements of B.S. 340. No joint shall exceed 12mm in width. All units shall be laid true to line and level and any unit found to be more than 3mm out of line or level at either end shall be lifted and relaid.

PRECAST CONCRETE PAVING SLABS

Unless otherwise shown on the drawings or directed, precast concrete paving slabs shall comply with B.S. 368 with minimum strength.

WEED KILLER

The finished formation of the footways and roads shall, where directed by the Architect, be sprayed with a persistent total herbicide 'Telvar' W or other equal and approved, at the rate of 4 Kg per hectare. The application shall be evenly sprayed in a high volume of water at about 100 to 200 litres per hectare.

PRECAST CONCRETE BLOCKS PAVING

Precast Concrete block paving shall be laid in sand on properly prepared and compacted sub-base as for in-situ concrete or asphalt concrete.

Blocks shall be fitted close together in a pattern approved by the Architect and boundaries shall be restrained by edge channels or kerbs before vibrating begins.

Blocks thickness and characteristic strengths shall be as measured in the Bills of Quantities.

Blocks shall be laid by hand 20 to 30mm above finished level on levelled, unconsolidated sand 50mm thick before compaction and the paving shall be compacted using a plate vibrator. Fine sand shall be brushed into the joints before and after compacting.

After compacting the surface level shall be within 5mm of the specified level and the level of any two adjacent blocks shall not differ by more than 2mm.

PRIME COST AND PROVISIONAL SUMS PREAMBLES

The Contractor shall include the Prime Cost and Provisional Sums for each Bill in his tender. These sums shall be expended as directed by the Architect or deducted in whole or in part if not required. Work executed in respect of Provisional Sums shall be measured and valued by the Quantity Surveyor in accordance with the Conditions of Contract.

The Contractor will be responsible for the administration of all Nominated Suppliers in accordance with the Conditions of Contract and will be required to arrange an approved programme for delivery of materials with each firm.

The Contractor will be responsible for the supervision and administration of all Nominated Sub-Contractors in accordance with the Conditions of Contract and will be required to arrange an approved programme with each firm.

The Contractor shall allow for general attendance upon Nominated Sub-Contractors and for affording them all reasonable specific attendance and facilities for carrying out their works simultaneously with his own and shall add to prime cost sums for each or all of the following items or any other item which he considers necessary :-

- (a) Profit and overhead cost
- (b) Supplying all necessary full size setting out templates
- (c) Giving all necessary dimensions and taking responsibility for their accuracy.
- (d) Unloading or assistance in unloading of materials, getting in and hoisting in position
- (e) Providing all necessary working space and providing space for storage accommodation which the Nominated Sub-Contractors will erect for themselves.
- (f) Allowing the free and full use of all scaffolding, ladders, hoists, trestles, scaffold boards and all plant of a similar nature belonging to or provided by the Contractor while it remains erected on the site. Any further scaffolding required shall be the Nominated Sub-Contractor's responsibility and he shall pay the cost thereof unless otherwise stated.

- g) Supply of water and supply of temporary lighting and of electric power, as more specifically described in Bill No. 1 under 'Water for the Works' and 'Lighting and Power for the Works' respectively.
- (h) Providing all necessary latrine accommodation as more specifically described in Bill No. 1 under 'Sanitation of the Works'.
- (i) Removing and replacing duct covers, pipe casings etc., as necessary for the execution and testing of Nominated Sub-Contractor's work.

Provision is made after each Prime Sum Cost for the pricing of the foregoing under two headings:-

'Add for Profit' should include (a)

'Allow for Attendance' should include (b) to (i) and any other expenses involved in compliance with the preambles of this Appendix.

Builder's work in connection has been measured separately unless otherwise described or unless any particular Sub-Contractor has been instructed to execute his own builder's work. Where work in connection is required from the Contractor, he must obtain particulars of positions in which chases, holes, mortices, etc., will be required so as to avoid unnecessary cutting away. No claim will be considered for the extra cost of cutting away work already built as a result of the Contractor's failure to obtain sufficient particulars beforehand.

Any percentage addition made by the Contractor against an item of 'Add for Profit' beneath a Prime Cost Sum will be deducted from the Contract Sum and in lieu thereof he will be paid the said percentage of the actual amount directed to be expended in respect of that particular Prime Cost Sum.

SECTION G:

SAMPLE FORMS

(to be used at various stages of tender process up to signing of contract)

| | <u>Page</u> |
|---|--------------------|
| (i) Form of Tender | G/2 |
| (ii) Letter of Acceptance | G/3 |
| (iii) Form of Agreement | G/4 – G/5 |
| (iv) Form of Tender Security | G/6 |
| (v) Form of Performance Bank Guarantee Undertaking | G/7 |
| (vi) Performance Bank Guarantee | G/8 – G9 |
| (vii) Certificate of site visit | G/10 |
| (viii) Form of Oath | G/11 – G/12 |
| (ix) Details of Sub-Contractors | G/13 |
| (x) Confidential Business Questionnaire | G/14 – G/15 |

FORM OF TENDER

To: **Ministry of Tourism and Wildlife,**
State Department of Tourism _____ **(Date)**

P. O. Box 30027 – 00100 Nairobi. _____ [Date]

PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN
MOMBASA COUNTY

Dear Sir,

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

Dated this _____ day of _____ 20 _____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of

_____ [Name of Tenderer]

of _____ [Address of Tenderer]

Witness: Name _____

Address _____

Signature _____

Date _____

LETTER OF ACCEPTANCE
[Letterhead paper of the Employer]

_____ [date]

To: _____
[name of the Contractor]

[Address of the Contractor]

Dear Sir,

This is to notify you that your Tender dated _____ for the execution of

PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN MOMBASA COUNTY

for the Contract Price of Kshs. _____ (Kenya Shillings _____ (amount in words) within a Completion **Period of _____ Weeks** in accordance with the Instructions to Tenderers is hereby accepted.

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

Authorized Signature _____

Name and Title of Signatory _____

Attachment: Agreement.

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____, **2019**

between **Ministry of Tourism and Wildlife, State Department of Tourism**, of [or whose registered office is situated at] **P.O. Box 30027 – 00100, Nairobi**

(hereinafter called “the Employer”) of the one part AND

_____ of [or whose registered office is situated at]

P.O. Box _____ **Nairobi** hereinafter called “the contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

The Proposed Regeneration of Jomo Kenyatta Public Beach in Mombasa County (hereinafter

called “the Works”) located in **Mombasa County** [Place/location of the Works] and the Employer

has accepted the tender submitted by the Contractor for the execution and completion of such Works

and the remedying of any defects therein for the Contract Price of Kenya Shillings

_____ [Amount in figures], Kenya Shillings

_____ [Amount in words].

and completion **period of** _____ **Weeks.**

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read as part of this Agreement i.e.:
 - i) Letter of Acceptance
 - ii) Form of Tender
 - iii) Conditions of Contract
 - iv) Appendix to Conditions of Contract
 - v) Specifications
 - vi) Drawings
 - vii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

SEALED with Common Seal of the Employer, **MINISTRY OF TOURISM AND WILDLIFE,**
STATE DEPARTMENT OF TOURISM

In the presence of (i) Name: _____
Address: _____
Signature: _____

(ii) Name: _____
Address: _____
Signature: _____

SEALED with Common Seal of the Contractor

In the presence of (i) Name: _____
Address: _____
Signature: _____

(ii) Name: _____
Address: _____
Signature: _____

FORM OF TENDER SECURITY

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

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

THE CONDITIONS of this obligation are:

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

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

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

Signature of the Bank

Name of Witness

Seal

Signature of the Witness

Date

Date

TO: Ministry of Tourism and Wildlife,
State Department of Tourism,
P.O. Box 30027 - 00100,
Nairobi.
KENYA.

Dear Sirs,

FORM OF PERFORMANCE BANK GUARANTEE UNDERTAKING

We.....

of.....(Surety)

are willing to act as Surety and to be bound to Ministry of Tourism and Wildlife, State Department of Tourism, P.O. Box 30027 – 00100, Nairobi (hereinafter called the Employer) in the sum equal to Ten Percentum (10%) of the Contract Sum for the due performance by

.....

.....

.....(Tenderer)

of(address) of a Contract

Which he/they contemplate(s) entering into with the Employer for Proposed Regeneration of Jomo Kenyatta Public Beach in Mombasa County according to the terms of the Form of Performance Bank Guarantee, a copy of which has been inspected by us without addition of any limitations.

We agree to provide a Performance Bank Guarantee under the above mentioned terms when and if called upon to do so.

Name of Surety.....

Signature of Surety.....

Date:

Witness

To be completed by proposed Surety
and returned with Tender Documents

(Official rubber stamp required)

PERFORMANCE BANK GUARANTEE

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

Dear Sir,

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

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

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

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

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

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

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

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

Name of Contractor _____

**PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN
MOMBASA COUNTY**

CERTIFICATE OF SITE VISIT

I/We, the undersigned Contractor, hereby certify that I/we have visited the above site, that I/we have familiarized ourselves fully with the existing buildings and that we are completely aware of the requirements of the tender documents as to the scope of works required to complete the works and the conditions under which such works will be carried out.

Contractor _____

Date _____

REPUBLIC OF KENYA

IN THE MATTER OF OATHS AND STATUTORY DECLARATION ACT
CHAPTER 15 OF THE LAWS OF KENYA
AND
IN THE MATTER OF THE EXCHEQUER AND AUDIT (PUBLIC
PROCUREMENT), REGULATIONS, 2001.

I,of P. O. Box being a resident of
..... in the Republic of Kenya do hereby make oath and state as follows:-

1. THAT I am the Chief Executive/Managing Director/Principal Officer/Director of
(name of the Candidate) which is a Candidate in respect of **Tender Number No.** To supply goods, render services and/or carry out works for Ministry of Tourism and Wildlife, State Department of Tourism and duly authorized and competent to make this Affidavit.
2. THAT the aforesaid Candidate has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Ministry of Tourism and Wildlife, State Department of Tourism which is the procuring entity.
3. THAT the aforesaid Candidate, its servants and/or agents have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Ministry of Tourism and Wildlife State Department of Tourism.
4. THAT what is deponed to hereinabove is true to the best of my knowledge information and belief.

SWORN at NAIROBI by the said }
..... }

Name of Chief Executive/Managing Director/ }
Principal Officer/Director }
on this day of 20 }

}

}

}

DEPONENT

Before me

}

}

}

}

}

}

Commissioner for Oaths

}

LIST OF PROPOSED SUB- CONTRACTORS

The Contractor is required to arrange for the undermentioned works to be executed complete by approved Sub - Contractors and shall state in the spaces provided the names of the Sub - Contractors he proposes to employ. The proposals will only be acceptable with the approval of the Project Manager. Sub-Contractor’s experience of similar works carried in the last 3 years with the Sub-Contract values will be considered before granting of approval.

ELEMENT OF CONSTRUCTION

PROPOSED SUB-CONTRACTORS

Painting and decoration

Name.....

Address.....

.....

.....

Structural steelwork

Name.....

Address.....

.....

.....

A.P.P. Waterproofing

Name.....

Address.....

.....

.....

Electrical Installations

Name.....

Address.....

.....

.....

Plumbing, drainage and fire fighting installations

Name.....

Address.....

.....

.....

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

Part 1 – General

Business Name:

Location of Business Premises:

Country/Town:

Plot No.

Street/Road:

Postal Address:

Tel No.

Nature of Business:

Current Trade Licence No.

Expiry Date:

Maximum value of business which you can handle at any time: KShs.:

Name of your Bankers:

Branch:

Sole Proprietor

Your name in full:

Age:

Nationality:

Country of Origin:

Citizenship details:

Part 2 (b) – Partnership

Give details of partners as follows

| | Name in Full | Nationality | Citizenship Details | Shares |
|----|--------------|-------------|---------------------|--------|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |

Part 2(c) - Registered Company:

Private or public:

Issued Kshs.

Give details of all directors as follows

| Name in Full | Nationality | Citizenship Details | Shares |
|--------------|-------------|---------------------|--------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |

Part 2 (d) - Interest in the Firm:

Is there any person/persons in [name of Employer] who has interest in this firm?
Yes/No.[delete as necessary]

I certify that the information given above is correct

Title

Signature

Date

* Attach proof of citizenship

SECTION H

SUMMARY OF THE EVALUATION CRITERIA MAIN BUILDERS WORKS – PROPOSED REGENERATION OF JOMO KENYATTA PUBLIC BEACH IN MOMBASA COUNTY

| STAGE 1 PRELIMINARY EVLAUATION | STAGE 2 TECHNICAL EVALUATION (MAX.100 POINTS) Documentary evidence Must be provided | STAGE 3 FINANCIAL EVALUATION | RECOMMENDATIONS |
|--|--|---|---|
| <p>a) Tax Compliance Certificate from KRA</p> <p>b) List of Directors with respective shareholding and citizenship details</p> <p>c) Audited Accounts for the last 2 years</p> <p>d) Certificate of Company Registration</p> <p>e) NCA class 2 and above Contractor for National Construction Authority</p> <p>f) Current Business permits from relevant local authority.</p> <p>g) Bid Bond of 2% of the Tender Sum from a reputable Bank.</p> <p>h) The proposed Domestic sub-contractors to</p> | <p>A <u>Documents fully completed/compliance with pricing instructions (4 points)</u></p> <ul style="list-style-type: none"> ➤ Dully filled/Completed Documents (4 points) or Rejection under Clause 2.2 of instructions to Tenderers <ul style="list-style-type: none"> • No errors (2 points) • Up to 15% error (1 points) • Above 15% error - Non responsive <ul style="list-style-type: none"> • Consistency in Price Distribution (1 points) • Non consistent (0 Points) <p>SUB-TOTAL SECTION A</p> <p>B <u>Personnel (28 Points)</u></p> <ul style="list-style-type: none"> ➤ Contract Manager to have at least University Degree in Architecture, Quantity Surveying or Civil Engineering with at least five years’ experience as a Contract Manager in works of an equivalent nature and Volume OR Higher National Diploma in Building Construction/Engineering with 15 years’ experience as a Contract Manager in works of an equivalent nature and | <p>PRICE COMPARISONS AND CHECKING FOR ARITHMETIC ERRORS</p> | <p>THE LOWEST EVALUATED TENDER TO BE RECOMMENDED FOR CONSIDERATION OF AWARD SUBJECT TO THE STATED CONDITIONS OF AWARD</p> |

| | | | |
|---|---|--|--|
| <p>submit (Electrical)</p> <p>a) Tax compliance certificate from KRA</p> <p>b) Certificate of company registration</p> <p>c) National construction authority registration and NCA category 3 or higher (copy of certificate to be attached)</p> <p>d) Electrical sub-contractor to provide ERC category A-1 and be licensed with Communications Authority of Kenya</p> | <p>Volume</p> <ul style="list-style-type: none"> • Qualification (5 points) and experience for the Period Indicated (points) – (total 10 Points) • With the required qualification but less experience than the period indicated (Pro-rate) • Less Qualifications than stated above (0 Points regardless of experience) <ul style="list-style-type: none"> ➤ Site Manager to have at least Higher National Diploma in Building Construction/Engineering with 10 years (if degree holder 5 years) experience as a Site Manager in works of an equivalent nature and Volume OR Certificate holder in Building Construction/Engineering with 15 years’ experience as a Site Manager in works of an equivalent nature and Volume | | |
| <p>i) The proposed Domestic sub-contractors to submit (Mechanical)</p> <p>a) Tax compliance certificate from KRA</p> <p>b) Certificate of company registration</p> <p>c) National construction authority registration and NCA category 3 or higher (copy of certificate to be attached)</p> | <ul style="list-style-type: none"> • Qualification (4 points) and experience for the Period Indicated (4 points) – (total 8 Points) • With the required qualification but less experience than the period indicated (Pro-rate) <ul style="list-style-type: none"> ➤ • Less Qualifications than stated above (0 Points regardless of experience) <ul style="list-style-type: none"> ➤ Construction/Engineering with 10 years (if degree holder 5 years) experience as a Construction Supervisor OR Certificate holder in Building construction/Eng with 15 years experience as a Construction Supervisor in works of similar nature. • Qualification (2 points each) and experience for the Period Indicated (1 | | |

| | | | |
|---|--|--|--|
| <p>NOTES:</p> <p>1. Tenders which do not satisfy any of the above requirements shall be rejected</p> <p>2. ✓ Responsive</p> <p>3. X Non Responsive</p> | <p>point each) – (total 6 Points)</p> <ul style="list-style-type: none"> • With the required qualification but less experience than the period indicated (Pro-rate) <ul style="list-style-type: none"> • Less Qualifications than stated above (0 Points regardless of experience) ➤ Detailed curriculum vitae of personnel certified by employee and bidding company representative to be attached (2 Points) <ul style="list-style-type: none"> • Submission for all the above staff (2 Points) • Submission of less (pro-rata) ➤ Copies of employment letters of relevant personnel on permanent or contract terms to be attached.(2 Points) <ul style="list-style-type: none"> • Submission of employment letters for all staff (2 Points) • Submission of less (Pro-rata) <p>SUB-TOTAL SECTION B</p> <p>C <u>Relevant Experience (30 Points)</u></p> <p>Details of experience and past performance on at least five completed projects as a main contractor (builders works) within the past ten years each with a value of a lesser magnitude including names of clients/firms, clear physical address and contact persons [At least three (3) of these projects must be located in Kenya]. (Attach Contract agreements and Certificates of completion)</p> <p>Completed projects to include the following name of project, address of client, contact persons. Providing evidence of such contracts(attach</p> | | |
|---|--|--|--|

| | | | |
|--|--|--|--|
| | <p>contract agreements and practical completion certificates. (6 Points on each project)</p> <ul style="list-style-type: none"> • Any project submitted as above which of a lesser magnitude or not accompanied by evidence of contract i.e. Contract agreement and Completion Certificate shall not be considered for scoring of the assigned points. • Projects that are at least 70% complete with evidence in regard to (1) above would be considered for scoring <p>SUB-TOTAL SECTION C</p> <p><u>D Machinery & Equipment (13 Points)</u></p> <p>Provide a list of Major items of construction equipment proposed to carry out the Contract including, but not limited to the listed items as shown in page 23 and 24 hereinafter {tenderers are expected to complete this table as necessary, failure to do so may attract nil points for this item}. State if own or lease and an undertaking letter that they will be available for the Contract. (Provide Proof of ownership e.g. copies of log books, receipts, letters of insurance e.t.c. or lease agreements or a firm commitment letter on its availability for inspection by Ministry of Tourism and Wildlife, State Department of Tourism at any time) – 10 points.</p> <p>Concrete mixing & placing plant/ Equipment (3 Points)</p> <p>Vertical Transport Equipment (3 Points)</p> <p>Vehicle Transport (2 Points Earthmoving & Compaction Equipment (5Points - All the listed Equipment (10 Points) - Less than the listed items (Pro-rata</p> | | |
|--|--|--|--|

| | | | |
|--|--|--|--|
| | <p>SUB-TOTAL SECTION D</p> <p>E <u>Business Support (19 Points)</u></p> <p>Availability of Liquid assets (5 points) and access to lines of credit or other financial resources (5 points) - (total 10 Points)</p> <p>Proof of Financial stability (current ratio of 2:1) – (4 Points)</p> <p>Information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount. If none, state so. (5 Point)</p> <p>SUB TOTAL SECTION E</p> <p>F <u>At least 3 referees (attach copies of referees).</u> <u>(3 Points)</u></p> <ul style="list-style-type: none"> • Three referees (3 points) • Less or none(0) <p>SUB-TOTAL SECTION F</p> <p>G <u>Completion programme for the works (3 points)</u></p> <ul style="list-style-type: none"> • Realistic shortest contract period (3 Points) • Any other period (Pro-rata) <p>SUB-TOTAL SECTION G</p> <p>GRAND TOTAL</p> | | |
| | <p>N.B. Cut off – 75% to qualify for financial evaluation.</p> | | |

ELECTRICAL INSTALLATIONS:

SECTION 1 - GENERAL CONDITIONS AND REQUIREMENTS.

SECTION 2 - QUALITY OF MATERIALS AND WORKMANSHIP.

SECTION 3 - COMMISSIONING AND TESTING.

SECTION 4 - PARTICULAR SPECIFICATION

SECTION 5 - SCHEDULE OF QUANTITIES AND PRICES

BILLS FOR ELECTRICAL INSTALLATION

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SECTION 1

1. GENERAL CONDITIONS AND REQUIREMENTS

1.1 INTRODUCTION

These specifications cover the execution of Electrical installation and standby Generator Installation and should be read in conjunction with all other relevant drawings and contract documents issued to the contractor in connection with the job.

1.2 WORKING DRAWINGS

Contract Drawings are preliminary drawings whose purpose is to establish the requirements and scope of the sub contract works and to allow tenderers to prepare their tenders. They are not intended to be working drawings and must not be used as such unless specifically released for that purpose

The Contractor shall himself prepare his working Drawings as may be necessary. The working drawing shall be complete in such detail that not only the Contractor works can be executed on site but also that the Engineer can approve the Contractor's designs and intentions in the execution of the Contractors works.

If the Contractor requires any further instructions, details, contract drawings , or information to enable him to prepare his working drawings or any work to be done, he shall give adequate notice in writing to the Engineer of such information as may be required.

All working drawings shall be submitted to the Engineer for approval.

The Engineer reserves the right to reject any work commenced prior to such approval.

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

- a) Any drawing required by the main contractor and the Engineer to enable structural provision to be made, they shall include details of holes, chases, fixings, foundations, cable ducting etc.
- b) General arrangement drawings of all plant, control panel, switch and distribution boards, fittings and apparatus or any part thereof and of installation layout arrangements of such plant and apparatus.
- c) Layout drawings of all concealed and surface ducts and conduits.
- d) Such other drawings as may be necessary.

One copy of all Working Drawings shall be submitted to the Engineer for approval. Two copies of approved Working Drawings shall be submitted as soon as possible thereafter.

There shall be no deviation from approved Working drawings without the Engineer's written permission. Working drawing shall be based on the metric system.

Approval by the Engineer of Working Drawings shall neither relieve the Contractor of any of his obligations under the Contract nor relieve him of correcting any error found subsequently in the approved Working Drawings or other drawings and in the work onsite or elsewhere associated therewith.

1.3 RECORD DRAWINGS

During execution of the works on site the Contractor shall, in a manner approved by the Engineer, record on working drawings contract drawings all information necessary for preparing record drawings of the installed Contract Works. Marked-up drawings and other documents shall be available to the Engineer as he may require for inspection and checking.

Record Drawings may, subject to the approval of the Engineer, include approved working drawings adjusted as a correct record of the installation of the Contract Works. They shall be included but are not restricted to the following drawings or information:

- a) Working Drawings And Contract Drawings amended as necessary but titled “Record Drawings” and certified as a true record of the “as installed” Contract Works. Subject to the approval of the Engineer such working drawings as may be inappropriate may be omitted.
- b) Fully dimensioned drawings of all plant and apparatus installed or connected by the Contractor.
- c) General arrangement drawings of equipment, other areas containing plant forming part of the Contract Works and the like, including the accurate size and location of plant and apparatus suitably cross-referred to the drawings mentioned in (b) above and hereinafter.
- d) Routes, types, sizes and arrangement of all electric cables, conduits, ducts and wiring.
- e) Schematic diagrams showing all vital information relating to control and instrumentation.
- f) Schematic diagrams of individual plant, apparatus, switch and distribution boards, and control panels

These diagrams shall include those particular to individual plant or apparatus and also those applicable to system operation as a whole.

- g) Wiring diagrams of plant and apparatus.

The Contractor shall supply for fixing in the plant room and the office of the maintenance Engineer and similar places such suitable instruction charts, Schematic diagrams as may be requested by the Engineer provided that the said charts, diagrams etc. Relate to the installations forming part of sub contract works. All such charts and diagrams shall be suitable plastic material on a stiff backing and must be approved by the Engineer before final printing.

Two copies of the Record Drawings of the Contract Works and two sets of installation charts and schematic diagrams on stiff backing shall be provided not more than one month after practical completion.

Record Drawings shall be prepared on approved translucent linen or plastic material suitable for reproduction by the Dyeline process or similar.

1.4 STRUCTURAL PROVISION FOR THE CONTRACT WORKS

Preliminary major structural; provision has been made for the Contract works based on outline information ascertained during preparation of the Contract documents. The preliminary major structural provision made will be deemed adequate unless the Contractor states otherwise when submitting his tender.

Any minor structural provisions or alterations to major structural provisions required by the Contract shall be shown on the working drawings to be submitted to the Engineer within 30 days of the date of award of the Contract.

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

1.5 COLLABORATION

The Contractor shall carry out his work in accordance with the main contractor's working program.

The Contractor shall collaborate with the Engineer and the Main Contractor in planning the installation before work is commenced. Particular care shall be taken to ensure that there is close collaboration with other Contractors in installing services to prevent fouling of service positions, cable routes, switch positions, access positions etc.

When large items of equipments such as switchboards, trunking or long lengths of conduit are to be installed or cable to be stretched out before drawing in, the Contractor shall advise the Main Contractor in adequate time so that access is provided for installation before work is commenced on site.

The Contractor shall make sure the correctness of connections he is making to all items and equipments supplied under this and other contracts before they are put into operation. Details of operation, temperatures, voltage, phase, power, rating etc shall be confirmed to others and confirmation received before the system is first operated.

1.6 CUTTING AWAY AND MAKING GOODS

The Main contractor shall be responsible for all cutting away and making good, but it will be the responsibility of the Contractor to make sure that this work is kept to a minimum.

The Contractor shall also be responsible for ensuring that runs for the floor or wall chase, holes to be cut or left, will be marked out at the appropriate stage of structural works.

The Main contractor shall be responsible for the provision of all cable ducts and trenches and for their installation, unless otherwise stated in the particular specification or the Contract Drawings.

The Contractor shall include in his tender for the plugging of all wall, ceilings and floors to facilitate the fixing of the conduits, accessories and all other portions of the electrical installations. Any purpose made fixing brackets shall also be provided and installed by the Contractor.

The Contractor is to set out at the earliest opportunity the position of all holes necessary for the passage of ducts and conduits or otherwise in the connection of his work, and should additional holes or openings be required due to failure of the Contractor to fulfil the condition of this clause, then he must arrange with the Main Contractor to make such openings as expense of the

Contractor. The Contractor is not to cut any holes or openings unless specifically authorized to do so by the Main Contractor and should he do so without the approval he will become liable to any damage to the building or fittings.

The Contractor shall pay particular attention to the fixing and alignment of switched socket outlets, telephone and similar boxes.

1.7 CONCEALED WORK

The Contractor will be responsible for the exact runs and placing of conduits and boxes that are to be cast in concrete ceilings, floors, walls, columns and beams, and for the proper fixing of the conduits and boxes to the shuttering and the steel reinforcement work.

During the procedure of casting, the Contractor must provide an electrician to attend the work and, if necessary, to be ready to make good any damage on the Contractor's work caused by the Main contractor's labourers when casting.

Where conduits are concealed, the boxes shall be in an exact position relative to the finished plaster or such other finish as may be applied to enable cover plates to be accurately positioned. The Main Contractor will, if required, indicate suitable datum points from which all measurements can be taken and will inform the Contractor of the measurements of all walls, depth of plaster and floor screeds, final finish and any other information. It is the responsibility of the Contractor to ensure accuracy of fixings.

1.8 POSITION OF SERVICES, EQUIPMENT, FITTINGS AND APPARATUS

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

The routes of services and approximate positions of apparatus are shown on the Contract Drawings, but their exact positions shall be determined by approved dimensional details on working drawings or on site by the Engineer in consultation with the Contractor or Contractor.

The Contractor shall ascertain on site that his work will not foul other services and in all cases the services through the ducts must be readily accessible for maintenance.

Any work which has to be re-done to negligence in this respect will be his responsibility.

The Contractor will be deemed to have allowed in his tender for locating terminal points of services (e.g. lighting switches, socket outlets, lighting points) in position 1 meter horizontally and vertically from the location shown on the Contract Drawings. Within this limits no variations in the Contract Sum will be made unless the work has already been executed in accordance with previously approved working drawings or with the Engineer's approval.

1.9 PAINTING

The Contractor must include for all protective and finish painting of the Contract works to the approval of the Architect and Engineer. The painting shall be carried out by skilled painters.

1.10 IDENTIFICATION OF PLANT AND COMPONENTS

All main switches, circuit breakers, isolators, switch fuses, consumer's service units and distribution boards shall be neatly and clearly labelled externally with identification marks corresponding with those on drawings or in Specifications.

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

SECTION 2

2. QUALITY OF MATERIALS AND WORKMANSHIP

2.1 REGULATIONS

The Contract Works must be carried out strictly in accordance with the following documents:

- i. The 14th Edition of the “Regulations for the Electrical equipment of Buildings” issued by the institution of Electrical Engineers of Great Britain with local amendments.
- ii. The Licensee’s bye-laws.
- iii. Relevant British standard specification and code of practice published by the British Standard Institution (hereinafter referred to as B.S. and C.P. respectively).
- iv. The Specification.
- v. The working drawings produced by the Contractor and approved by the Engineer.
- vi. The Engineer’s instructions.

The Contractor shall undertake all modifications demanded by authorities in order to comply with the regulations, and produce all certificates, if any, from the authorities without extra charge.

2.2 QUALITY OF MATERIALS AND WORKMANSHIP

All materials, fittings and accessories are to be new and in accordance with the requirements of the current rules and regulations where such exist, and with the relevant British Standard Specification.

Uniformity of type and manufacture of fittings or accessories is to be preserved as far as practicable throughout the whole work.

Wherever in this Specification the practice is adopted of specifying a particular item as ‘similar’ to that listed in a particular firm’s catalogue, it is to be clearly understood that this is to indicate the type and quality of equipment required.

No attempt is being made to give preference to the equipment supplied by the firm whose catalogue is quoted.

Where particular manufactures are specified herein, no alternative makes will be considered without weighty reasons and the Engineer shall have the right to reject any other makes.

The Contractor shall if required by the Architect or Engineer submit samples of materials for their approval before placing an order.

The Contractor will be entirely responsible for all materials, apparatus, equipment etc. Furnished by him in connection with his work, and shall take all special care to protect all parts of finished work from damage until handed over to the Employer.

The work shall be carried out by competent workmen under skilled and experienced supervision. The Engineer shall have the right to have any part of work taken down or changed at the Contractor’s expense, which is executed in an unsatisfactory manner.

Such materials supplied by other installation and/or connection by the Contractor shall be carefully examined before installation and connection. Any defects noted shall immediately be reported to the Engineer.

2.3 EARTHING

The Contractor shall earth the entire installation in accordance with the IEE Regulations and Licensee's bye-laws.

An earth electrical system shall be installed at the point adjacent to the main supply intake and at every building served by the external distribution system.

Each earth electrode shall be a 12mm diameter copper rod driven to a depth of 1300mm. In rocky soil conditions, where this depth is difficult to obtain, the Sub contractor shall obtain written approval from the Engineer for an alternative earth electrode system. The electrode shall be connected via a green PVC insulated copper cable to an earth terminal adjacent to the incoming supply, to which all cable armouring, conduit, trunking, switchgear etc. shall be bonded, together with all other metallic incoming services, e.g. water, gas etc.

Provision shall also be made for connection with the neutral of the incoming supply.

Where P.M.E. is approved and after the supply Authority has made its connection, the electrical Contractor shall similarly connect the neutral of each distribution main to the earth at its remote end.

The bonding of other services or connections of neutral to earth shall be made after satisfactory completion of earth continuity and line earth loop impedance tests. Tests of the resistance to earth of each electrode system shall also be carried out and the results recorded.

The entire system of metallic conduits and trunking, metallic sheaths of cables, cases and enclosures of switchgear and electrical apparatus shall be connected to the earth point, according to current rules and regulations. The Su-Contractor is reminded that resistance of the earth conductor from the earth electrode to any point in the earthing system shall not exceed 0.5 ohms.

The Contractor shall supply and install conductors, cables, copper tapes, earthing rods etc for installation of complete earthing system.

Means shall be provided, e.g. by means of test clamp, to isolate the electrode from the system for periodic checking.

All cable glands for steel wire armoured underground type cable, where installed, shall be fitted with an approved earthing washer having a tag for the connection of an earth lead. Every such washer installed shall be connected by an insulated earthing lead to proper earthing terminal by means of lug or washers on the adjacent switchgear or other equipment.

2.4 SWITCHBOARDS

Tender prices must include the supply of all switchboards and distribution boards where not otherwise stated.

All costs for installation in the positions indicated on drawings and the cleaning and connection of all in and outgoing cables to the correct terminals must be included in the tender.

Each switchboard section shall be completed, fully wired and checked out at the factory or workshop and shall require a minimum of installation work on site. Modular construction shall be

used wherever practicable and provision shall be made for simplified servicing, replacement and maintenance throughout without major dismantling.

All switches, switch fuses, circuit breakers etc. shall be numbered in agreement with the Engineer with engraved plastic labels.

Where space on switchboards is provided for future components to be installed as shown on the drawings, all ancillary parts shall be provided and installed so the future components may be installed and connected with the least possible inconvenience. Fully safety measures shall be provided with all such spaces.

Provision must be made for installation of the Licensee's metering equipment, if any, including viewing holes in the panel.

Switch and distribution boards shall be dustproof if nothing else is stated. They shall have a flexibility of arrangement so that future extensions are possible. Switch fuses shall be so installed that when front covers are removed all incoming and outgoing connections are easily accessible from the front. Neutral and earthing bar shall be provided within each panel in the full length of the panel having connectors equivalent to the number of switches.

The arrangements shall be so that complete switches may be disconnected and withdrawn without too extensive work.

All busbars and busbar connections shall be clearly marked with colours according to the phases: red, yellow, blue, and black for the neutral. The busbars shall be orderly arranged in the panel and furthermore so the extensions to both sides may be made in the future.

Removable insulated shields shall be provided for protection against contact with live parts. All panel arrangements shall be of sufficient mechanical strength to withstand the influences of short-circuit currents.

All wiring within each switchboard shall be orderly laced and bonded to the panel structure, the wiring insulation being colored according to the above busbar color scheme.

Where wiring passes through holes in metalwork protection by rubber bushes shall be provided.

Where single core cables are used care shall be taken to prevent hysteresis.

Conduit and cable entries shall be provided at top and bottom end.

Where wiring is installed to panels which are supplied and installed by others the cables shall be brought into the panel and sufficient lengths left to permit the making off and connection by others to the terminals.

Similarly where wiring which is installed by others to a panel supplied under this contract, the final connection of the cables to the terminal shall be carried out as part of this contract. Standard colour phase discs shall be fixed on all panels to indicate to which phase the various components are connected.

Each panel shall be fitted internally with circuit lists and a schematic drawing showing the distribution system, mounted on a glazed frame.

2.5 LOW VOLTAGE SWITCHBOARDS INCORPORATING FUSE SWITCHES-GENERAL

Low voltage (L.V) switchboards shall be of the 'unit' or 'cubicle' type as specified, constructed by a specialist switchgear manufacturer in accordance with BS. 5486.

Each switchboard shall incorporate the isolators; fuse switches, meters, instruments, protection relays as detailed in the following specification sections and/or drawings.

Equipment sizes indicated are minimum acceptable to the Engineer. Approved manufacturer's standard units, may be offered however, the units shall not be of lower rating than the sizes specified.

Each switchboard shall be manufactured so that no operating handle exceeds the height of 2.10 m from the finished floor level.

Fused switches shall comply fully with the testing requirements of BS. 5419, the tests being carried out at an A.S.T.A. proving Station. Fuse switches shall be fitted with suitable HRC cartridge fuse links, which fully comply with BS. 88. The units shall totally enclosed in a sheet steel case and be of the 440 volt (A.C between phases) rating, triple pole and switched neutral (T.P. & S.N.), triple pole and unswitched neutral (T.P. & N) or single pole and unswitched neutral (S.P. & N) as specified. Glazed porcelain or approved equal bases and carriers shall be fitted. Together with a hand operated isolating mechanism, complete with a mechanical On/OFF position indicator.

All switched neutral contacts shall be arranged to close the circuit prior to the phase contacts and break the circuit after the phase contacts.

All fuse switches or isolator handles shall be arranged to operate in a vertical plane.

Connections between the fuse switches or isolators and the bus-bars shall be made by means of solid high conductivity copper links and solid mechanical clamps.

Bus-bars incorporated in each switchboard shall be marked and arranged in accordance with BS.158 and be manufactured from either circular or rectangular hard drawn, high conductivity copper and be supported by rigid bracings manufactured from bakelite, ceramics or other approved material. Bus-bar clearance shall be in accordance with BS.15 and PVC insulation shall be applied to all bus-bars and associated connections.

Each switchboard shall be arranged so that the bus-bar is accessible from a separate sheet steel cover or covers, without removing any fuse switch or isolator.

Connection to the bus-bars shall be made with suitable solid mechanical clamp, nut and bolt to BS.159. Bus-bars shall not be drilled.

Each complete switchboard shall be constructed in compliances with BS.159 and be capable of withstanding, without damage, a symmetrical through fault of prospective current equivalent to 31.0MVA. 3 phase at 415 volts for the maximum time it will take the major prospective device incorporated in the switchboard to operate unless otherwise agreed in writing by the Engineer. Each switchboard shall be capable of having an isolator or fuse switch closed or opened on to such a fault without damage to the switchboard.

2.6 LOW VOLTAGE SWITCHBOARD INCORPORATING FUSE SWITCHED-UNIT TYPE

Low voltage (L.V) unit type switchboards shall be in accordance with the preceding 'L.V. Switchboards- General' clause of this specification Section and be purpose designed and constructed by an approved specialist switchgear manufacturer.

Each switchboard shall be manufactured from a suitable angle or channel iron welded framework on to which shall be fixed the items of switchgear, with inter-connections or trunking as necessary to form a neat and compact switchboard.

Individual items of equipment shall be mounted above and below a bus-bar chamber with the complete switchboard being of the floor mounting type with suitable wall ties.

Each complete switchboard shall be prefabricated by the switchgear manufacturer with all internal wiring being carried out before delivery. The wiring shall be coloured to indicate the different phases.

Each bus-bar chamber shall be constructed from rustproof sheet steel with detachable end plates and a screwed or bolted front cover. All conductors shall be equal cross section formed from H.C. copper and mounted on insulators.

Heavy grade bitumastic felt shall be provided between the floor and the switchboard.

2.7 MANUFACTURERS

All low voltage main and sub-main switchboards shall be supplied by the same manufacturer.

All floor distribution cubicles, purpose made distribution panels, distribution boards, MCCB, MCB, switches and isolators shall be supplied by one manufacturer, but not necessarily the same manufacturer as mention above.

All types of equipment shall have been in general use for at least 3 years prior to the commencement of the contract and spare availability shall be guaranteed for a minimum of 5 years following the completion of the contract.

2.8 FUSE SWITCHES, SWITCH-FUSE & ISOLATING SWITCHES

All fuse switches, switch-fuses, and isolating switches shall be hand operated, single pole and neutral, double pole, triple pole and neutral, four poles as specified and be ASTA certified to B.S.5419.

The neutral contact shall be arranged to be switched or linked as specified and in the switched neutral units the neutral contact shall make before, and break later than the phase contacts.

Each unit shall be of the 440-volt (a.c. between phases) rating and be complete with a sheet steel case manufactured from not less than 1.7mm thick metal.

Each unit shall incorporate a hinged cover provided with adequate lugs to enable padlocks to be fitted if required.

Suitable phase identification shall be fitted to all units.

Each switch shall have a quick make and break switch action with spring-assisted mechanism ensuring positive ON/Off movement and identification.

Adequate wiring space shall be provided in each unit to facilitate wiring and connection and, if possible, removable side and top panels shall be provided.

Each complete unit shall be fitted with all necessary terminals, shrouds, earthing connection etc and be stove enamelled finished to an approved colour.

2.9 H.R.C. FUSES

The Contract shall include for the provision of H.R.C. fuses of maximum rating of all equipments, in compliance with BS.88 for AC46 Category of Duty and class Q1 fusing factors.

Confirmation of fuse ratings shall be obtained from the Engineer before placing any orders.

H.R.C. fuses provided on this contract shall be supplied by the same manufacturer and be of same class or type to ensure adequate discrimination and grading throughout the distribution system.

Semi-enclosed or rewirable type shall not be provided.

Cartridge fuses for use in conjunction with 13amp socket outlet fused plug tops shall be in accordance with B.S.1362.

2.10 DISTRIBUTION BOARD

The Contract shall include for each distribution board to be of the same size and type as detailed in the following specification sections, or the attached drawings and to fully comply with BS; 4649 for those incorporating MCCB or MCB units and BS: 214 for those incorporating HRC fuses. Each enclosure shall be of the dust protecting pattern in accordance with BS.4727 Part 2 group 03.

Each unit shall be of the 500-volt pattern as a minimum requirement and be complete with a pressed or fabricated steel case manufactured from sheet steel having a minimum thickness of 1.7mm.

Hinged doors shall be provided and shall be complete with a catch and key operated lock.

All live terminals or parts shall be shrouded by insulating material to ensure that it is impossible for any live metal to be touched whilst withdrawing or replacing the MCB units or fuses.

The moulded case circuit breakers (MCCB), miniature circuit breakers (MCB) or HRC fuses shall be arranged in banks which shall be easily removable to facilitate wiring and connection. Adequate non-ferrous bus-bars shall be fitted to the banks and shall be complete with suitable cast brass cable terminals for the termination of cables. The diameter of each terminal pinching screw shall be not less than 75% of the diameter of the cable entry hole.

Each distribution board shall be completed with an internal circuit chart clearly detailing the circuit numbers, areas served and the respective circuit breakers or HRS sizes, The charts shall be type-written, glued to stiff cardboard, covered with clear Perspex and fixed to the inside face of the door by means of screws and nuts.

In addition, each circuit chart shall contain full details of the size and type of cable feeding the distribution board, etc, together with the size, type and location of major switch or section board serving the board.

Circuit and phase colour identification bands shall be fitted to all phase, neutral and control circuit cables.

Each distribution board shall be new and complete with all necessary shrouds, carriers, MCCB, MCB and HRC units etc, with metal case stove enamelled finished to an approved colour.

Where distribution boards are surface mounted, and the installation is concealed with walls, the conduit shall be terminated in a suitable flush adaptable box measuring not less than 300mm x 300mm. The distribution board shall be mounted over the box and attached to the box with four brass machine screws into threaded holes at the corner of the box and in addition shall be securely fixed to the wall with rawl bolts or rawl plugs and screws.

Final connections between the adaptable box and the distribution board shall be made via a large square or rectangular hole in the back of the distribution board. The edges of the hole shall be finished with a suitable insulating material to ensure that the cables are not pulled over rough or sharp edges.

The insulating material shall be securely fixed to the distribution board and the adaptable box shall be adequately bonded to the distribution board by means of short lengths of flexible copper tape, bolts, nuts and shake proof washers.

Each neutral bar incorporated in distribution boards shall have the same number of connections, as there are phase connections within the boards. Each neutral wire connections as there are phase connections within the boards. Each neutral wire connections shall be made in the same order as the phase wires are connected to the protection units.

The neutral bar shall be of the same cross-sectional area as the respective phase bus-bars.

2.11 MINIATURE AIR BREAK CIRCUIT BREAKERS (MCB)

Miniature air break circuit breakers (MCB) shall be provided in accordance with the following specification sections and attached drawings, and shall fully comply with BS: 3871. Part 1.

Distribution boards incorporating MCB units shall be arranged such that sub-circuits cannot be made alive by unauthorized persons. MCB units shall be of the plug-in type or supplied capable of being locked in the 'OFF' position.

All sizes of MCB units shall be checked with the Engineer before any orders are placed. Each MCB unit unless otherwise stated, shall be of the hermetically sealed, magnetic, hydraulic type having a short circuit duty rating of M6 (6000 amps) at 415 volts a.c.

MCB units used for the final means of protection and isolation to items of fixed or removable equipment, e.g. electrical tubular heaters small ventilation fans, macerators, etc, shall be complete with malleable iron or pressed steel box and with front plate arranged as over-lapping for flush mounted units.

Assemblies shall be arranged for flush or surface mounting as indicated in the detail sections of this specification, schedules or drawings, and the associated front plates shall be finished to match the general lighting switches.

Final connections between the MCB unit and item of equipment shall be made by means of a short length of conduit, B.S. 4568 conduit box having 50.8mm fixing centres and sheet steel cover plate. The plate shall be complete with suitable brass stuffing gland with a flexible cord or cable as specified provided between the MCB and the particular item pf equipment.

2.12 PVC INSULATED, PVC SHEATHED, SINGLE WIRE ARMoured & PVC SHEATHED OVERALL CABLE (PVCI, SWA & PVCS)

PVC armoured cables shall be used only in the position indicated the attached drawings and/or specification sections and each cable shall fully comply with the following requirements.

The p.v.c. armoured cables shall comprise copper conductors of equal section laid up in a sector shape, the cores being p.v.c. insulated twisted and wormed circular, further insulated with an overall p.v.c. sheath, single wire armoured and p.v.c. sheathed overall.

The cables shall be rated at 600/1000 volt in accordance with BS: 6346.

Duplicate copies of the test certificates for each length of cable, together with 300mm of 'stepped' sample cut from the cable length, shall be forwarded by the manufacturer direct to the Engineer before the cable is dispatched to the site.

Each size of cable shall be manufactured in one length. No through joints shall be allowed in any new cables, unless authorized by the Engineer. The contract shall include for the phasing of cable conductors from the main switchboard i.e. 0,1,2,3,4, etc. Terminal at each end of the feeder shall be correspondingly marked. In no case shall the radius of the cable bend be lower than eight times the overall diameter of the cable.

The contractor shall include for measuring and cutting exact lengths required for the runs. No allowance shall be made for waste lengths. All cables shall be delivered to the site with the maker's sales, labels, or other proof of origin attached.

The cables shall be terminated in approved type compression glands complete with p.v.c. shroud.

All p.v.c. armoured cables shall be installed generally as detailed in the specification section. No cable shall be installed when the cable or ambient temperature is 0⁰C or below.

After the installation has been completed, tests shall be carried out on the cables as set out in BS: 6346 to the general requirement detailed in this specification section.

2.13 PVC INSULATED, PVC SHEATHED SINGLE WIRE ARMoured & PVC SHEATHED OVERALL CABLES (PVCI, PVCS, SWA & PVCS) INSTALLATION & TESTING

PVC armoured cables shall be installed along the routes generally indicated on the attached drawings and/or described in the specification sections.

PVC armoured cables shall be fixed to an approved cable rack system consisting of two identical half racks, diecast in magnesium aluminium alloy conforming to BS: 1490 or approved and equal material. The cable rack shall be supported on a metal back strap with rawlbolts grouted into the building structure. Spacing of cable racks shall not exceed 1 m on straight runs and additional racks shall be erected at bends as required.

The Contract shall include for the preparation of detailed plan and section drawings for the cable runs. The drawings shall be submitted to the Engineer for approval before work is commenced.

Where PVC cables and PVC armoured cables are to be installed together, they shall be fixed to a common cable tray, the PVC armoured cables being secured to the cable tray by means of suitable saddles or other approved means.

Where cable pass through floors or through walls, they shall be protected by short length of heavy gauge pipe bushed with hardwood or lead at each end. When rising through a floor the protecting barrel shall project to a height of approximately 1.20 m.

PVC armoured cables scheduled to cross roads, paths, car parks, structural concrete or pavements, exceeding 1.80 m wide, shall be installed in adequate cross-sectional area earthenware ducts or approved and equal type. Cables to be installed adjacent to pavements shall be located below the outer edge of the pavement, with cable tile protection.

Where more than one cable is to be installed in a common trench or route, they shall be spaced at the following minimum dimensions: -

| <u>CABLE</u> | <u>H.V</u> | <u>L.V</u> | <u>TELEPHONE</u> | <u>COMMUNICATIONS</u> |
|----------------|------------|------------|------------------|-----------------------|
| H.V | 15mm | 300mm | 30mm | 300mm |
| L.V | 300mm | 80mm | 300mm | 300mm |
| TELEPHONE | 300mm | 300mm | 50mm | 50mm |
| COMMUNICATIONS | 300mm | 300mm | 50mm | 50mm |

Roller and chairs shall be used during the installation of underground cables to prevent them being pulled through the base of the trench.

No cables crossing will be permitted except at branches off the main trench. Where the cables enter draw-in points adequate slack cable shall be left. All cables shall be kept clear of other service pipes and cables by not less than 50mm, preferably below hot water pipes. Where it is found necessary to cross service pipes and cables and the required clearance cannot be obtained, hardwood blocks shall be inserted between and securely fixed in position.

Where cables enter buildings they shall pass through cast iron or equal and approved conduits that shall form runs laid to fall under the surrounding paths, etc. The cast iron pipes shall be complete with suitable puddle flanges and after the installation of the cables the conduits shall be plugged to ensure that a complete watertight seal is provided around and within the conduit. Each puddle flange shall be provided by Building Contractor. This Contract shall include for the provision of the necessary detail and liaison attendance.

Unless otherwise stated, the excavation and backfilling of trenches, provision of sifted soil or sand and cable conduits will be carried out by the Building Contractor. The Contractor shall include for the supply and installation of cable tiles/identification tape and cables and to supervise the backfilling and correct protection of the cables to suit the layout of draw-in points and/or cable routes.

Voltage and bending tests in accordance with BS: 6346 shall be carried out on each lengths of cable to be installed under this contract. These tests shall be carried out at the manufacturer's works before the cable is dispatched and duplicate copies of the test certificate for each length of cable shall be sent to the Engineer.

The Contract shall include for high voltage tests on the cables and joints on accordance with the requirements of BS: 6346 to be carried out after the cables have been installed.

In addition, the following tests on all cables shall be executed:-

- Resistance of each core
- Resistance of sheath and armour.
- Capacitance of each core, with all other cores floating free of earth.

- Capacitance of each core, with all other cores earthed.

The Contract shall include for all necessary test equipment to carry out the tests and the provision of the necessary qualified staff.

The Engineer shall be notified in writing seven days in advance of when the pressure testing is to be carried out and duplicate typewritten copies of the tests taken and the results obtained shall be sent to the Engineer.

Any unacceptable insulation or continuity reading identified by the cable pressure testing sequence shall be corrected and cable retested. The contract shall include for this.

2.14 PVC CABLES

PVC cables shall be enclosed in conduit, trunking within short lengths of flexible conduit and final connections to the various items and equipment.

PVC cable shall be manufactured in accordance with the requirements of BS: 6004 Table 1a) and be rated at 450/750 volts.

No cables less than 1.5mm² shall be used and the p.v.c. Cables shall be coloured as detailed in this particular specification section. All 2.5mm² cables shall be of the 7/0.67 type 'B' classification in accordance with BS: 6231,

2.15 HEAT RESISTANCE CABLES

Heat resistance cables shall be used as detailed in the following Specification Section and drawings and shall be of butyl rubber insulated type or approved equal.

Butyl rubber insulated cable shall be manufactured to BS: 6007 and rated 450/750 volts.

No cable less than 1.5mm² shall be used and the cables shall be coloured as detailed in the specification section for p.v.c. cables.

2.16 FLEXIBLE CORDS & SYSTEMS

Flexible cords or cables shall be manufactured in accordance with the attached drawings and/or specification section. No cord or cable less than 24/0.20 or 0.75mm² respectively shall be used

Flexible cords or cables, except those used to final connections to light fittings, shall be circular 2 or 3 core as required and each conductor shall be insulated with butyl rubber and taped, cores laid up, cotton filled, cotton braided and treated with cellulose lacquer, to give a glossy white finish.

Flexible cords used to final connections to all luminaries shall be silicone rubber insulated and terylene braided, manufactured in accordance with BS: 6500 Tables 15 and 16.

2.17 CONDUITS & ACCESSORIES

Except where other kinds of enclosures are specifically referred to in this specification, all p.v.c cables shall be enclosed in heavy gauge, screwed and welded conduit, finished black stove enamel (B.E.) or hot-dipped, zinc coated and sheradized (HDZCS) as described in the specification section. The conduits shall be manufactured in accordance with BS: 4568 Part1.

Lighting power and low voltage socket outlets, together with other auxiliary services shall be enclosed in separate conduit and no wiring associated with one service shall be installed in any conduit box or enclosure containing wires associated with a different service, unless the box or enclosure etc. as supplied by the manufacturer, is complete with a segregation fillet, in accordance with the I.E.E regulations.

Conduit accessories shall be manufactured in accordance with BS: 4568 Part 2. Black stove enamelled (B.E.) conduit shall be used with black stove enamelled (B.E.) accessories and hot-dipped zinc coated and sheradized (H.D.Z.C.S.) conduit with (H.D.Z.C.S.) accessories.

All B.E. and H.D.Z.C.S. conduit and accessories shall be complete with class 2 and class 4 protections respectively in accordance with BS: 4568.

The ends of conduits shall be reamed internally to give a smooth bore. No thread shall be exposed except at running couplers.

Running couplers shall be backed by a securely locked heavy gauge lock nut and excess threads painted with good quality paint for B.E. conduit and zinc-rich paint for H.D.Z.C.S.

All couplers shall be securely tightened and care shall be taken to ensure the conduits 'butt-up' inside the couplers.

No conduit bearing traces of rust, or damage shall be used. The conduits shall be cleaned and free from oil before erection.

Conduits shall be laid as far as possible in straight lines with easy sets or bends. Conduits to be formed shall be bent cold without altering the section with an approved type of machine to give results consistent with first grade craftsmanship. Such bends and sets shall be painted in accordance with the requirements of this specification section. The conduits shall be run so as to be self-draining to switch boxes incorporating, as necessary, an approved means of draining.

Conduits entering equipment or accessories shall do so through clearance holes only and connection shall be made by means of a hexagonal male brass bush, earth continuity washer and coupler. Connections to cable trunking and large sheet steel adaptable boxes shall be made means of hexagonal male brass bush of the long threaded type, earth continuity washer, lead or leather washer and flanged coupler.

Standard round boxes in accordance with standard sheet 4 of BS: 4568 Part 2 and with 50.8mm fixing centres and of malleable iron shall be used for all intersection and outlet points, except where the conduits terminate in accessories such as lighting switches, sockets outlets etc.

At intersection points on multiple conduit runs, steel adaptable boxes with light steel covers (overlapping for concealed conduit work) shall be used in accordance with standard sheets No. 3a and 3b in BS: 4568 the largest conduit entry. Cables from more than one distribution board shall not enter any single adaptable box.

Conduits of capacity sufficient to carry the full number of circuit way cables shall be installed between trunking and distribution board. The sub-mains supplying the distribution board shall be considered separately.

Adaptable boxes and distribution boards, where not fixed to trunking, shall be installed with 20mm or 25mm clearance holes suitably plugged, with at least 2 holes for adaptable boxes and holes equal to spare fuse-ways for distribution boards.

Manufactured solid or inspection elbows or tee pieces shall not be permitted.

The conduit work shall be arranged so that the wiring can be drawn in and out, and later renewed from draw-in box and point box positions. Draw-in boxes and point boxes shall be of ample size to enable this to be carried out.

No boxes shall be provided in voids where access cannot be readily obtained. No draw-in boxes other than point boxes shall be installed in plaster wall or ceiling surface, where conduit work is flush, except within cupboards and switchrooms, or where specific permission is given by the Engineer. If permission is given, each box shall be made permanently accessible and so arranged to be neatly finished, flush with the finished surface of the walls, ceilings or floors.

Where bends or sets are required, they shall be made cold and on proper bending machines without altering the section of the conduit. Such bends or sets shall be painted with good quality paint wherever the finish has been removed.

Conduit buried in concrete or plaster and chased into walls shall be secured by holdfasts or crampets spaced at intervals not greater than 1200mm and there shall not be less than 20mm covering over the final projection of any holdfast coupling, conduit etc. Where indicated in the attached specification sections that this contract is to include chasing for concealed conduit, the making of ways for conduit shall be carried out by machine raggling of all necessary walls, floors, ceilings etc. and it shall be noted that no other method of raggling will be accepted.

All surface conduits fixed to walls, ceiling and to the roof steelwork shall be fixed by means of heavy gauge distance saddles as standard sheet No.23 or BS: 4568 Part 2 spaced at intervals not greater than 1200mm apart with additional saddles as necessary at bends and joints and within 275mm of such points. Draw-in points shall be available on such conduits every 8.00m of straight run or after not more than two right angled bends. Where such points are provided exclusively for draw-in purposes, they shall be in the form of rectangular junction boxes.

No conduit or accessories smaller than 20mm shall be allowed and the number of cables drawn into each conduit shall not exceed that stated in the latest I.E.E. Regulations.

The whole of conduit system to be erected shall not be covered with concrete or plaster or cables drawn in, before permission is given by the Engineer.

Conduit runs shall be left clear of gas or water pipes by a minimum distance of 150mm. Where conduit is, or may be, in contact with any structural steelwork, an efficient and permanent metallic connection shall be made between the conduit and metal work.

No part of the conduit shall be under mechanical stress and each length of conduit shall be swabbed out prior to the installation of the cables.

All conduit boxes, saddles and point boxes shall be fixed by not less than 40mm x No.8 wood screws with raw plugs or similar fibre plugs in concrete or brickwork, and not less than 25mm x No.8 wood screws in structural timber. No fixing shall be made to building boards or to plaster, but only to concrete, brickwork, timber structures and block or tile partitions.

Countersunk screws shall be used for fixing only where special countersunk holes have been drilled or provided. Round-headed screws used for all fixings shall be black japanned finish. Screw heads shall have all burrs and sharp edges removed before wiring commences and all screws are to be driven into their correct depth. Box lids shall be fitted by means of brass round headed M.4 screws. All such boxes shall be securely fixed by means of at least two screws such that the screw threads do not project into the box.

Conduits crossing expansion joints shall be fitted with expansion couplers at the position of expansion joint. An earth wire shall be installed between the nearest conduit box at either side of the coupler. The back of the conduit box shall be drilled and taped to a size not less than M.4 and

the earth connection made by means of an approved combination of terminal washer and brass screws.

Where conduits pass from inside the building to the outside, free circulation of air shall be prevented by the insertion of a conduit box, which shall be filled with plastic compound after the cables have been drawn in.

All flush boxes installed shall be recessed approximately 3mm below the finished wall or ceiling surfaces. The Contractor shall include for verification on site with the building contractor of the finished thickness of all walls and ceilings.

The entire conduit installation shall harmonise with architectural features of the building, including accessibility, inspection and maintenance and attention shall be given to alignment of conduits which shall be on the same horizontal or vertical centre lines where practicable.

Attention shall be paid to the installation of surface conduits. All corners and angles shall be neatly negotiated with vertical and horizontal runs kept straight. No diagonal runs shall be permitted and all branches shall be taken off at right angles.

The lead and return conductor of the same circuit or circuits shall be drawn into the same conduit.

The conductors forming the various systems shall be installed in separate conduits or trunking compartments unless specifically agreed otherwise in writing by the Engineer.

All conduit which is left with screwed ends for the reception of outlet boxes, etc, shall be fitted with a coupler and screwed plug to protect the ends.

No conduits shall be installed in vertical ducts specifically installed for the installation of mechanical, air conditioning or public health engineering services without the permission of the Engineer.

A running coupler socket within 300mm above or below the floor on all vertical drops or pieces respectively shall be provided where conduit is cast into or passes through structural floors.

Where conduits are installed in floors and the building programme indicates that the screed is not to be applied within three days of the three days of the installation, then the conduits shall be immediately protected by means of a hunching of a cement and sand mixture by the Building contractor.

Conduits set through walls shall not be permitted. Where conduits change direction through a wall, a back outlet box shall be used.

No outlet shall be installed immediately behind each other (i.e. back-to-back) in a common wall or partition, unless agreed in writing by the Engineer. Separate conduits shall be taken to each outlet, from the floor screed/ void or ceiling void and no 'through wall' conduit or cable connections shall be made.

2.18 SURFACE CABLE TRUNKING

Sheet steel cable trunking shall be used only in areas and in the position detailed on the attached drawings or for terminating conduits and cables at distribution boards etc. cable trunking may be used, if required, in the ceiling voids or otherwise large runs of multiple conduits would occur.

Cable trunking and fittings shall be in accordance with BS: 4678 Part 1 and shall be either Class 2 staved black enamel (B.E.) or Class 3 galvanized (G) protected as detailed in the following specification section and/or attached drawings.

The cable trunking shall consist of butting section constructed from high grade sheet rust-proofed by an approved process and be finished either stove enamel or galvanized as specified. Trunking lids shall be made from the same material and shall be removable over the whole length of the trunking and secured at centres not greater than 450mm by cadmium plated mushroom head screws. These screws shall locate into ' Hank bushes'. The trunking shall be provided with return edges on its opening side to form a tray and clips shall be inserted at centres not greater than 600mm to retain the cables in position when lids are removed.

Where vertical runs of p.v.c. cables enclosed in trunking exceed 8.00m, the enclosed cables shall be adequately supported by approved carrier rods inserted in the trunking at not more than 3.00 m centres with the cable effectively bound to the rods having I.S.O. Metric threads complying with requirements of BS: 4183.

Adjoining lengths of trunking shall be correctly aligned and the two sides at right angles to the cover shall be jointed to the corresponding sides of the adjacent trunking piece by means of internal fishplate connector not less than 2.5mm thick, attached by means of not less than four cadmium plated steel mushroom headed M.4 screws for trunking having a depth of less than 150mm and eight cadmium plated steel mushroom headed M.4 screws for trunking having a depth 150mm and above, each passing through clearance holes, shakeproof washers and nuts. Two pairs of screws on either side of the join shall be connected by tinned copper links with split soldering washers under the nuts, to provide electrical continuity across the joints.

The nuts shall be located on the outside of the trunking and tinned copper straps shall be provided across all joints formed by the straight lengths, angles, tees etc.

Trunking shall be manufactured from not less than 1.2mm (18swg) thick for trunking up to 100mm x 100mm cross-section and a minimum of 1.6mm (16swg) for trunking sizes above this. Where the trunking passes through walls or floors, sections of cover plate shall be fitted, before erection, such that cover plate extends approximately 50mm beyond the finished surfaces of the walls or floors.

Separate compartments shall be provided in trunking as necessary and in all tees, angles, reducers etc, to ensure that the segregation of the various services as detailed in this specification section.

All tees, reducers and angles for trunking shall have folded and welded corners. All angles formed in wall trunking shall have fillet corners.

Where cables are to be enclosed in the same trunking compartment and connected to different distribution boards i.e. single phase and three phase power circuits, they shall be distinguished by separating the cables by insulated taping at intervals of 1.20m together with an approved means of identification sleeve adjacent to each taping that clearly denotes the circuit type and reference. Trunking shall be fixed to walls etc, with No. 12 round-headed wood screws to lengths depending on the material on which the fixing is made. The contractor shall include for providing all necessary supporting devices, for trunking and adequate allowance shall be made for expansion and contraction of long runs. All cable trunking shall be fixed clear of the respective surfaces by means of not less than 6mm spacers.

Trunking and trunking fittings shall be manufactured by a reputable engineering company, with facilities for giving quick delivery of trunking and purpose-made pieces of trunking whose shape shall be determined by dimensions obtained from site. On-site welding shall not be allowed.

Flexible expansion joints shall be provided in trunking runs as necessary.

Cable trunking shall have 25% spare capacity for installation of any future cables, due to precaution being taken to ensure that the correct space factor of fully loaded trunking is provided in accordance with the relevant clause, in the I.E.E. Regulations.

Attention is also drawn to Regulation B.40 of the 14th edition of the I.E.E. Regulations, in connection with precaution to be taken to prevent spread of fire.

2.19 SURFACE CABLE TRUNKING INSTALLATION

The minimum cable trunking requirement shown on the drawings shall be supplemented if required. Proposals for any such supplementary trunking shall be indicated on the installation drawings at the time of submission for approval. It shall be clearly understood that the introduction of supplementary trunking runs or the increase of compartment size will be allowed only at the discretion of the Engineer and if accepted shall be regarded as a concession to permit cables that would otherwise be enclosed in conduit to be accommodated in trunking.

Cable Trunking installed on the exposed surface of walls shall be arranged with the respective wiring compartments in the vertical plane with all conduits emanating from the top, bottom and side of the assembly. In all cases the access lid shall be fitted to the exposed side of such assemblies.

Cable trunking installed either in voids or on the soffit of exposed ceilings wherever possible shall be installed with the compartments arranged in a horizontal plane with the access lid at the lower edge of the trunking and all conduits connected to the top and sides of the assembly.

The cable trunking shall be installed immediately above the ceiling structure within ceiling voids, generally below and clear of mechanical, air conditioning and public health services.

Trunking shall be supported by purpose-made brackets suspended from the structural concrete ceiling slab soffit.

Conduits used to complete the final section of each circuit from the general trunking system installed in the ceiling voids unless otherwise stated, shall emanate from the top of appropriate compartment of the cable trunking and rise vertically to the structural soffit. The conduit shall be taken when through the structural slab or be arranged to drop vertically to terminate at the various lighting, power, telephone or auxiliary service outlet points.

The majority of the space in the corridor ceiling voids, with the exception of the space reserved for electrical services and detailed on the attached drawings, will be used to accommodate pipe work and ducting, associated with the mechanical, air conditioning and public health services. The Contract shall include for all necessary costs for co-operating with other trades to ensure that a neat and a high Standard of overall installation is provided.

Drawings showing the extent of the mechanical air conditioning and public health engineering services may be inspected at the Engineer's office.

The contract shall include for the preparation of detailed installation drawings of all trunking and conduit runs and for their submission to the Building Contractor and the Engineer for approval. These drawings shall be submitted to the above organizations as quickly as possible, after receiving the official order for the Works. Duplicate copies of the drawings shall be submitted initially for approval. Unless otherwise stated, upon receipt of approval a further six copies of each drawing shall be submitted to the Engineer for distribution.

2.20 FLEXIBLE CONDUIT

Conduit connections to motors or other such items of removable equipment, unless otherwise stated, shall be made with p.v.c. sheathed metallic flexible conduit, in accordance with the attached Schedules and to BS: 731.

All such metallic flexible conduit shall be composed of double aluminium with bitumen infused paper interleaf, with a p.v.c. Overall sheath. Each end of the flexible conduit shall be terminated by a coupler comprising a union, lead seal and screwed nut. Each coupler shall have a male thread for connecting to a standard BS: 4568 box or an equipment terminal box.

Each length of flexible conduit shall be complete with an approved integral copper earth wire of 2.5mm minimum size incorporated during manufacture. As an alternative, an independent earth wire of 2.5mm minimum size and complete with green butyl rubber insulation shall be installed in all such flexible conduit and shall be connected to the accessory earth terminal at one end and an M.4 brass screw and washer tapped into the back or side of a BS: 4568 conduit box at the other

Flexible conduits shall be less than 300mm and more than 1.00m in length unless permitted in writing by the Engineer.

2.21 LIGHTING SWITCHES

Unless otherwise stated, lighting switches shall be 5amp single pole, one way, two way or intermediate way, and be mounted in singles or in gangs as required. All units shall be suitable for the a.c. supply and mounted at the height detailed on the attached schedule or shown on the drawings unless otherwise stated.

Switches shall be suitable for flush or surface mounting, as required, and be complete with pressed steel box, adjusting grid plate, switch interior and cover plate. All grid plates to be earthed to the mounting box by means of short green coloured p.v.c. sheathed bonding wire.

Each switch interior shall be of porcelain or bakelite, mounted to a top adjustable grid plate and complete with a switch 'rocker' to match the finished plate. At least 9mm clearance shall be provided between the switch and the inner wall of the box.

Flush mounting switch plates shall be flat, overlapping the associated metal box not less than 5.5mm at all sides. Switch plates shall be manufactured from white amino plastic urea powder moulding to BS: 1233 with high track resisting qualities or stainless steel to an approved sample in accordance with the attached Schedule unless otherwise stated.

In plant, roof space and other similar areas as specified, the switches shall be arranged in singles or in gangs as required complete with protected type dolly. Switched assemblies shall be stove enamel or galvanized finished to match the connected conduit.

Switches mounted in exposed locations or positions subject to moisture shall be enclosed in a galvanized metal weatherproof enclosure in accordance with an approved sample.

All ceiling switches shall be complete with a 50.8mm fixing centre conduit box, porcelain or bakelite interior and overlapping plate, finished as the general lighting switches unless otherwise stated. Each unit shall be complete with white nylon cord and white acorn.

Where two or more phases of the supply are connected to a single switch assembly, switch units finished as above shall be provided complete with the necessary phase barriers and identifications, in order to comply with the relevant clauses of the I.E.E regulations.

Switch plates specified to be labelled shall be suitably engraved to clearly denote the function of the switch. Details of the actual engraving shall be determined at a later date or is given in the following Specification Section and/or on the drawings.

Where indicator switches are shown on the attached drawings, they shall be as the general lighting switches, with the addition of a red indication light.

All switches shall fully comply with BS: 3676, quick make and break for d.c. and slow make and break for a.c. supplies.

2.22 LUMINAIRES

The contract shall include for the erection and connection of the luminaries and lamps as detailed on the attached schedule of Luminaries and Lamps and for the provision of all-necessary lamp holders, lamps, flexible connections etc.

All luminaries shall be manufactured in accordance with the appropriate sections of BS: 4533. Parts 1 and 2.

The control gear associated with each of the fluorescent luminaries shall accord with BS: 2818 and BS: 4017 and be of the instant start type unless otherwise stated.

Luminaries incorporating tube suspensions shall be complete with non-rigid connections to the general conduit system, the conduits being of the hook plate type. Ball socket joints shall be provided if the suspension chain, wire or non-rigid tube be used as the earth continuity conductor. Flexible earth wires shall be provided across all ball/socket joints.

Luminaires designed for use with 300 watt lamps and larger sizes shall incorporate cool wiring devices so that in an ambient temperature of 21° C they shall limit the temperature of the fitting wiring to a maximum of 53°C and the temperature of the lamp caps to a maximum of 150°C.

Fluorescent and other forms of discharge luminaire shall be complete with an integral HRC circuit fuse and capacitor of the 'dry foil' type, to provide power factor correction to a minimum of 0.9 lagging.

The Contract shall include for all luminaries detailed under a P.C. sum to comply fully with this clause.

2.23 LUMINAIRE CONNECTIONS

Final connections to all luminaries shall be made by means of an approved nylon connector terminal block, complete with two screws, brass ferrules for connecting to the final sub-circuit wiring.

Unless otherwise stated, each luminaire in this specification shall be mechanically connected to a metal conduit box by means of suitable brass R.H. screws finished to match the metalwork of the luminaire. The terminal block shall be enclosed in the conduit box.

In the case of fluorescent luminaries, two such conduit boxes shall be provided at appropriate fixing centers,

A heat resisting flexible cord shall be connected from the terminal block to the fitting. Care shall be taken to ensure that the metalwork of the fitting is effectively earthed.

Final connection to each bulkhead luminaries shall be by a standard circular conduit box in accordance with Standard sheet No.4. of BS: 4568 Part 2 mounted immediately adjacent to the fitting.

Wiring of sub-circuit cables through luminaries shall not be allowed unless otherwise stated.

Where luminaries are mounted on or in accessible suspended ceilings, the final sub-circuit wiring shall terminate in a universal ceiling rose and flexible cord used for the final connection to the fitting.

2.24 LAMP HOLDERS

Each luminaire shall be complete with a suitable lampholder, or lampholders, or lampholders, to BS:52 BS:98, BS:495, BS:841 as appropriate with the tungsten luminaries being complete with heavy duty H.O. pattern lampholders of the G.E.S., E.S., or B.C. type as detailed below.

The lampholders shall be provided as follows: -

- Lamps up to and including 100 watts – B.C. type.
- Lamps over 100 watts and including 300 watt – E.S. type.
- Lamps over 300 watts- G.E.S. type.

All E.S. and G.E.D lampholders shall be of the porcelain type with brass guard. B.C. type lampholders shall be of the heavy duty brass type.

Where S.B.C. or non-standard Lampholders are specifies in other sections of this Specification they shall be of the heavy duty brass type.

Lampholders suspended from flexible cords shall be of the all-insulated cord-grip type, with insulated skirts and solid stem plungers complete with external springs. The cable entry to the lampholders shall allow the cable sheath to be taken into the lampholder.

Lampholders incorporating 'telescopic' type plungers shall be used in conjunction with non-flexible cable only.

All batten lampholders not fitted with shades shall be complete with insulated skirt. Shade carrier rings shall be provided with all lampholders not incorporated in fittings.

Lampholders for use with fluorescent lamps shall be either of the white bakelite retractable 'bi-pin' type or centre twist type, complete with earthing clamp, in accordance with BS: 1875.

2.25 LAMPS

All lamps shall be in accordance with BS: 161, BS:555 and BS:1853 as detailed in the attached Schedule of Luminaires and Lamps and/or Specification Sections.

After testing the installation, lamps shall be removed from the luminaries and replaced prior to handover.

Fluorescent lamps shall be provided in accordance with the attached Schedule and/or Specification Section and drawings.

2.26 CEILING ROSES

The Contract shall include for ceiling roses to be manufactured from glazed porcelain, suitable for direct connection to a 50.8mm fixing center BS:4568 conduit box, unless otherwise stated.

Where a conduit box is flush mounted in the ceiling, a suitable white bakelite break-ring shall be provided and fitted between the soffit and the ceiling rose.

Each ceiling rose shall fully comply with BS: 67

Plug-in type universal ceiling roses, manufactured from either rigid p.v.c. or bakelite and complete with 50.8mm fixing centres and short length of three core flexible cord shall be used for the final connection to all luminaries incorporated in removable and hence accessible type false ceilings.

2.27 GENERAL PURPOSE SOCKET OUTLETS

The Contract shall include for the installation of the general purpose 13 amp switched socket outlets positioned as shown on the drawings, the socket being wired in accordance with the circuit details indicated on the attached drawings. Each socket outlet shall fully comply with BS: 1363.

The 13amp socket outlets shall comprise single or twin units as shown on the drawings. Each outlet shall be complete with a plug top, unless otherwise stated and manufactured in accordance with an approved sample.

Each socket outlet shall be finished either in metal or made from white aminoplastic urea powder mouldings to Bs: 1322 as detailed in the attached schedule and/or Specification Section with cover plate to match the lighting switches, suitable for flush or surface mounting as necessary.

Each 13amp socket outlet shall be complete with a pressed steel box, the metal plates being fitted with white bakelite inserts.

In the plant, roof space and other similar areas switch socket outlets complete with protected type dolly and galvanized finish shall be supplied and installed as detailed in the following Specification sections and/or drawings.

Each socket shall be of the rectangular three-pin type complete with line and neutral shutters. The shutters shall be manufactured from unbreakable insulating material which shall be non-ignitable and track resistant.

The shutters shall effectively screen and isolate the line and neutral socket contacts to exclude dust and interference and shall only be operable when the interlocked earth pin in the associated plug top has been inserted.

Each switch associated with a socket outlet shall be complete with adequate ON and OFF markings and be of the ' rocker' type, unless otherwise stated.

Switch socket outlets complete with red neon indicating lamps shall be provided in the position indicated on the attached drawings and/or Specification Section.

All socket plug tops shall be handed over to the Employers representatives and two copies of a receipt obtained for them. One copy of the receipt shall be forwarded to the Engineer for reference.

2.28 FUSED SPUR OUTLETS

Fused spur outlets shall be of the switched or unswitched type, where shown complete with a red neon indicator light and positioned as indicated on the attached drawings and/or Specification Section.

Each unit shall be complete with a sheet steel box adjustable top grid and plate finished to match the lighting switches.

White bakelite inserts and fuse holders shall be fitted to each unit, together with an appropriately rated cartridge fuse to BS: 1362.

2.29 SUB-CIRCUIT WIRING

The wiring of the installation shall be carried out on the 'loop-in' system. Switch feed wires for lighting circuits shall be looped at the switch points and common or neutral wires and switch wires at lighting points.

Appliances other than lighting points which are on the same circuit shall loop from appliances. No other joints shall be allowed. Junction boxes, three plate ceiling roses etc., shall not be used.

Other than at luminaries and accessories, joints in cables will not be permitted. Connections between flexible cords and cables shall be made by means of an approved porcelain connector block.

Any cables which fail to pass the specified tests during installation; at completion of the work and/or completion of defects liability period shall be replaced. No extra charge shall be levied for this work.

At termination points such as luminaries, switch or socket outlets etc., sufficient length shall be left on cable ends to ensure that there is no tension on the connections.

When preparing cable ends, ensure that none of the conductor strands are damaged and that the strands are twisted together with pliers, to ensure a neat and firm connection.

The conductor insulation shall be removed for a minimum length to facilitate connection, and no excess length of exposed conductor shall be left.

Where p.v.c. cable are installed vertically, in either trunking or conduit, adequate supports for the cables, shall be provided so that they may be clamped to relieve the stress, due to the cable weight.

All cables entering distribution boards or terminals outlets such as switch socket outlets, luminaries etc., shall be complete with a coloured identification sleeve to denote the phase, circuit reference and/or terminal number to which it is connected.

No form of earth concentric wiring shall be allowed and the phase and neutral conductors shall be effectively isolated from items of switchgear and enclosures which are at earth potential. Connections between the neutral and earth conductors shall be made only at transformer or main L.V. switchboards as indicated on the attached drawings and/or specification sections.

Phase and neutral conductors at all times shall be installed in continuous earth metal enclosures in the form of conduit, trunking, cable sheaths and armouring, metal clad switchgear etc, unless otherwise indicated.

The position and loading of all points shall be taken from the drawings for tender purposes, but the exact setting out and runs of conduit and cables shall be agreed with the Engineer before the work is carried out. Particular Attention shall be given to the position of switches with reference to hanging of doors.

The Engineer's attention shall be drawn to locations where switch positions are at variance with drawings, consistent with the following conditions:-

- Single doors: Switch shall be located adjacent to closing style.
- Unequal two-leaf doors: Switches shall be located adjacent to hanging style of narrower portion of doors.
- Equal two- leaf doors: Switches shall be located adjacent to the left hand side of the doors on entering.

Cable terminations to equipment shall be made by one of the following methods:-

Sweated lugs of the appropriate sizes for the cable used.

Compression type lugs.

Pinch screw type terminations of the type that do not spread the conductors.

Clamp type conductors.

In addition the cable conductors shall be doubled back on themselves for all single connections of Conductor's size up to and including.

2.30 CABLE IDENTIFICATION

Cable shall be coloured as in the latest edition of the I.E.E. Regulations i.e. respective phase conductors shall be coloured red, yellow, and blue up to the final single pole and neutral distribution boards and throughout all three phase circuits. Final single phase sub-circuits shall have phase wires coloured red. Under all circumstances the neutral wire shall be black.

The cord of all flexible cords and cables shall be coloured brown for the phase conductor, blue for the neutral conductor and green/yellow strips for earth conductor.

All ancillary service cable sheaths shall be coloured in accordance with the following:-

Impulse Clocks - Brown

Fire alarm - Grey

Extra-low voltage - Orange

Cable ends connected to items of equipment shall be complete with approved end seal markers, in order to identify the circuit, phase and connections reference.

The cable markers shall be coloured in accordance with the following: -

Red Phase -Red

Yellow Phase -Yellow

Blue Phase -Blue

Neutral -Black

2.31 EARTHING & TESTING

Earth continuity tests on the conduit, trunking and cable installation, shall be executed under this Contract to ensure that the resistance of the earth path is within the limits set out in the I.E.E. Regulations before any wiring is commenced. Copies of the test certificates shall be forwarded to the Engineer before wiring is commenced. Further tests shall be carried out after the total installation has been completed.

The complete installation shall be earthed and tested in accordance with Section 'E' of the 14th Edition of the Regulations for the Electrical Equipment of Buildings, published by the Institution of Electrical Engineers.

All necessary labour and instruments for carrying out these tests shall be provided under this contract. The Engineer shall be given at least seven days notice of the date when it is proposed to carry out the tests, to enable him to be present during the tests if required.

Duplicate typewritten copies of the completed test reports shall be forwarded to the Engineer within seven days of the date when the tests are carried out.

All metal, sinks, tanks, etc., shall be bonded under this Contract to the earth terminal of an adjacent socket outlet using green P.V.C. insulated cable in accordance with Table D.3 of the I.E.E. Regulations. The earth wire shall be installed in flush conduit terminating at low level with 50.8mm fixing center conduit box fitted with a bushed dome lid. The supply and installation of all necessary bonding terminals to the sinks, tanks, etc., shall be included in this contract.

On completion and if considered necessary at the end of the defects liability period, the work shall be inspected by the Engineer for compliance with the Specification.

The following tests shall be executed under the Contract in the presence of the Engineer as detailed in the I.E.E. Regulations:

- Insulation to earth and between phases,
- Polarity,
- Earth conductor continuity,
- Earth bonding,
- Line- earth loop impedance,
- Earth electrode resistance,

Full load test (1hour). During this test, voltage and current readings at the final sub-circuit, sub-main and main intake positions shall be taken.

On completion of the test and inspection, the certificates described in Section 'E' of the I.E.E. Regulations shall be completed and submitted in duplicate to the Engineer together with full details of the test results.

SECTION 3

3. COMMISSIONING AND MAINTENANCE

3.1 COMMISSIONING AND TESTING

All tests prescribed in the 14th Edition of the regulations for the electrical equipment of the Institute of Electrical Engineers, together with all amendments as applicable, shall be carried out by the Contractor on the completed installation. In addition testing of all special equipment to the complete satisfaction of the Architect and such other persons or authorities concerned with the installation shall be carried out by the Contractor.

Tests may also be required during progress of the Contract for insulation resistance, continuity of all conduit and earth connections, and also the ability to withdraw all cables or any cables from conduits.

In addition to any tests required by the Supply Company upon completion of the installation, tests for polarity, insulation resistance, earth continuity and adequate operation of all parts of the installation shall, as stated above, be carried out by the Contractor. The Contractor shall provide accurate instructions and apparatus and all labour required for such testing.

All tests must be carried out in the presence of the Engineer or such other person appointed for the purpose, but the Contractor alone will be held responsible to the authorities as to the installations compliance with rules and regulations.

The Contractor will be required to give all notices or details to enable the installation to be tested or inspected.

All fees arising from the inspection and any subsequent inspection or re-testing shall be paid by the Contractor.

Duplicate copies of the results of these tests shall be provided within **14days** of the witnessed tests, and the Contractor will be required to issue to the Engineer the Requisite Certificate upon completion, as required under the regulations referred to above.

Any faults, defects, omissions or faulty workmanship, incorrectly positioned or installed made apparent by such inspections or tests shall be rectified by the Contractor, at his own expense.

3.2 HANDING OVER

The Contract works shall be considered complete and the maintenance and defects liability period shall commence only when the Contract Works and supporting services have been tested, commissioned and operated to the satisfaction of the Engineer and officially approved and accepted by the Employer, provided always that the handing over of the Contract Works shall coincide with the completion of the Main Contract Works.

The procedure to be followed will be as follows:

- a. On completion of the Contract Works to the satisfaction of the Engineer, the Contractor shall request the Engineer to arrange for handing over.
- b. The Engineer shall then arrange a handing-over meeting or a series thereof at the site.

- c. The Contractor shall arrange with the Engineer and the Employer for a complete demonstration to be carried out of each and every service, and for instructions to be given to the relevant operating staff and other representatives of the Employer.
- d. The Contractor shall prepare approved Handing Over Certificate and check lists of all controls and items of equipment, tools, spares and the like.
- e. In the presence of the Employer and the Engineer, handing over will take place, subject to agreement upon the handing over Certificate and associated check lists.

3.3 MAINTENANCE AND DEFECTS LIABILITY PERIOD

The Sub- Contractor shall maintain the complete electrical installation and associated equipment for a period of minimum 12 months from the date the installation is handed over to the client.

The Contract shall be held responsible for and shall make good all defects in material and workmanship that appear during the 12-month maintenance period. The period of liability shall not end until all defects which appear during the maintenance period have been rectified.

Any item of material found to be defective shall be replaced by the Contractor within seven days of his being notified and any results of defective workmanship shall be repaired including supply of new parts if necessary immediately upon being notified.

If the Contractor fails to carry out such replacement or repair within a reasonable time, the material or work so affected may be made good by the Contractor in such manner as the Architect may direct, In which case the cost thereby incurred shall, upon the written certificate of the Architect be recoverable by the Contractor as a liquidated demand in money.

If any defects be such that it shall be impracticable or inconvenient to remedy the same, the diminution in value of the works due to existence of such defects shall be deducted from the sum remaining to be paid to the Contractor or failing such remainder shall be recoverable as a liquidated demand in money.

The Contractor shall allow in his tender price for this maintenance and inspection service and shall provide for all tools, instruments, plant and scaffolding, and the transportation thereof, as required for the correct and full execution of these obligations, and the provision, use or installation of all materials whether they are normal maintenance materials such as oils, greases, sandpaper etc. and parts which are periodically renewed such as relay contacts or parts which are faulty for any reason whatsoever excepting always Acts of God such as storm, tempest or flood, lightning and earthquakes and civil revolt, acts of war and vandalism.

SECTION 4

4. PARTICULAR SPECIFICATION

4.1 EXTENT OF WORKS

The work to be carried out under this Contract includes the supply, delivery, installation, commissioning testing energizing and leaving in a serviceable condition to the satisfaction of the Engineer of the complete installation as herein specified on the drawings or as many to be directed and shall include all such materials, and equipment which, although not expressly, are required and are necessary to complete the installation to the satisfaction of the Engineer.

The installation comprises the following items which are more fully described in other parts of this specification:

- a. Conduit, boxes and wiring for all lighting circuits.
- b. Conduit, boxes and wiring for all power circuits.
- c. Conduit, boxes and wiring for closed circuit television (CCTV) system.
- d. The complete conduit system including conduit and outlet boxes for telephones.
- e. All sub-distribution cables.
- f. All earthing requirements.
- g. Receiving delivery, handling and installation of lighting fittings.
- h. Receiving delivery, handling and installation of all switchgear and accessories.
- i. Power supply and connection equipment supplied by others such as fans, pumps and lifts all as specified.
- j. Complete Addressable Fire Alarm System as specified.
- k. Making arrangements with the supply Company for testing and connecting main power and metering.
- l. Sub-main cables to Distribution Boards on all floors.
- m. Receiving delivery, handling and installation of all external lighting.
- n. Liaison with Kenya Power Authorities.
- o. Supply and installation of cable trays.
- p. Supply and installation of cable ladders.

4.2 EXCLUSIONS

The following work in connection with the carrying out the Electrical Installation will be done by others.

- a. Excavation of cable trenches.
- b. Cable duct & manholes.
- c. All structure penetration openings.

4.3 INSTALLATION OF LIGHTING

All conduits for lighting circuit shall be concealed in walls, ceiling, slab and floors.

Lighting fittings shall be recessed and surface mounted in all the blocks and boxes for switches shall be installed at 1350mm above finished floor level, unless otherwise stated.

All light fittings and shall be supplied by the Client, unless otherwise directed.

The Contractor shall include in the tender price for fixing of light fittings and for all necessary accessories for fixing the fittings such as suspensions, glands, flexible cables, connectors etc.

4.4 INSTALLATION FOR POWER

Conduits for circuits in the general areas shall be concealed in the walls and floors. All power points in these areas shall be installed at 300mm above the finished floor level, unless otherwise stated. All socket outlet plates, telephone outlets, DP switches and isolators shall be supplied by the Client as per attached **Schedule of Switches in Appendix A**. Contractor is to ONLY receive delivery, handling, installation, testing and commissioning.

The tender price for fixing of all switchgear shall be required. The Contractor shall also include for all fixing accessories.

Suitable rated isolating switches shall be installed by the Contractor adjacent to all Equipment.

4.5 LIGHTING FITTING

All lighting fitting including external lighting fitting shall be supplied by the Client. All lamps shall be supplied by the Client.

Where a purpose made light fitting is shown as a locally made fittings, the Contractor shall submit a detailed working drawing for approval by the Architect and Engineer reserves the right to reject any fitting which in his opinion does not conform to the general standard of finish and workmanship expected for his project.

4.8 **FIRE ALARM & DETECTION SYSTEM**

4.8.1 **PART 1 GENERAL**

01. **Scope**

The work covered by this Section of the Specification shall include all labor, equipment, materials and services to furnish and install a complete fire alarm system of the zoned, non-coded <general alarm> <two stage> type. It shall be complete with all necessary hardware, software and memory specifically tailored for this installation. It shall be possible to permanently modify the software on site by using a plug-in programmer. The system shall consist of, but not be limited to, the following:

- a) Addressable Fire alarm control panel.
- b) Addressable break glass fire alarm stations.
- c) Intelligent Addressable Multisensor Detector.
- d) Audible notification appliances ; horns, .
- e) Air handling systems shutdown control.
- f) Battery standby.

02. **Applicable Codes and Standards**

- All equipment shall be UL listed for its intended use.
- NFPA Standards 72
- The National Electric Code.
- All other local codes and authorities having jurisdiction.
- British Standard.

03. **Related Documents**

Secure permits and approvals prior to installation.
Prior to commencement and after completion of work notify Authorities Having Jurisdiction.
Submit letter of approval for installation before requesting acceptance of system.

04. **Related Work**

The Contractor shall coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the fire alarm system shall include, but not be limited to:

- a) Conduit.
- b) Wire and Cables.

05. **Submittals**

Provide list of all types of equipment and components provided.
Provide description of operation of the system, similar to that provided in Part 2 of this Section of the Specifications, to include any and all exceptions, variances or substitutions listed at the time of bid. Any such exceptions, variances or substitutions which were not listed at the time of bid and are identified in the submittal, shall be grounds for immediate disapproval without comment.
Provide manufacturer's printed product data, catalog cuts and description of any special installation procedures.
Provide samples of various items when requested.

Provide shop drawings as follows:

- a) Drawing of the fire alarm control panel.
- b) Single line riser diagram showing all equipment and type, number and size of all conductors.

06. **Warranty**

Manufacturer shall guarantee the system equipment for a period of one (1) year from date of final acceptance of the system.

The contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of final acceptance of the system.

Upon completion of the installation of fire alarm system equipment, the electrical contractor shall provide to the architect a signed written statement, substantially in form as follows:

"The undersigned, having engaged as the Electrical Contractor on the <Name of Project> confirms that the fire alarm system equipment was installed in accordance with the wiring diagrams, instructions and directions provided to us by the manufacturer."

4.8.2 **PART 2 PRODUCTS**

01. **Acceptable Manufacturers**

The catalog numbers used are those of Edwards Systems Technology (EST) or equal and approved, and constitute the type and quality of equipment to be furnished.

02. **Circuiting Guidelines**

Each addressable analog loop shall be circuited as shown on the drawings but device loading is not to exceed 80% of loop capacity in order to leave for space for future devices. The loop shall have Class operation.

Each of the following types of alarm notification appliances shall be circuited as shown on the drawings but shall be typically as follows:

- a) Audible Signals: Provide one (1) notification appliance circuit for each FLOOR.

03. **Fire Alarm System Sequence of Operation**

The system shall identify any off normal condition and log each condition into the system database as an event.

- a) The system shall automatically display on the control panel Liquid Crystal Display the first event of the highest priority by type. The priorities and types shall be alarm, supervisory, trouble, and monitor.
- b) The system shall have a Queue operation, and shall not require event acknowledgment by the system operator. The system shall have a labeled color coded indicator for each type of event; alarm - red, supervisory - yellow, trouble - yellow, monitor - green. When an unseen event exists for a given type, the indicator shall flash. When all events of a given type have been displayed, the indicator shall change from flashing to steady.
- c) For each event, the display shall include the current time, the total number of events, the type of event, the time the event occurred and up to a 40 character custom user description.
- d) The user shall be able to review each event by simply selecting scrolling keys (up-down) for each event type.
- e) New alarm, supervisory, or trouble events shall sound an silenceable audible signal at the control panel.

Operation of any alarm initiating device shall automatically:

- a) Update the control/display as described above (B.1.)
- b) <Sound all alarm signals throughout the building at the evacuation.>
<or>
<Sound alarm signals in the area of alarm at the evacuation rate.>
- c) <Turn on a red alarm zone LED at the fire alarm control panel.>

The entire fire alarm system wiring shall be electrically supervised to automatically detect and report trouble conditions to the fire alarm control panel. Any opens, grounds or disarrangement of system wiring and shorts across alarm bell/strobe wiring shall automatically:

- a) Update the control/display as described above (B.1.)
- b) <Operate the supervisory relay contacts to initiate the transmission of an alarm to a central station agency via leased telephone lines.> (Optional)

04. **Support for Installer and Owner Maintenance**

Provide a coded one man walk test feature. Allow audible or silent testing. Signal alarms and troubles during test. Allow receipt of alarms and programmed operations for alarms from areas not under test.

Provide internal system diagnostics and maintenance user interface controls to display/report the power, communication, and general status of specific panel components, detectors, and modules.

Provide loop controller diagnostics to identify common alarm, trouble, ground fault, Class A fault, and map faults. Map faults include wire changes, device type changes by location, device additions/deletions and conventional open, short, and ground conditions. Ground faults on the circuit wiring of remote module shall be identified by device address.

Allow the user to display/report the condition of addressable analog detectors. Include device address, device type, percent obscuration, and maintenance indicator. The maintenance indicator shall provide the user with a measure of contamination of a device upon which cleaning decisions can confidently be made.

Allow the user to report history for alarm, supervisory, monitor, trouble, smoke verification, watchdog, and restore activity. Include Facility Name, Licensee, Project Program Compilation date, Compiler Version, Project Revision Number, and the time and date of the History Report.

Allow the user to disable/enable devices, zones, actions, timers and sequences. Protect the disable function with a password.

Allow the user to activate/restore outputs, actions, sequences, and simulate detector smoke levels.

Allow the service user to enter time and date, reconfigure an external port for download programming, initiate auto programming and change passwords. Protect these functions with a password.

05. **Equipment**

05.a **Fire Alarm Control Panel**

The fire alarm control panels shall be Edwards Systems Technology (EST) type or equal and approved equivalent and shall incorporate all control electronics, relays, and necessary modules and components in a <surface> mounted cabinet. The operating controls shall be located behind locked door with viewing window. All control modules shall be labeled, and all zone locations shall be identified. The cabinet shall be steel, with a gray finish. The assembly shall contain a base panel, system power supply and battery charger with optional modules suitable to meet the requirements of these specifications.

System circuits shall be configured as follows: Addressable analog loops Class < ; Initiating Device Circuits Class ; Notification Appliance Circuits Class . <Single> <Two> stage operation.

The system shall be supervised, site programmable, and of modular design with expansion modules to serve up to <96> detectors and <94> remote modules, and <two> notification appliance circuits (NACs) convertible to power risers to serve remote multiple NAC modules for zoned signal applications.

The system shall store all basic system functionality and job specific data in non-volatile memory. The system shall survive a complete power failure intact.

The system shall have built-in automatic system programming to automatically address and map all system devices and provide a minimum default single stage alarm system operation with support of alarm silence, trouble silence, drill, lamp test, and reset common controls.

The system shall allow down loading of a job specific custom program created by system application software.

It shall support programming of any input point to any output point. The system shall support the use of Bar Code readers to assist custom programming functions. It shall allow authorized customization of fundamental system operations using initiating events to start actions, timers, sequences and logical algorithms.

The system shall support distributed processor intelligent detectors with the following operational attributes; integral multiple differential sensors, automatic device mapping, electronic addressing, environmental compensation, pre-alarm, dirty detector identification, automatic day/night sensitivity adjustment, dual normal/alarm LEDs, relay bases, and isolator bases.

The system shall use full digital communications to supervise all addressable loop devices for placement, *correct location*, and operation. It shall allow swapping of "same type" devices without the need of addressing and impose the "location" parameters on replacement device. It shall initiate and maintain a trouble if a device is added to a loop and clear the trouble when the new device is mapped and defined into the system.

The system shall have a UL Listed Detector Sensitivity test feature, which will be a function of the smoke detectors and performed automatically every 4 hours.

The system shall support 100% of all remote devices in alarm and provide support for a 100% compliment of detector isolator bases.

All panel modules shall be supervised for placement and return trouble if damaged or removed.

The system shall have a CPU watchdog circuit to initiate trouble should the CPU fail.

The system evacuation signal rate shall be <continuous>

Provide a signal silence inhibit feature set to < 2 minutes > and an automatic signal silence timer set to < 2 minutes >. Audible notification appliances shall be affected by signal silence features. Visual signal appliance shall not be affected by signal silence features.

The system program shall meet the requirements of this project, current codes and standards, and satisfy the local Authority Having Jurisdiction.

Passwords shall protect any changes to system operations.

The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection.

The power supply shall provide internal power and 24 Vdc at 4A continuous for notification appliance circuits. The power supply shall be capable of providing 10A to output circuits for a maximum period of 50 ms. Auxiliary power shall be 24 Vdc at 500 mA. All outputs shall be power limited. The battery shall be sized to support the system for <24> <4> hours of supervisory and trouble signal current plus general alarm for 5 minutes.

The LCD Display Module shall be of membrane style construction with a 4 line by 20 character Liquid Crystal Display. The LCD shall use supertwist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the total number of disable points. In the alarm mode display the total number of events and the type of event on display. Reserve 40 characters of display space for user custom messages.

The module shall have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, CPU fail, and test. There shall be common control keys and visual indicators for; reset, alarm silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicators to flash the indicators when undisplayed events are available for display and turn on steady when all events have been displayed. Allow the

first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event “hands free”.

Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.

The Main Controller Module shall control and monitor all local or remote peripherals. It shall support the LCD Display Module, power supply, remote LCD and zone display annunciators, strip and carriage printers, and support communication interface standard protocol (CSI) devices such as color computer annunciators and color graphic displays. The RS-485 port shall be capable of supporting up to 32 remote annunciators. The MCM shall provide one loop controller circuit, two notification appliance circuits, and common form ‘C’ contacts for alarm, supervisory, and trouble. Contact ratings shall be 24Vdc at 1A.

<The panel shall have:

- a) an Expander Loop Module with one additional loop controller circuit and two notification appliance circuits to expand the system capability to 192 detectors and 188 modules. (Optional Capacity).
- b) <an interface module option for remote site monitoring. The module shall have a local energy municipal loop and reverse polarity connections for each of alarm, supervisory and trouble.>

06. **Components**

06.a **Intelligent Devices -- General**

Each remote device shall have a microprocessor with non-volatile memory to support its functionality and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, number of alarms and troubles, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller. Each device shall be capable of electronic addressing, either automatically or application programmed assigned, to support physical/electrical mapping and *supervision by location*. Setting a device’s address by physical means shall not be necessary.

06.b **Intelligent Detectors - (Multisensor - 4D)**

The System Intelligent Detectors shall be capable of full digital communications using both broadcast and polling protocol. Each detector shall be capable of performing independent fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. Signal patterns that are not typical of fires shall be eliminated by digital filters. Devices not capable of combining different fire parameters or employing digital filters shall not be acceptable. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detector head. Distributed intelligence shall improve response time by decreasing the data flow between detector and analog loop controller. Detectors not capable of making independent alarm decisions shall not be acceptable. Maximum total analog loop response time for detectors changing state shall be 0.5 seconds.

Each detector shall have a separate means of displaying communication and alarm status. A green LED shall flash to confirm communication with the analog loop controller. A red LED shall flash to display alarm status.

The detector shall be capable of identifying up to 32 diagnostic codes. This information shall be available for system maintenance. The diagnostic code shall be stored at the detector. Each smoke detector shall be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information.

It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings.

Each detector microprocessor shall contain an environmental compensation algorithm which identifies and sets ambient "Environmental Thresholds" approximately six times an hour.

The microprocessor shall continually monitor the environmental impact of temperature, humidity, other contaminants as well as detector aging. The process shall employ digital compensation to adapt the detector to both 24 hour long term and 4 hour short term environmental changes. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value. Differential sensing algorithms shall maintain a constant differential between selected detector sensitivity and the "learned" base line sensitivity. The base line sensitivity information shall be updated and permanently stored at the detector approximately once every hour.

The intelligent analog detectors shall be suitable for mounting on any Signature Series detector mounting base.

06.b.1 The Multisensor will be having three sensors:- Photoelectric, Ionization and heat element.

06.c Intelligent Modules -- General

It shall be possible to address each Intelligent Signature Series module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes shall not be acceptable. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults.

The module shall be suitable for operation in the following environment:

- Temperature: 32°F to 120°F (0°C to 49°C)
- Humidity: 0-93% RH, non-condensing

06.d Intelligent Manual Pull Stations/BREAK GLASS -- General

It shall be possible to address each Signature Series fire alarm pull station without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The station shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input circuit wiring shall be supervised for open and ground faults.

The fire alarm pull station shall be suitable for operation in the following environment:

- Temperature: 32°F to 120°F (0°C to 49°C)
- Humidity: 0-93% RH, non-condensing

06.e Notification Appliances - General

All appliances shall be UL Listed for Fire Protective Service.

All strobe appliances or combination appliances with strobes shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971, and ULC S526 Listed.

All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers' instructions.

Any appliances which do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purposes intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended.

4.8.3 **EXECUTION**

01. **Installation**

The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturer's wiring diagram. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type recommended by the manufacturer, approved by the local Fire Department, and shall be installed in rigid, threaded conduit throughout.

All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.

End of Line Resistors shall be furnished as required for mounting as directed by the manufacturer.

All wiring shall be color coded throughout, to National Electrical Code standards.

The system shall be arranged to receive power from one three wire 120 Vac, 15 A supply. All low voltage operation shall be provided from the fire alarm control panel.

02. **Field Quality Control**

The system shall be installed and fully tested under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all of the function as specified.

03. **Tests**

Reports of any field testing during installation shall be forwarded to the Engineer.

Each individual system operation on a circuit by circuit basis shall be tested for its complete operation. The procedure for testing the entire fire alarm system shall be set forth with the consent of the code enforcement official, the Engineer and the manufacturer.

04. **Documentation and Training**

The contractor shall compile and provide to the owners three (3) complete manual on the completed system to include operating and maintenance instruction, catalog cuts of all equipment and components, as-built wiring diagrams and a manufacturer's suggested spare parts list.

In addition to the above manuals, the contractor shall provide the services of the manufacturer's trained representative for a period of four (4) hours to instruct the owners' designated personnel on the operation and maintenance of the entire system. An EST2 End-User Training Video shall be included as part of the system documentation.

END OF SECTION

SECTION 5

SCHEDULE OF QUANTITIES AND PRICES

1. In all cases where quantities have been specified the unit rates given must include for everything necessary to install that section of the works complete with testing and commissioning.
2. It is important that tenderers fill in this section of Schedule of Quantities giving unit rates as indicated.
3. The quantities filled in shall be as given in the Specifications and NOT as measured by the Contractor without reference to the Consulting Engineer.
4. Where there is an omission which leads to the works not being possible to be given complete and working, this omission shall be brought to the attention of the Consulting Engineer.
5. Prices quoted for the quantities given in the following pages shall be for the supply, installation, connection, setting to work and all accessories. Where not separated out shall be included in the Unit Rates and Total Prices.

GENERAL
SPECIFICATIONS

PART B2

GENERAL PLUMBING AND DRAINAGE SPECIFICATIONS

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SECTION B2

GENERAL PLUMBING AND DRAINAGE SPECIFICATIONS

2.1 MATERIALS AND STANDARDS

2.1.1 GENERAL

This section specifies the general requirements for plants, equipment and materials forming part of the Plumbing and Drainage Installations.

PIPEWORK AND FITTINGS

Pipe materials are to be used as follows:-

2.1.2 Cold Water Mains

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

2.1.3 Black steel Pipework

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

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

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

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

2.1.4 Galvanized Steel Pipework

Galvanized steel pipework shall be manufactured to comply in all respects with the standards described for black steel pipework in paragraph 2.1.3 above.

Galvanized shall be carried out in accordance with the requirements of BS 1387 and BS143 respectively.

2.1.5 Copper Tubing

All copper tubing shall be manufactured in accordance with BS 2871 from C.160 "Phosphorus De-oxidized No- Arsenical Capper" in Accordance with BS 1172.

Pipe joints shall be made with soldered X] fittings and connections to equipment shall be compression fitting manufactured in accordance with B.S 864.

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

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

2.1.6 Cast Iron Pipework

(a) Internal Services

Cast iron pipework and fittings for use above ground in connection with internal building services, shall be manufactured with spigot and socket joints of the weight required by the local authority and shall fully with the required of B.S. 416.

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

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

(b) External Services

Cast iron pipework, which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirements of B.S.1211

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

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

2.1.6 Pitch fibre Pipework

Pitch Fibre Pipework and fittings for use in connection with external drainage services shall be manufactured in accordance with the requirements of B.S. 2760. Pipes shall be connected by means of purpose tapered joints manufactured in accordance with B.S. 2760.

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

2.1.7 Concrete Pipe

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

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

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

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

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

2.1.8 Asbestos Cement Pressure Pipe

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

The classification of these pipes fall into classes:

A, B, C, and D, respectively, and the class to be used shall depend upon the pressure conditions pertaining at site.

Where cast iron detachable joints are used for connecting pipes, the material comply with the B.S. Specification, then the materials used shall be of a quality not less than required by this standard.

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

2.1.9 Concrete Pipe

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

The joints of concrete pipe and fittings may be of the following depending upon application:

- 1) Flexible spigot socket type
- 2) Flexible rebated type (Storms water drainage Only)
- 3) Ordinary Spigot and socket type
- 4) Ordinary rebated type (Storms water drainage only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufactured in accordance with B.S. 2494 except where they are likely to be contaminated in accordance with the requirement of B.S. 486.

The Classification of these pipes fall into four classes:

A.,B.,C., and D., respectively, and the class to be used shall depend upon the pressure conditions pertaining at site.

Where cast iron detachable joints are used for connecting pipes, the materials shall comply with B.S. Specifications , then materials used shall #be of a quality not less than that required by this standard.

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

2.1.10 P.V.C. (Hard) Pressure Pipe and fittings

All P.V.C pipes and fittings shall be manufactured in accordance with B.S. 3505: 1968 or the relevant Kenyan Standard.

Fittings shall comply in all respects with British Standard 4346 part 1: 1969 or the relevant Kenyan Standard. Pipes shall be supplied in plain-ended lengths.

Thickness

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

| | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Nom. Dia.(mm) | 10 | 12 | 20 | 25 | 32 | 40 | 50 | 75 | 100 |
| Thickness (mm) | 1.5 | 1.7 | 1.9 | 2.2 | 2.7 | 3.1 | 3.9 | 5.7 | 7.3 |

Jointing

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

Anchoring

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

Workmanship

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

| | | | | | | | | | |
|---------------|-------|-------|-------|------------|------------|-------|-------|------|-------|
| Pipe diameter | 10mm | 15mm | 20mm | 25mm | 32mm | 40mm | 50mm | 75mm | 100mm |
| Horizontal | 0.75m | 0.90m | 1.05m | 1.20m m | 1.35. m | 1.65m | 1.80m | do | do |
| Vertical | 1.50m | 1.80m | 2.10m | 2.40m | 2.70m | 3.30m | 3.60m | do | do |

Pipes passing through walls or floors shall be sleeved to allow unrestricted movements.

The works shall be inspected and tested during installation.

All work, which will be concealed, shall be tested before it is finally enclosed and verified by the clerk of works.

Pipe Bed

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

Supports to fittings

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

Backfilling

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

Testing

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

2.1.11 MuPVC Waste Systems

All pipes and fitting shall be manufactured in accordance with B.S. 5255: 1968 Or the relevant Kenyan Standard.

Pipe shall be supplied in plain-ended lengths.

Thickness

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

| Size (in) | Size (mm) | Pipe and Fittings Wall Thickness (mm) |
|-----------|-----------|---------------------------------------|
| 1 1/4 | 32 | 1.8 |
| 1 1/2 | 40 | 1.9 |
| 2 | 50 | 2.0 |

Jointing

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

Anchoring

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

Workmanship

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

| Nominal size (in) | Nominal size (mm) | Horizontal (mm) | Vertical (mm) |
|--------------------------------|------------------------------|----------------------------|--------------------------|
| 1 1/4 | 32 | 500 | 1200 |
| 1 1/2 | 40 | 500 | 1200 |
| 2 | 50 | 900 | 1200 |
| 3 | 80 | 900 | 2000 |
| 4 | 100 | 1000 | 2000 |
| 6 | 150 | 1000 | 2000 |

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

Pipes passing through walls or floors shall be sleeved to allow unrestricted movements.

The works shall be inspected and tested during installation at any stage in accordance with BS5572. All work, which will be concealed, shall be tested before it is finally enclosed and verified by the Clerk of Works.

Pipe Bed

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

Supports to Fittings

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

Backfilling

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

Testing

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

2.1.12 A.B.S. Waste system

Where indicated on the drawings and scheduled, the Contractor shall supply and fix A.B.S. Waste pipes and fittings.

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

Joining of pipe shall be carried out by means of solvent welding. The manufacturer's instructions, and B.S. 5572:1978.

Joining of pipe shall be carried out by means of solvent welding. The manufacturer's recommended method of joining preparation and fixing shall be followed.

Standard brackets, as supplied for use with this system, shall be used wherever possible. A where the building structure renders this impracticable the Contractor shall provide purpose made supports,

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

2.1.13 P.V.C Soil System

The Contractor shall supply and fix P.V.C soil pipe and fittings as indicated on the drawings and schedules.

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

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

Connections to W.C and pass shall be affected by the use of a W.C. connector gasket and cover, fixed to suit pan outlet.

Suitable supporting brackets and pipe clips shall be at maximum of meter centers.

The Sub- contractor shall be responsible for the joint into the Gully Trap on Drain Trap as indicated on the drawings.

2.1.14 UPVC Square Rainwater System pipe and Gutter

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

Gutters shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm.

Rainwater pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness or rainwater pipes shall be 1.80mm.

Pipe support brackets must be adequate to screen expansion gaps.

The grade of uPVC used for gutter and pipe shall have a minimum softening point of 75C when tested by the vicat method as described in B.S, 2782.

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

2.1.15 uP.V.C. Rainwater Fittings

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

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

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

The fitting shall incorporate a gutter-retaining clip.

Gutter shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm.

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

Rainwater pipes shall be supplied in plain-ended lengths. The minimum acceptable wall thickness of rainwater pipes shall be 1.80mm

Pipe support brackets must be adequate to screen expansion gaps.

The grade of uPVC used for gutter and pipe shall have a minimum softening point of 75°C when tested by the Vicat method as described in B.S.2782.

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

2.1.16 uP.V.C. Underground Drainage System

(a) Pipes and fitting

The pipes and fittings shall comply in all respects to British Standard 46600 &5481 or the relevant Kenyan Standards.

Pipes shall be supplied in plain-ended lengths.

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

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

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

The grade of uPVC used for the pipes shall have a minimum softening point of 82°C when tested by the 'Vicat' method 102D as described in British Standard 2782, and for fittings 79°C.

The pipe and fittings shall be of Colour golden brown approximating to British Standard 381 C: Bo.414. These seal reacting caps shall be black polypropylene.

The natural rubber for lip seal joints shall be to British Standard 2494: 1976.

Holderbats shall be made of mild steel protected from corrosion by galvanized or search coating for optimum fit to fit to pipe supports a special purpose made P.V.C. packing piece may be used.

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

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

(b) Excavation of Trenches

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

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

(c) Trench Invert

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

(d) Pipe bed

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

(e) Laying and jointing

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

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

(f) Side Filling

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

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

(g) Back Filling

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

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

(h) Granular Material for Bed and Side Fill

All material for bed and site fill shall be hard and granular passing 20mm sieve and shall contain not more than 5 per cent fines passing 3mm sieve.

The material may be composed of crushed stone, clinker, quarry scalping, ballast, gravel, shingle or all-in aggregate to British Standard 882.

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

2.1.17 VALVES

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

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

(b) Gate Valves

All gate valves 80mm nominal bore and above, other those requires for fitting to buried water mains shall be of cast iron construction, in accordance with the requirement of B.S. 3464. All gate valves required for fitting to the buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S1952.

The pressure classification of valves shall depend upon the pressure conditions pertaining to the site of works.

(c) Globe Valves

All globe valves upto and including 65 mm nominal bore shall be bronze construction in accordance with the requirements of B.S. 3061.

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the Site of Works.

(d) Check or Non-Return Valves

All check or non-return valves 80mm nominal bore and above shall be of the swing check type of cast iron construction in accordance with the requirement of B.S. 4090

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the Site of works.

(e) Ball Valves

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

| | | |
|-------|-----------------|-------------------|
| (i) | Low Pressure | 3.52Bars maximum |
| (ii) | Medium Pressure | 7.72Bars maximum |
| (iii) | High Pressure | 12.62Bars maximum |

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

(f) Manually Operated Mixing Valves

Mixing valves for shower fittings and other appliances being provided under the Contractor Works shall be manufactured in accordance with the requirements of B.S. 1415 from bronze or other corrosion resistant materials.

2.1.19 WASTE FITMENT TRAPS

(a) Standard and Deep Seal P&s Traps

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

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

(c) Anti-Syphonic Traps

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

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

2.1.20 PIPE SUPPORTS

(a) General

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

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

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

The Contractor shall supply and install all steel forming part of the pipe support assemblies and shall be responsible for making good any damage to builders work associated with the pipe support installation.

The Contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection work commences.

The Contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection work commences.

(b) Steel and copper Pipes and Tubes

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

An approximate guide to the maximum permissible support spacing in meters for steel and copper pipe and tube is given in the following table for horizontal runs.

| Size Nominal Bore | Copper Tube To BS 659 | Steel Tube To BS 1287 |
|----------------------------------|----------------------------------|----------------------------------|
| 15mm | 1.25m | 2.0m |
| 20mm | 2.0m | 2.5m |
| 25mm | 2.0m | 2.5m |
| 32mm | 2.5m | 3.0m |
| 40mm | 2.5m | 3.0m |
| 50mm | 2.5m | 3.0m |
| 6.5mm | 3.0m | 3.5m |
| 80mm | 3.0m | 3.5m |
| 100mm | 3.0m | 4.0m |
| 125mm | 3.5m | 4.5m |
| 150mm | 4.5m | 5.5m |

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

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

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

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

(d) Asbestos Cement Pressure Pipes

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

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

Within building, asbestos pressure pipes shall be carried either on concrete support on rigidly fixed steel wall brackets.

Suitable anchors shall be provided at all changes of pipe directions junctions and tees to counterpart the effect of end thrust loads.

(e) Concrete and Pitch Pipes

These pipes shall not be used for above ground application.

(f) Expansion Joints and Anchors

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

The Contractor shall pay particular care when supporting cast and asbestos cement pipes in order to ensure that the settlement and building movement do not break the pipe joints.

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

The Contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant

2.1.21 SANITARY APPLIANCES

All Sanitary appliances supplied and installed as part of the Contract works shall comply with the general requirements of B.S. Specification.

2.1.22 PIPE SLEEVES

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

2.2 INSTALLATION

2.2.0 GENERAL

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

2.2.01 ABOVE GROUND INSTALLATION

(a) Water Services

Before any joint is made, the pipes shall be hung in their supports and adjusted ensure that the joining faces are parallel and any falls which shall be required are achieved without springing the pipe.

Where falls are not shown on the contract drawings or stated elsewhere in the Specification, pipe work shall be installed parallel to the line of the buildings and as close to the walls, ceilings columns, etc.,as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other use equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational eq1uipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a short stepladder, extension spindles with floor or wall pedestals shall be provided.

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

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

All screwed joints to piping and fitting shall be made with P.T.F.E. Tape.

The pump shall maintain the test pressure for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of one gallon per 25mm of diameter, per 1.6 Kilometers per hours per 30 meters head, may be considered reasonable but any visible individual leak shall be repaired.

(b) Sanitary Services

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

The Contractor shall be responsible for ensuring that all ground floor waste fittings are discharged to a gully trap before passing to the sewer via

The Contractor shall provide all necessary roding and inspection facilities within the draining system in position where easy accessibility is available.

Where a branch requires roding facilities in apposition to which normal assess in unobtainable, then that branch shall be extended so as to provide a suitable purpose made roding eye in the nearest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The Contractor shall be responsible for sealing the roof after installation of the stacks.

The open end of each stack shall be fitted with a plastic coated, or galvanized steel , wire guard.

Access for roding and testing shall be provided at the foot of each stack.

(c) Sanitary Appliances

All Sanitary appliances associated with the Contract works shall be installed in accordance with the best standard of modern practice as described in B.S. 5572 to the approval of the Engineer.

2.2.02 UNDERGROUND INSTALLATION

(a) General

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

(b) Sequence of o0peration for Underground /service Installation

(1) Setting out

As described in B.S. code of practice 301 Cause 502.

(2) Breaking Up Surface (If in Roads)

As described in B.S. code of practice 301 Clause 503.

(3) Excavation and Timbering

Excavation shall be made to such depths and dimensions as may be required by the Engineer by the to obtain prior and firm foundations No permanent construction shall be commenced on any bottom until the excavation to the correct level with concrete 1:4:8 to 38mm maximum aggregate sizes.

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

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

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

(4) Laying of Concrete Beds or Other Support for Pipes (if required)

As described in B.S. code or practice 301 clauses 504 and the following:-

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

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

(5) Pipe Laying and Jointing

Drainpipe shall be laid and jointed as described under B.S code of practice 310, clause 401, 402, 403 and 404.

(6) Manholes

(1) General

All manholes provided under the Contract works shall be constructed or approved materials and in approved manner.

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

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

In all other respects, manholes shall be constructed in accordance with B.S. code of practice 301

(ii) Rectangular and Square Manholes

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

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

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

Length
Branch Diameter

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

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

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

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

Width
Branches Diameter

100mm to 300mm for each side with branches plug

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

(iii) **Precast Concrete Circular Manholes**

Where specified straight through Precast concrete manholes shall be manufactured and constructed to comply with B.S. 556 and the following dimensional requirements, (Dimension in Millimeters).

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

When branches are connected into manholes the internal diameter of the chamber shall increased, as necessary, up to a maximum chamber diameter 1830.

(iv) **Steps Irons and Covers**

Access shaft to manhole of depth greater than 760mm shall be provided with approved steps irons as suitable intervals.

Every manhole or manhole access shaft shall be fitted with a removable airtight cast iron cover to adequate size and strength, fixed in a manner that prevents surface water gaining into the system.

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

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

- (v) Back Drop Connections
Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop or practice 301.
- (vi) Channels
Where the branch channel connects to the main channel in the manhole, the invert of the branch channel shall be a minimum of 38mm higher than the main channel.
- (7) Testing of Pipelines
After pipelines are connected up and joints have been sealed, the pipeline shall be tested before pipes are, if required, hunched or surrounded in concrete.

Methods of testing and inspection shall be in accordance with Clause 4 of the Specification.
- (8) Concrete Bedding, Hunching and Surround
Concrete bedding, hunching and surrounding shall be provided as necessary or where called for by the Engineer in accordance with the requirements laid down in B.S. code of practice 301, Clause 310.
- (9) Backfilling

Backfilling of trenches, heading and manholes shall be carried out in accordance with the methods described in B.S. code of practice 301, clause 508.
- (10) Reinstatement of Surface
Following the final Backfilling of all trenches, headings, and manhole surrounds, the surface of the excavated areas shall be fully reinstated to the approval of the Engineer.

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

No Claims for extra in this respect will be accepted.
- (11) Sewer Connection
Sewer Contractor shall pay all charges associated with the connection by the local Authority of the drainage to the Main sewer, including necessary reinstatements.

2.3 TESTING AND INSPECTION

2.3.01 SITE TESTS-PIPEWORK SYSTEMS

(a) Underground Water Mains

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

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

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

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

(b) Above Ground shall be tested hydraulically for a period of one hour not less than one and half times the design working pressure.

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

During the test each branch and joint shall be examined carefully for leaks and any defects revealed should be made good by the Contractor and the section re tested.

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

(c) Underground Drainage

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

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

All tests on underground drains shall be permitted on cast iron drains at the discretion and to the approval of the Engineer.

Water test shall be carried out in accordance with the methods described under B.S. code of practice 301, Clause 601, (b) and (c) and the test pressure shall not be less than 1,5200mm head at the highest point in the section and not more than 10,360mm head at any point in the section.

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

In addition to pressure tests, drainpipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods described in B.S. Code of Practice 301, clause 601 (e).

Testing of manholes shall be carried out in accordance with the methods described under B.S. code of practice 301, clause 601 (f)

(d) Above Ground Soil Waste and Ventilation System

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

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

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

In all other respects, tests shall comply with the requirements of B.S.5572.

2.3.02 SITE TEST- PERFORMANCE

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

All hot water pipework shall be installed with preformed fibre glass lagging to a thickness of 25mm where they runs above a false ceiling or in areas where the ambient temperature is higher than normal with the results that pipe "seating", due to condensation will cause nuisance.

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

- (i) Apply a coating of suitable filler until the canvas weave disappears and allow drying.
- (ii) Apply two undercoats of an approved paint and finish in suitable gloss enamel to colours approved by the Engineer.

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

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

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

Pressure gauges should be recalibrate before the tests.

The Contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this clause of the specification.

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

2.4.0 STERILIZATION OF HOT AND COLD WATER SYSTEMS

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

The sterilization procedures shall be carried out by the Contractor in accordance with the requirements of B.S. code of practice 310, clause 409, to the Engineer.

2.5.0 WATER MAINS

2.5.1 Piping

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

On pipes less than 75mm diameter shall be screwed and socketed, unless otherwise stated.

2.5.2 uP.V.C Pipes

uPVC piping shall be in accordance with B.S. 3505:1968.

The maximum sustained working pressure to which the pipes and fittings will be subjected is based on water at a temperature of 20`C.

The Contractor shall submit full details of the Colour of the pipe he intends to supply. The Colour of the pipe shall be such as to meet the requirements of Clause 2 'Material' and Clause 8.5'opacity' of B.S. 3505.

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

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

The pipes of 75mm diameter and over shall consider of a grooved socket at one end of the pipe. The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe. The sealing medium that shall seat in the groove shall be a rubber ring.

If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking on the outside of the socket area as reinforcing sleeve of the same material as the pipe.

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

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

The sealing ring shall supply be of first grade natural rubber and the physical properties of the mix shall meet the requirements of B.S.2494.

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

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

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

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

Special care shall be taken in transit, handling and storage to avoid any damage to the ends.

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

2.5.3 Manufacturer's Instructions

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

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

2.5.4 Fittings and Specials for Galvanized Steel Pipes

All special shall be of such dimensions will meet with piping supplied. Screw down stop valves shall comply with B.S 1010. Specials shall comply with B.S. 1740.

2.5.5 Flanged Adaptors and Flanges

Flanged adaptors shall be piece suitable for connecting a flanged sluice valve to the type of piping supplied. All flanged or special shall conform to B.S. 10 part 1 and shall be drilled to Table 'C' and machined across the faces. The flanged adaptors shall comply with B.S. 78 and B.S. 3961:1965. All P.V.C. flanged shall be supplied with metal backing rings jointing of flanges shall be carried out using the joint rings, bolts and washers as necessary.

2.5.6 Tees

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

2.5.7 Hydrants

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

2.5.8 Gate Valves

All gate valves 800mm nominal bore above, other than those required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 3463. All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S. 1952.

The pressure classification of all gate valves shall depend upon the pressure conditions pertaining to the site of works.

2.5.9 Air Valves

Air valves shall be of cast iron conforming to B.S. 1452 Grade 14. They shall not be suitable for working pressure nor less than that specified for the class of pipe to which they are connected.

2.5.10 Ball Float Valves

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

2.5.11 Non-Return Valves

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

2.5.12 Stop Cocks

Stopcocks up to 50mm diameter shall be brass and shall conform to B.S. 1010 part 1: 1959 part 2; 1973.

2.5.13 Rubber and Insertion Jointing

Rubber and insertion jointing for flange jointed shall comply with B.S. 2494 part 1 and jointing rings shall be used in the contract, which have not been supplied by manufacturer's approved by the Engineer.

2.5.14 Bituminous paints

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

2.5.15 Steel Pipe and Fittings for Rising Main

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

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

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

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

2.5.16 Drain-Off Taps, Stops Valves for Water Services

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

2.5.17 Storage of Plants and Materials

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

2.5.18 Loading , Handling and Conveying of Pipes

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

2.5.19 Interference's with Fences, Drains, Pipes property etc

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

2.5.20 Method of Excavation

- (a) The Contractor shall excavate the pipe trenches in the line and to the depths indicated by the Engineer. Except where otherwise indicated on the Drawings or indicated by the Engineer, it is intended that the trench shall be excavated to such a depth as will allow of a minimum cover of 500 mm over top of the barrel of the pipe when laid plus or minus a tolerance of 75mm either way. All trenches be excavated in open cuttings.
- (b) Where the trenches passes through grassland, arable land or garden, whether enclosed or otherwise , the turf, if any shall be pared off and stacked, and the productive soil shall be carefully removed for a width of 600mm greater than the nominated trench width or equal to the overall width of track of the excavating machine, whichever is greater, and laid aside to be subsequently used in reinstating the surface of the ground after the trench has been refilled.
- (c) The bottom of the trench shall be properly trimmed off, and all low places or irregularities shall be leveled up with fine material where rock or large stones are encountered, they shall be cut down to a depth of at least 75 mm below the level at which the bottoms of the barrel of the pipes are to be laid, and covered to a like depth with materials, so as to form a fine and even bed for the pipe.
- (d) Joints holes shall be excavated to suit minimum dimension as it allow the joints to be well and properly jointed.

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

- (f) The contractor shall whenever necessary by means of timbering, or otherwise support the sides of the trench so as to make them thoroughly secure, and afford adequate support to adjoining, roads, lands buildings and property, during the whole time the trench remains open and shall remove such timbering or other work shall be deemed to be included in the rates for excavation. In case the Contractor is instructed by the Engineer to leave any portion of such timber in position, he will be paid for if accordingly.
- (g) The clear width inside the timbering the in the case of single pipes shall at least 320mm in excess of the external diameter of the pipe be laid, in order to allow it to be freely lowered into position, in the trench without damage to the external protection.
- (h) Where more than one pipe is to be laid parallel, then the clear width inside the timbering shall be at least 520mm in excess of the combined external diameters of the pipes.
- (i) Should the excavation be taken out to a greater depth than is specified the bottom shall be made good to the correct level with Mix 1:3:6 concrete or other materials approved by the Engineer. No payment shall be made for any other excavation carried out by the contractor and the coat of filling up to required levels
- (j) If a mechanical excavator is used by the contractor, he shall indemnify the employer against all claims for damages that in the opinion of the Engineer, may be caused by the used of this plant. When a mechanical excavator is used the bottom 230mm of excavation shall be got out by hand to ensure an even bed for the pipes.

2.5.21 Main Laying

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

In laying the pipes and specials care shall be taken not to damage the protective linings and the pipes shall be handled with tackle as directed by the Engineer.

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

2.5.22 Temporary Bench Marks and Sight Rails.

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

2.5.23 Curves and Bends

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

2.5.24 Cutting of Pipes

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

2.5.25 Flanged Joints

In laying pipes and specials with flanged joints, flanges shall be brought together and bolted with the faces absolutely parallel. A rubber jointing ring 3mm thick shall be used in each flange joint and one washer with each bolt. The ring shall be a strip ring lying within the bolt circle and full flange width ring.

The bolts shall be tightened up gradually and equally in customary manner in order to distribute the stress eventually over the flange. If it is found necessary to slightly from the normal run of the piping, the deflection shall be obtained by means of beveled gunmetal ringer washer between the flanges.

2.5.26 Surface Boxes

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

2.5.27 Fixing of valves, Air Valves and Washout Pipes.

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

2.5.28 Support and Anchor Blocks

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

2.5.29 Colour Coding

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

2.5.30 Lettering

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

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

2.5.31 Testing

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

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

- b) When a section of the main has been jointed, the ends shall be closed with caps plugs or flanges, which must be strongly strutted against a solid backfilled to the satisfaction of the Engineer. The trench shall be properly backfilled and rammed as hereinafter specified and as shown on the Drawings, for its whole length so as to cover the main to a depth of not less than 500mm, except at the joints holes which shall be kept clear of all backfiring, if necessary by the use of timbering, so that each joint is left fully exposed for inspection. No Backfilling will be permitted before testing of each section.

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

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

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

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

- c) After the section to be tested has been charged and all air liberated it shall standing underrate moderate pressure for several days' final airing.

The leakage from the mains and connections from each section tested shall not exceed 4 litres per 25mm diameter of main, per 2km. Length each 24 hours, every 30meters head of pressure, and any visible individual shall be repaired.

To determine the rate if leakage, the contractor shall furnish a suitable hydraulic test pump, pressure gauge, connection and water meter or other appliance, for measuring the amount of water pumped.

If the leakage were at a greater rate than that specified, the contractor should re-excavate the trench where necessary and shall remake the joints and replace defective work until the leakage shall be reduced to the allowable amount.

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

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

- (e) In carrying out the test for waiter tightness the Engineer only shall authorize the operation of all valves, but the contractor shall provide all the necessary labor to assist in the opening and closing of the valves to the Engineer's instructions, and he shall allow in his price for all his expenses in connection with testing on completion.

- (f) The Engineer shall be the sole judge of water tightness.

2.5.32 Cleansing And Sterilizing The Main

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

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

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

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

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

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

2.5.33 Clearance of site

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

2.5.34 Existing Installations

(a) Cold Water

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

(b) Sanitary Fittings

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

(c) Sealing Off Existing Drains and Manholes

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

2.6.0 COLD WATER STORAGE TANKS

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

Where paints is required the Contractor shall use the paints, which will not be toxic.

The tanks shall be manufactured to the following British Standards:-

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

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

2.7.0 WATER HEATERS

Electrically Heated

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

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

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

Purpose made storage water heaters of the specified size shall comply with B.S. 853 and shall be to the specified working and test pressure. The heaters shall be provided w3ith all necessary bosses, coils etc, and shall be hot dip galvanized after manufacture. Installation shall, if nothing else is specified, be fiberglass to the specified thickness with finish suitable for painting.

Domestic heaters for floors mounting shall, if not provided with legs, be mounted on a minimum 100mm high concrete plinth.

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

PART C
PARTICULAR SPECIFICATIONS
FOR
PLUMBING, DRAINAGE AND
RAIN WATER SYSTEMS

PART C
PARTICULAR SPECIFICATIONS
FOR
PLUMBING, DRAINAGE AND RAIN WATER SYSTEMS

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PART C

3.1 INTRODUCTION

These specifications cover the execution of plumbing, Drainage and Fire Fighting Installations and should be read in conjunction with other relevant specifications, drawings and contract documents issued to the contractor in conjunction with the Contract.

3.2 INCLUDED IN THE CONTRACT

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

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

- Cold water supply pipework and fittings to the water storage tanks from the existing water mains.
- Water storage tanks complete with all necessary covers, fittings, washout and overflow pipes and supports. The Contractor is expected to take the overflow and washout pipes to a reasonable discharge point.
- The water supply pipework to the functional and sanitary as shown on the drawing plus the necessary fixing support and jointing materials from the water storage tanks.
- The sanitary and operational fittings together with the fixing supports and jointing of the supply and discharge pipes.
- The waste and soil pipework from the sanitary and operational fittings to the first manholes including all fixing, supports and jointing materials.
- All cutting away and all making good will if nothing else is specified, be carried out by the main contractor but it will be the responsibility of the Contractor to ensure that this work is kept to a minimum, be responsible for the correct marking out of all chasers and holes; and will provide also necessary details to the main contractor.
- The Contractor shall also be responsible for ensuring that runs for floor or wall chases, holes to be cut or left will be marked out at the appropriate stage of the structural work.

- The Contractor shall undertake all notifications demanded by the Authorities in order to comply with current regulations and produce all certificates, if any, the authorities without extra charge.
- The Contractor shall as part of his Tender supply all necessary information such as manufacture, catalogue or type numbers, brochures or copies of catalogue pages, weight, and all other relevant information which are necessary to classify the equipment tendered for.
- All other materials labour ,tools, instruments, scaffolding, etc, which are necessary for completion in a first class manner of the plants to the Engineer satisfaction. Excluded are only materials and workmanship especially mentioned herein as “Excluded from this Contractor”
- The sub- contractor shall include for cables, pipes etc from central facilities to working area.
- Provide the Engineer for his approval complete working and manufacturing drawing as specified.
- Commissioning and testing of the plants as specified.
- Supply of complete operation and maintenance manuals as specified as well as adequate instruction of the Client’s maintenance personnel as specified.
- The Contractor shall include for full maintenance during initial maintenance period as specified.

3.3 EXCLUDED FROM THE CONTRACT

- All concrete works, inclusive of necessary holes, plinths, etc
- All block work inclusive of necessary holes (to be marked by the Contractor) etc
- All electrical wiring up to and inclusive o isolators and switchboards.
- The main contractor will provide central located facilities for supply of water and power during the construction period.

3.4 EXTENT OF THE CONTRACTOR’S DUTIES

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

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

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

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

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

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

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

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

The Engineer and Architect shall have full rights to inspect the work in progress and all materials and equipment for use in the installation prior to its erection whether these are on site or the Contractor's workshop.

The Contractor shall allow for all reasonable access to the works for this purpose.

Where large items of equipment are to be installed, the Contractor shall advise the main contractor in good time so that access is provided for installation before work is commenced on site.

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

3.5 FINISH PAINTING

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

PART I
PARTICULAR SPECIFICATIONS
FOR
PORTABLE FIRE EXTINGUISHERS

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PARTICULAR SPECIFICATION FOR THE SUPPLY AND INSTALLATION
OF PORTABLE FIRE EXTINGUISHERS

1.0 General

The particular specifications details the requirements for the supply and installation and commissioning of the portable fire extinguishers which shall conform to BS 5423 : 1977. The Contractor drawings but which are necessary for the completion and satisfactory function of the equipment.

1.01 Scope of works

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

1.02 Water/CO₂ Fire Extinguishers

The portable 9-litre water filled CO₂ cartridge operated portable fire extinguishers shall comply with BS 1382 : 1977. Unless manufactured with stainless steel, bodies shall all have internal surfaces completely coated with either a less tin, lead alloy, or zinc applied by hot dipping. There shall be no visibly unallocated areas

The extinguishers shall be clearly marked with the following:-

- a) Method of operation
- b) The words 'WATER TYPE' (GAS PRESSURE) in prominent letters
- c) Name and address of the manufactures or responsible vendor.
- d) The nominal charge of the liquid in imperial gallons and litres
- e) The liquid level to which the extinguisher is to be charged
- f) The year of manufacture
- g) A declaration to the effect that the extinguisher has been tested to a pressure of 350 lb/sq in (24.1 bar).
- h) A declaration to the effect that the extinguisher has been tested to a pressure of 350 lb/sq in 24.1 Bar).
- i) The number of the British Standard "BS 1382" or "BS 5423".

1.03 Portable Carbon Dioxide Fire Extinguishers

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

The body of the extinguishers shall be a seamless steel cylinder manufactured to one of the following British Standards, BS 401, BS 1287 or BS 1288.

The filling ratio shall comply with BS 5355 with valves fittings for compressed gas cylinder to BS 341. Where a hose is fitted it shall be flexible and have a minimum working pressure of 3000 lb/sq in (206.85 bar), the hose is not to be under internal pressure until the extinguisher is operated.

The nozzle shall be manufactures of brass gunmetal, aluminum or stainless steel and may be fitted with a suitable valve for temporarily stopping the discharge if such means are not incorporated in the operating head.

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

The extinguishers shall be clearly marked with the following:-

- a) The words 5 kg carbon dioxide fire extinguishers and to include the appropriate nominal gas content
- b) Method of operation
- c) The words "Re-charge immediately after use"
- d) Instruction for periodical checking
- e) The number of the British Standard BS 3326 : 1960
- f) The manufacturers name or identification markings.

1.04 Dry Powder Portable Fire Extinguishers

The portable dry powder fire extinguishers shall comply with BS 3465 : 1962 and BS 1449 or aluminum to BS1470 : 1972 and shall be suitably protected against corrosion.

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

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

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

- a) The words "Dry powder Fire Extinguisher".
- b) Method of operation in prominent letters
- c) The working pressure and the weight of the powder charge in kilograms
- d) Manufactures name or identification mark
- e) The words " RECHARGE AFTER USE " if rechargeable type.
- f) Instructions to regularly check the weight of her pressure container (gas cartridge) or inspect the pressure indicator on stored pressure types when fitted, and remedy any loss indicated by either.
- g) The year of manufacture
- h) The pressure to which the extinguisher was tested .
- i) The number of this British Standard BS 3465 or BS 5423 : 1977.
- j) When appropriate complete instructions for changing the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

1.05 Foam Spray Portable Fire Extinguishers

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

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

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

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

- a) The words "Foam Spray Fire Extinguisher".
- b) Method of operation in prominent letters.
- c) The working pressure and the capacity of the foam charge in litres.
- d) Manufactures name or identification mark.
- e) The words "RECHARGE AFTER USE " if rechargeable type.
- f) Instructions to regularly check the weight of the pressure container or inspect the pressure indicator on stored pressure types when fitted, and remedy any loss indicated by either.
- g) The year of manufacture.
- h) The pressure to which the extinguisher was tested.
- i) The number of this British Standard BS 3465 or BS 5423 : 1977.
- j) When appropriate complete instructions for recharging the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

1.06 Fire Blanket

The fire blanket shall be made from cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1210x1800mm and shall be fitted with specialties folded so as to offer instantaneous single action release blanket from storing jacket.

PART II
PARTICULAR SPECIFICATIONS
FOR
HOSE REEL SYSTEM

PART II

PARTICULAR SPECIFICATIONS FOR

HOSE REEL SYSTEM

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PART II

PARTICULAR SPECIFICATIONS FOR FIRE FIGHTING HOSE REEL SYSTEM

1.01 General

The particular specification details the requirements for the supply, installation and commissioning of the hose reel installation. The hose reel installation shall comply in all respects to the requirements set out in C.O.P. 5306 part 1: Lower Floors.

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

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

If in the opinion of the Contractor there is a difference between the requirements of the specification and the Contract Drawings, he shall clarify this difference with the Engineer before tendering.

1.02 Commencement of works

The Contractor in submitting his tender shall be deemed to have included for commencing any necessary work on site at such a time as will comply with the main contractor's program or shall be directed by the Engineer.

1.02 Ordering

The Contractor shall order materials from the quantities taken from his own approved working drawings and not the quantities shown in the specifications.

1.03 Spares

Spares shall be presented to the client at hand over.

1.04 Scope of works

The Contractor shall supply, deliver, and erect test and commission all the automatic fire fighting hose reel installation, which is called for in this specification and shown on the contract drawings.

In connection with the above works the Contractor shall liaise fully with the plumbing Contractor who will be responsible for making a new connection to the existing water mains, supplying and laying a metered service pipe, up to the connections to the water tank.

The Contractor shall handover to the Electrical Contractor all the electrical control gear for the installation. The electrical Sub contractor shall supply electrical power, interconnecting cabling and wiring to the hose reel installation.

The Contractor shall supply and handover all the wiring and control diagrams necessary for the works when required to do so.

Though the electrical Contractor shall install the isolator and be responsible for the electrical connections in compliance with electrical regulations, the Contractor for the works contained in this documents shall supply and install the starting stopping gears, indication equipment and retain full responsibility for the correct functioning of the installation.

1.05 Fire Hose Pumps

The fire hose reels pumps shall consist of a duplicate set of multi-line centrifugal pumps as Lowara Sphere unit model CEM 80/55 or similar approved. The pumps shall be capable of delivering 2.3 l/s (8.3 m/hr) against a head of 21m (22.1 bar). The complete specification of the packaged pump set to be as follows:-

- a) **Pumps**
High Efficient single impeller pump, enclosed type motor, enclosed in a stainless steel shell.
- b) **Pump Materials**
Suction and Discharge casing to be made from Grey Cast Iron. Pump body, back plate, shaft, conveyor, diffuser and impeller made from stainless Steel AISI 304.
- c) **Motors**
T.E.F.C. Squirrel Cage Motors Conforming to metric standards suitable for 240 volts (+/- 6%), single phase, and 50 Hz supply. Windings insulated to class "F" Speed 2800 RPM, permanent split capacitor, built-in thermal overload and IP 44 protection.
- d) **Mechanical seal**
Self-adjusting type with carbon/ceramic with elastomer made of NBR and other components in stainless steel.
- e) **Base Frame**
Welded fabrication from Mild Steel sections with facility for lifting unit.
- f) **Flexible Connections**
Flexible connections to be a fixed to suction and discharge connections of the pump.
- g) **Valves**
Pump isolating valves shall be butterfly valves to B.S. 5155 with Cast Iron nylon coated disc and black nitrile liner. Non-Return valves shall be vertical lift to be manufactured from Cast Iron with nitrile seal
- h) **Control Panel**
The control panel is to be located in the position on the contract drawings.

The control panel shall be constructed of mild steel with auto lacquer finish, be moisture, insect and rodent proof shall be provided complete with spare fuses and a wiring diagram enclosed in plastic laminate.

Standard panel cubicle to be manufactured to IP. 55 standards, containing Direct- On line starters or Star Delta starters above 1.0 kW.

Safety features to include 240 volts low voltage controls for starter coils. Panel shall be mounted on vibration isolators to minimize vibration to electrical equipment.

The panel shall incorporate HRC main fuses and thermal overloads for the pumps motors, time control unit for minimum run period, start relay incorporating timing element for standby pump delay, and set of voltage free changeover contracts to give remote alarm/indication for the indicator lights mentioned.

The pump shall be controlled by a pressure switch and the control panel shall include the following facilities to IP 54 protection:-

- (i) "On " push button for setting control panel to live
- ii) Green indicator light for indicating control panel live
- iii) Duty/stand by pump auto-change over
- iv) Duty pump, pump run green indicator light
- v) Stand by pump, pump run green indicator light
- vi) Duty pump fail red indicator light
- vii) Stand by pump fail red indicator light
- viii) HanA/off/Auto Switches
- ix) Line and control circuit fuses
- x) Low water condition pump cut out with red indicator light

i) Pressure Switch

It shall be of differential adjustment type manufactured to IP 44 standards

Multi-pump sequencing control to be effected from a single pressure instrument, utilizing control circuitry specially for pressure boosting applications.

j) Pressure Gauge

4" Dial Bottom Connection to B.S 1780 calibrated in Bars and Kpa.

k) Member Tank-(24 litre Hydrosphere)

Fabricated Steel Construction housing a neutral rubber diaphragm ideally suited for drinking water applications. Precharged with Nitrogen to correct pressure at least stage.

l) Low Level Water Cut-out

The pumps shall be protected by low level cut out to prevent dry pump run when low level water conditions occur.

5.07 Pipework

The pipework for the hose reel installation shall be galvanized Wrought steel tubing "Medium " Grade Class "B" to B.S. 1387: 1967 with pipe threads to B.S.21.

5.08 Pipe Fitting

The pipe fittings shall be galvanized wrought steel pipe fittings welded or seamless fittings conforming to B.S 1740 Part 1971 or malleable iron fittings to B.S.143/1256.

All changes in direction shall be with standard bends or long radius fittings no elbows will be permitted.

5.09 Flanges

The flanges shall comply with B.S. 450004:1969. All flanges shall comply to a nominal pressure rating of 16 bar (P.N. 16)

5.10 Gaskets

The gaskets for use with flanges to B.S. 4304: 1969 shall comply with B.S. 4865 Part 1: 1072 for pressure up to and not exceeding 64 Bar.

5.11 Non-return Valves

The non-return valves up to and including 80 mm diameter shall be as Pelger to B.S. 5153: 1974 with flanges to B.S. 4504 P.N.16.

The valves shall be of iron construction with gunmetal seat and bronze hinge pin.

5.12 Gate Valves

The gate valves up to and including 80 mm shall be as pegler non-rising stem and wedge disc to B.S. 1952: 1964 (B.S. 5154:1974) with screwed threads to B.S. 21 taper thread.

5.13 Sleeves

Where pipework passes through walls,, floors or ceilings a sleeve shall be provided one diameter of the pipe, the space between to be packed with mineral wool, to the Engineer's approval.

5.14 Hose Reels

The hose reels to the installation shall consist of recessed automatic hose reels as Mather & Platt Model 1065 standard swinging hose reel (recessed).

All the above hose reels shall comply with B.S : 1976 and B.S, 3169: 1970 and is to be installed to the requirements of C.P 5306 Part 1 1976.

The hose reels shall be supplied and installed complete with first-aid non-kicking hose 30meters long, with nylon spray jet/ Shut-of nozzle. A screw down chrome plate globe valve to B.S. 1010 to the inlet of the reel shall be fitted. The orifice to the nozzle is to be not less than 4.8 mm to maintain a minimum flow of 0.41/S to the jet.

The hose reels shall be installed at 1.5 metres center above the finished floor level in locations shown on contract Drawings.

5.15 Earthing

The hose reel installation shall be electrical earthed by a direct earth connection. The installation of the Earthing to be carried out by the Electrical Contractor.

5.16 Finish Painting

Upon completion of testing and commissioning of the hose reel installation the pipework shall be premed and finish painted with 2 No. coats of red paint to the Architects requirements

5.17 Testing and Commissioning

The hose reel installation is to be flushed out before testing to ensure that no builder's debris has entered the system. The installation is to be then tested to one and a half times the working pressure of the installation to be approval of the Engineer.

Simulated fault condition fault of the pumping equipment, is to be carried out before acceptance of the system by the Engineer and Architect.

5.18 Instruction period

The Contractor shall allow in his contract sum for instructing of the use of the equipment to the Clients maintenance staff. The period of instruction may be within the contract period but may also be required after the contract period has expired.

The period of time required shall be stipulated by the Client but will not exceed two days in which time, the client staff shall be instructed in the operation and maintenance of the equipment.

PART III
PARTICULAR SPECIFICATION
FOR
WET/DRY RISER INSTALLATION

PART III

PARTICULAR SPECIFICATION FOR WET/DRY RISER INSTALLATION

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PART III

PARTICULAR SPECIFICATION FOR DRY RISER SYSTEM

6.1 General

The particular specification details the requirements for the supply, delivery, installation, testing and commissioning of the dry system.

The dry riser system shall comply in all respects to the requirements set out in C.O.P. B.S 5306 Part 1 1976 and BS 5041.

The Contractor shall include for all appurtenance and appliance not necessary called in this specification or shown on the contract drawings but which are necessary for the completion and satisfactory functioning of the works. No claims for extra payments shall be accepted from the Contractor because of his non-compliance with the above requirements.

If in the pinion of the Contractor, there exists a difference between the requirements of the specification and contract drawings, he shall clarify these differences with the Engineer before tendering.

6.2 Regulations

The dry riser installation shall comply with al applicable clause in this specification and the following codes of practice and Standards:-

- 1) F.O.C. Rules 29th Edition and subsequent revisions issued by Fire Officer's Committee.
- 2) BS 5041, 5 parts. Fire Hydrant system equipment
- 3) BS 5306, 2 parts. Fire extinguishing installations and equipment on premises.
- 4) Together with standards against each clause.

6.3 Scope Of Works

The Contractor shall supply, deliver, erect, test and commission the Dry Riser Installation which is called for in this specification and as shown on the contract drawings.

6.4 Inlet Boxes

An inlet box shall be provided at the position indicated on the drawings, such that the center of the box is 760 mm above ground level.

The box shall be constructed of sheet metal with Georgian wired glass doors with a spring cylinder lock with key.

The size of the box shall be sufficient to allow easy access for maintenance and inspection purposes and to operate the drain valve.

The inside face of the glass shall be suitably lettered with 50mm high letters so that it reads from the outside as follows:-

FIRE BRIGADE

DRY RISER INLET

6.5 Inlet Breeching

A 100mm diameter riser shall be fitted with two inlets and 150mm diameter riser shall be fitted with four inlets.

Each inlet shall consist of a 65mm diameter male instantaneous inlets to BS 366 with a non-return valve, a blank cap with chain and a 25mm drain valve. The inlet shall be connected to the riser main by a Breeching piece.

The Breeching body shall have a wall thickness not less than 3.5 mm and shall be tested to a pressure of 20 bar after the fitting of the inlet drain valve. The breaching piece shall be marked in accordance with BS 5041 upon successful completion of this test, and screws or flanged to the eraser pipework.

6.6 Drain valves

Each Breaching piece shall be fitted with a 25mm wedge gate drain valve.

A 50mm drain valve shall be fitted at the lowest point of the riser. This should normally be the inlet box but the pipework may fall below the box, in either case due regard shall be paid to facilitate for conducting the water to a suitable drain. Where a low level drain is fitted there must be a permanent notice near the drain valve "DRY RISING MAIN- DRAIN VALVE" and also a notice near the inlet box "LOW LEVEL DRAIN VALVE IN...(state location)".

Low level drain valves must be kept closed and secured with a leather (or similar material) strap and padlock.

6.7 Outlet Landing Valves

Outlet landing valves shall be installed 1000mm above floor level and must not project in a manner likely to cause abstraction.

When required by the performance specification, the valve shall be enclosed in a box in accordance with BS 5041: Part .

Each outlet shall comprise a wedge gate pattern valve 65mm bore constructed in good gunmetal, screwed or flanged to the dry riser, and fitted with a standard 65mm instantaneous female outlet to BS 336, blank cap and chain, strap and padlock.

The valve spindle shall not be less than 20mm diameter, which should be marked "OPEN" and "SHUT". The valve shall open in an anti-clockwise direction and in a clockwise direction.

The whole fittings shall be of sound construction and hydraulically tested to a pressure of 10 bar before being connected to the rising main.

The valve on each outlet shall be kept strapped shut and secured by a padlock and the strap must be of leather or similar material, which can be quickly cut in an emergency.

6.08 Automatic Air Valve

An automatic air valve shall be fitted at the top of the riser to release air when the riser is charged with water or admit air when draining off.

It will be screws with 1" BSP male.

6.07 Pipework and Installation

Dry riser pipework shall be installed using heavy weight quality galvanized steel to BS 1387 and shall be flanged as necessary using screw on flanges and be complete with all necessary supports.

Where one outlet per floor is screwed from a single riser, the pipe diameter shall be 100mm. When two outlets per floor are screwed from a single raiser, the pipe diameter shall be 150mm

Dry riser pipework should be installed progressively as the building is constructed, so as to provide fire protection during operations. In buildings taller than 30.5m in height the riser must be installed when the buildings exceeds 18.3 m in height.

6.09 Pipe Fittings

The fittings shall be wrought steel pipefitting welded or seamless fittings conforming to BS143.

All changes in direction will be standard bends or long radius fittings. No elbows will be permitted.

6.11 Flanges

The flanges shall comply with BS 4504: 1969. All flanges shall comply with a normal pressure rating of bar (P.N. 16) and shall be of either cast iron or steel.

6.12 Gaskets

The gaskets for use with flanges to BS 5404: 1969 shall comply with BS 4865 part 1: 11972 for pressure up to and not exceeding 64 bar.

6.13 Non-Return Valves

Non-return valve up to and including 100mm diameter shall be as pegler to BS 5153: 1974 with flanges to BS 4503 P.N. 167. The valves shall be cast iron construction with gunmetal seat and bronze hinge pin.

6.14 Gate Valves

The gate valves up to and including 100mm shall be as Pelger non-rising stem and wedge disc to BS 5154: 1974 with screwed threads to Bs 21 taper threads.

6.15 Sleeves

Where pipes passes through walls, floors or ceilings, sleeve shall be provided, one diameter larger than the diameter of the pipe, the space between to be packed with mineral wool to the Engineer's approval.

6.16 Floor and Ceiling Plates

Where pipe passes through walls, floors, walls and ceilings plates shall be secured around the pipe. The plates shall be of stainless steel construction and will serve no other purpose to present a neat finish, to the exposed installation.

6.17 Earthing

The dry riser pipework is to be electrically earthed.

This shall be achieved by a separate rod not via the electrical power earth. A test clamp shall be provided in the connection between the dry riser and the earthing rod. Connection shall be made at the lowest point of the pipework.

6.18 Finish Painting

Upon completion of test and commissioning of the dry riser installation, the pipework shall be primed and finish painted with 2 coats of an appropriate red shade of paint to the Architects requirements.

6.19 Testing and Commissioning

The dry riser installation is to be flushed out before testing to ensure that no builder's debris has entered the system. The installation is to be then tested to one and half times the working pressure of the installation to the approval of the Engineer.

6.20 Instruction Period

The Contractor shall allow in his contract sum for instructing of the use of the equipment to the client's maintenance staff. The period of instruction may be within the contract period but may also be required after the contract period has expired.

The period of time required shall be stipulated by the client not exceed two days in which time the clients staff shall be instructed in the operation and maintenance of the equipment.

PART IV
PARTICULAR SPECIFICATION
FOR
SPRINKLER SYSTEM

PART IV
PARTICULAR SPECIFICATION FOR
SPRINKER SYSTEM

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PART IV

PARTICULAR SPECIFICATION FOR SPRINKLER SYSTEM

7.0 General

The particular specification details the requirements for the Supply, Installation and Commissioning of the Automatic Sprinkler installation. The sprinkler installation shall comply in all respects to the requirements set in the Fire Officers Committee Rules for Automatic Sprinkler installation, 29th Edition for ordinary Group 111 Installation.

The Contractor shall include for all appurtenances and appliances not necessarily called for in this specification or shown on the Contract Drawings built which are necessary for the completion and satisfactory functioning of the works.

No claim for extra payments shall be accepted from the Contractor because of his non-compliance with the above requirements

If the opinion of the Contractor there exists a difference between the requirements of the specification and the Contract Drawings he shall clarify these differences with the Engineer before tendering.

7.01 Climatic Conditions

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

Where not otherwise stated, all ratings of plant, equipment and apparatus shall be interpreted at site rating and not sea level or ratings.

| | |
|----------------------------|--|
| Maximum Design Temperature | 27°C DB |
| Minimum Temperature | 12°C DB |
| Average Diurnal Range | 13.1-24.8°C |
| Relative Humidity Range | 40-85% |
| Altitude | 1683 m |
| Longitude | 36° 49'E |
| Latitude | 01° 19'S |
| Rainfall | Extremely heavy at certain periods of the year |

The Contractor shall be deemed to have taken account of the above details in his prices and his planning of the execution of the works.

7.02 Scope of works

The Contractor shall supply, deliver erect, test and commission all the automatic fire fighting sprinkler installation which is called for in this specification and shown on the Contract Drawings.

In connection with the above works the Contractor shall fully with the plumbing Contractor who will be responsible for making a new connection to the existing Council water mains, supplying and laying metered service pipe, upto making connections to the tank

The Contractor shall install all the electrical and diesel pumps called for in this Contract.

The Contractor shall handover to the Electrical Contractor all the Electrical control gear for the installation. The Electrical Contractor shall supply Electrical power, interconnecting cabling and wiring to the sprinkler installation.

The Contractor shall supply and handover all the wiring and control diagrams necessary for the works when required to do so.

Though the Electrical Contractor shall install starting and stopping gears supply and install indication equipment and responsible for the electrical connection in compliance with electrical regulations, the Contractor for the works contained in this documents shall retain full responsibility for the correct functioning of the installation.

The sprinkler system shall be fed by two sources of water supply described below:-

From 100mm diameter water service of water supply described below:-

From a 118,800 litre water storage tank through 2 No. automatic electric pumps.

7.03 Automatic Sprinkler Pumps

The automatic sprinkler pumps shall consist of 2 No. automatic horizontally mounted centrifugal electrically driven pumps. Both pumps shall be connected to the normal incoming electrical main and to the standby generator.

The pumps shall be capable of providing at installation control valve a running pressure of at least 1.4 bar plus the pressure equivalent of the difference in height between the highest sprinkler and the valves when the water is being discharge from the valves at a rate of 725 dm³/min (16.6 L/S).

The pumps shall be constructed of cast iron with impeller of cast iron and are to have mechanical seals.

The motor shall be there phase totally enclosed fan cooled squirrel cage continuously rated complying in general with B.S 2613/1970.

Provision shall be made for low level cut outs to the pumps to prevent dry pumps run in the event of low level water conditions.

The pumps shall be provided with a plate giving the output pressure at the nominal flow specified. Where the performance characteristic with an orifice plate not integral with the pump delivery, the pump name plate shall carry a reference to the fact that the performance given is that of the pump and orifice plate combination, and reference shall be made to the orifice k factor.

7.04 Installation Control Valves

The Contractor shall supply and install approved installation control valves called for on the Contract Drawings and in this Specification. The installation control valves set shall comprise of a main stop valve, wet pipe alarm valve, a water motor alarm and gong, and installation pressure gauges.

7.05 Spares

The Contractor shall supply and fix a cabinet with 24 spare sprinkler heads together with a set of sprinkler spanners.

7.06 Control Panel

The control panel is to be mild steel construction or other approved material, moisture-proof and insect and rodent-proof and shall be provided complete with a wiring diagram that is moisture-proof.

Pump operation shall be controlled by pressure switch, the control panel is there to include the following:-

- a) Manual Stop/Reset push button to No 1 duty pump connected to Electrical mains.
- b) Manual stop/Reset push button to No. 2 standby pump connected to Electrical mains
- c) Test push button with green indicator light to No.1 standby pump.
- d) Test push button with green indicator light to No. 2 standby pump.
- e) Electric Alarm bell provided for remote warning of systems operation during pumps run.
- f) Red warning for indication of no water in storage tank.

7.07 Sprinkler Heads

The sprinkler heads shall be conventional pattern, designed with a universal deflector and similar to "GRINNEL" Type F, quartz bulb sprinkler heads as manufactured by Mather and Platt (UK) Limited.

All sprinkler heads shall comply with the following requirements:-

| | |
|--------------------|---------------------------|
| Nominal size | 15mm |
| K Factor | 80+/-5% |
| Temperature rating | 73/79.4°C (yellow colour) |

7.08 Pipework

The pipework for the sprinkler system shall be black medium quality, steel tubing, high frequency seam weld pipe to comply with B.S. 1387 and suitable for screwing to B.S.21 tapered pipe threads.

7.09 Pipe Supports

The variety and type of pipe supports shall be kept to a minimum and their design shall be such as to facilitate quick and secure fixing to both metals, concrete and wood.

Piping shall be secured in the normal manner with pipe clips."U" bolts shall not be used as substitute for pipe clips.

Where the design of the structure is in reinforced concrete, pipe hangers and brackets shall be secured to the structure by means of redheads, rawbolts or other approved means.

Where the structure is constructed of hollow clay pot and concrete fill the Contractor shall arrange for his hangers and brackets to be supported from the concrete columns and beams. No rawbolts and redheads shall be inserted in any clay pot construction unless specifically and exceptionally approved by the Engineer.

An approximate guide to maximum permissible support spacing in feet for different classes of pipe and tube is given for horizontal runs in the following table.

Vertical pipe runs shall be supported at intervals not greater than 1½ times the distance shown in the table.

| Size N/Bore (mm) | Copper Tube To B.S.659 (mm) | Steel Tube To B.S (mm) |
|------------------|-----------------------------|------------------------|
| 15 | 1200 | 1800 |
| 20 | 1200 | 2000 |
| 25 | 1500 | 2500 |
| 32 | 1500 | 2500 |
| 40 | 1800 | 2700 |
| 50 | 1800 | 3000 |
| 65 | 1800 | 3400 |
| 80 | 2000 | 3400 |
| 100 | 2500 | 3400 |
| 125 | 2700 | 4000 |
| 150 | 2700 | 4300 |

The Contractor shall submit all pipe support designs for the Engineer's approval.

Positions and type of the supports shall be shown on the working drawings and submitted to the Engineer for approval.

7.10 Pipe Fittings

The pipe fittings for sprinkler systems shall comply with medium quality steel pipe fittings to B.S. 1740 part 1 with B.S 21 tapered pipe threads.

7.11 Flanges

The flanges shall comply with B.S.4504:1969. All flanges shall comply to a nominal pressure rating of Bar (PN 16) and shall be either Grey cast iron or steel with raised faces.

7.12 Gaskets

The gaskets for use with flanges to B.S.4504: 1969 shall comply with B.S.4865 par 1 1972 for pressure up to 64 bar.

7.13 Footvalves

The Footvalves shall be as Greenfield check valve No. 5803 to B.S. 5153:1974 incorporating strainer, with flanges to B.S. 4504 PN 16

The strainer shall be Machined Cast iron with strainer area not less than twice the suction pipe area.

7.14 Non-Return valves

The non-return valves shall be as Glenfield No.5003 conforming to B.S.5253 : 1974 with flanges to B.S 4504 PN.16

The body, door covers are to be of Meehanite Cast iron construction with gun metal seat to B.S.1400.

7.15 Gate Valves

The gate valves up to and including 150mm diameter shall be as Glenfield R.SD Gate valve 3500 series to B.SD 5163 with flanges to B.S. 4504 P.n. 16 with raised faces. The valve shall be double flanged cast-iron wedge gate valve for water work purposes with Meehanite cast iron body to V.S.1452 Gr.14 with rubber covered Meehanite cast iron gate. The stem is to be of forged stainless steel to B.S. 9700 with Meehanite cast iron hand wheel.

7.16 Finish Painting

Upon completion of testing and commission, the sprinkler installation shall be primed with 1 No. coat of primer and 2 No. coats of appropriate red shade of paint to the Architect's requirements.

7.17 Approval of Automatic Sprinkler Systems

After the tender contract has been let, the Contractor shall prepare complete detailed working drawings of the protection with plans of floor, details of water supplies upto the installation control valve and any pressure reducing valves, water meters, water locks and any orifice plates. The drawings shall be on an indicated scale not less than 1: 100. A key of any symbol used is to be included. A summary schedule should be included:-

- i) Total number of sprinkler heads on each installation.
- ii) Height of highest sprinkler head in each installation
- iii) Type of installation, in this case to be wet pipe system and the size of main control valves to be indicated.

7.18 Instruction period

The Contractor shall allow in his contract sum of instructing of the equipment to the clients' maintenance staff. The period of instruction may be within the contract period but may also be required after contract period has expired.

The period of time required shall be stipulated by the client but will not exceed two days in which time the clients staff shall be instructed in the operation and maintenance of the equipment.