



**MINISTRY OF TRANSPORT & INFRASTRUCTURE
STATE DEPARTMENT FOR INFRASTRUCTURE**

**KENYA RURAL ROADS AUTHORITY
ROADS 10,000 PROGRAMME: LOW VOLUME SEAL ROADS**

**REVISED BID DOCUMENT FOR UPGRADING TO BITUMEN STANDARDS AND
PERFORMANCE BASED ROUTINE MAINTENANCE OF:**

**IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO -
GACHATHA, & GACHATHA – KANGAITA – ITHEKAHUNO -
GATIKI ROADS**

Tender Number: RWC 561

APRIL 2019

**Director (Development)
Kenya Rural Roads Authority,
P.O. Box 48151 - 00100
NAIROBI**

**Director General
Kenya Rural Roads Authority,
P.O. Box 48151 - 00100
NAIROBI**

**BID DOCUMENT FOR UPGRADING TO BITUMEN STANDARDS AND
PERFORMANCE BASED ROUTINE MAINTENANCE OF IHWA - IHURURU,
NDUGAMANO – GURA/ NDUGAMANO - GACHATHA, & GACHATHA –
KANGAITA – ITHEKAHUNO - GATIKI ROADS**

CONTRACT NO. RWC 561

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SECTION 1:

FORM OF BID

FORM OF BID

(NOTE: The Appendix forms part of the Bid. Bidders are required to fill all the blank spaces in this form of Bid and Appendix)

UPGRADING TO BITUMEN STANDARDS AND PERFORMANCE BASED ROUTINE MAINTENANCE OF: IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO - GACHATHA, & GACHATHA – KANGAITA – ITHEKAHUNO - GATIKI ROADS (RWC 561)

TO: The Director General,
Kenya Rural Roads Authority
Blue Shield Towers, 6th Floor
P. O. Box 48151-00100,
NAIROBI, KENYA

Sir,

1. **BID SUM 1 For Improvement Works:** Having examined the Conditions of Contract, Specifications, Bills of Quantities, and Drawings for the execution of the above-named works we, the undersigned, offer to construct and install such works and remedy any defects therein in conformity with the said Bills of Quantities, Conditions of Contract, Specifications and Drawings for the sum of

_____ (Insert amount in figures)

_____ (Insert amount in words)

as specified in the Appendix to Bid or such other sums as may be ascertained in accordance with the said Conditions.

2. **BID SUM 2 For Performance based Routine maintenance:** We offer to execute in conformity with the Bidding Document the routine maintenance and repairs on and off carriageway and emergency works as instructed for the Contract period of 30 months. Our bid price is KShs.

_____ [Amount in figures]
Kenya Shillings

_____ Amount in words]- VAT Included.

TOTAL BID PRICE BID SUM (1) + BID SUM (2) KShs.

_____ [Amount in figures]

Kenya Shillings

_____ [Amount in words VAT

Included].

3. We undertake, if our bid is accepted, to commence the works within twenty-eight (28) days of receipt of the Engineer's order to commence, and to complete and deliver the whole of the works comprised in the contract within the time stated in the Appendix to Bid.
4. If our bid is accepted, we will, when required, obtain the guarantee of a Bank or other sureties (to be approved by you) to be jointly and severally bound with us in a sum not exceeding 5% of the above-named sum for the due performance of the contract under the terms of a Bond to be approved by you.
5. We agree to abide by this bid for the period of **two hundred fifty-five (255) days** from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. We understand that you are not bound to accept the lowest or any bid you may receive.
7. On the basis of our previous experience we are fully experienced and competent in the type of work included in this BID and we have adequate financial resources to carry out the works described within the period for completion. We are in a position to fulfil the contract for which we have tendered.

Dated this Day of 20

Signature.....in the capacity of

Duly authorized to sign bids on behalf of (Name of Bidder)

.....

(Address of Bidder).....

(Name of Witness).....

(Signature of Witness).....

(Address of Witness).....

(Occupation of Witness).....

SECTION 2:

APPENDIX TO FORM OF BID

APPENDIX TO FORM OF BID
(This appendix forms part of the bid)

CONDITIONS OF CONTRACT	CLAUSE	AMOUNT
Bid Security (Bank Guarantee/Insurance Bond Only)		Kshs [1,000,000.00]
Amount of Performance Security(Unconditional Bank Guarantee) FOR IMPROVEMENT WORKS	10.1	5% of BID Sum 1 in the form of Unconditional Bank Guarantee
Amount of Performance Security(Unconditional Bank Guarantee) FOR PERFORMANCE BASED MAINTENANCE WORKS	10.1	5% of BID Sum 2 in the form of Unconditional Bank Guarantee
Program to be submitted	14.1	Not later than 21 (twenty one) days after issuance of Order to Commence
Cash flow estimate to be submitted	14.3	Not later than 21 (twenty one) days after issuance of Order to Commence
Minimum amount of Third Party Insurance	23.2	KShs. 3,000,000.00
Period for commencement, from Engineer's order to commence	41.1	28 days
Time for completion	43.1	30 months
Amount of liquidated damages	47.1	KShs. 100,000.00 per day
Limit of liquidated damages	47.1	5% of Contract Value
Defects Liability Period	49.1	12 (Twelve) months
Maintenance Period		36 (Thirty-Six) months after the expiry of the defect liability period.
Percentage of Retention	60.3	10% of Interim Payment Certificate
Limit of Retention Money	60.3	5% of Contract Price
Minimum amount of interim certificates	60.2	As per milestone achieved in Schedule of Payment
Time within which payment to be made after Interim Payment Certificate signed by Engineer	60.10	56 days
Time within which payment to be made after Final Payment Certificate signed by Engineer	60.10	56 days
Amount of Advance	60.12	10% of BID sum 1
Advance Payment Security	60.12	10% of BID sum 1 in the form of Unconditional Bank Guarantee
Appointer of Arbitrator/Adjudicator	67.3	The Chartered Institute of Arbitrators (Kenya)

Notice to Employer and Engineer	68.2	The Employer's address is: Director General, Kenya Rural Roads Authority Blue Shield Towers, 6 th Floor P.O. Box 48151- 00100, NAIROBI The Engineer's address is: Director (Development), Kenya Rural Roads Authority Blue Shield Towers, 6 th Floor P.O. Box 48151-00100, NAIROBI
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CONDITIONS OF CONTRACT	AMOUNT/DESCRIPTION	CONDITIONS OF CONTRACT CLAUSE
Approximate Weightings for Price Adjustment Formula	See Table A below	70.3
Weightings and Indices	The currency of BID and payment is Kenya Shillings and rates of exchange requirements are not applicable.	70.3 and 70.4

Table A Approximate Weightings for Price Adjustment

<i>Description of Index</i>	<i>Sources of Indices</i>	<i>% Range of Weighting</i>	<i>Base indices -28 days prior to the date of Bid Submission</i>	<i>Bidders proposed Weighting</i>
Fixed (“A”)	KNBS	50		
Labour	KNBS	5 – 10		
Fuels	KNBS	10 – 15		
Oils and lubricants	KNBS	1-5		
Cement	KNBS	4-10		
Reinforcement and Steel products	KNBS	1 – 3		
Explosives	KNBS	0.1 –0. 5		
Bitumen and Bituminous products	KNBS	20 - 25		
Total				100

NOTE: ^a Denotes that this should be used as guidance to bidders and for purpose of checking their submissions, the Employer has estimated and provided a range of acceptable weightings for related major construction inputs in accordance with the potential range of construction methodologies, based on estimated cost in a common currency.

Signature of Bidder.....Date

Schedule of Payment (Clause 60.2)

The Contractor shall be paid an Advance Payment as indicated in the Appendix to Tender. Thereafter, payments shall be made in instalments on preparation of statement of account and as per the milestones detailed below.

Q/No.	*Milestone	Payment Date	Valuation	Recovery of advance payment
1.	On attainment of 10% of project length to bitumen standard		Full value of Milestone as measured	
2.	On attainment of 20% of project length to bitumen standard		Full value of Milestone as measured	Start recovery as per sub clause 60.12
3.	On attainment of 30% of project length to bitumen standard		Full value of Milestone as measured	
4.	On attainment of 40% of project length to bitumen standard		Full value of Milestone as measured	
5.	On attainment of 50% of project length to bitumen standard		Full value of Milestone as measured	
6.	On attainment of 60% of project length to bitumen standard		Full value of Milestone as measured	
7.	On attainment of 70% of project length to bitumen standard		Full value of Milestone as measured	End recovery as per sub clause 60.12
8.	On attainment of 80% of project length to bitumen standard		Full value of Milestone as measured	
9.	On attainment of 90% of project length to bitumen standard		Full value of Milestone as measured	
10.	On attainment of 100% of project length to bitumen standard		Full value of Milestone as measured	

- *A mile stone shall be a fully completed section of the road as above having all pavement layers, access culverts, cross pipe culverts and functioning drains with the exception of road furniture and road marking and major structures.**
- Work executed under Major structures (box culverts and bridges will be valued and paid together with due milestone payments**
- Road Furniture and road marking will form part of the last mile stone**

SECTION 3:

FORM OF BID SECURITY

FORM OF BID SECURITY

Note: The bidder shall complete only this form of Bid Security. No other Form of Bid Bond or any other forms of security will be accepted. Bidders who fail to comply with this requirement will be disqualified. **(NOTE: ALTERING THE TEXT IN THIS FORM OF BID SECURITY WILL RESULT IN DISQUALIFICATION)**

WHEREAS [*Name of bidder*].

.....
(herein after called “the Bidder”) has submitted his bid dated

for the proposed **Upgrading to Bitumen Standards and Performance Based Routine Maintenance Of: Ihwa - Ihururu, Ndugamano – Gura/ Ndugamano - Gachatha, & Gachatha – Kangaita – Ithekahuno - Gatiki Roads (RWC 561)**

hereinafter called “The Bid”

KNOW ALL MEN by these presents that we [*Name of Bank/Insurance Company*]

.....
.....

of [*Name of Country*]

.....

having our registered offices at

.....
(hereinafter called the Bank/Insurance Company) are bound unto the Director General, Kenya Rural Roads Authority (hereinafter called “the Employer”) in the sum of

(in words) KShs.....

.....

(In figures) KShs.....

for which payment will be well and truly made to the said Employer, the Bank/Insurance Company binds itself, its successors and assigns by these presents.

Signed for the said Bank/Insurance Company thisday of20.....

THE CONDITIONS of this obligation are:

1. If the bidder withdraws his Bid during the period of bid validity specified by the Bidder on the Bid Form; or

-
2. If the Bidder refuses to accept the correction of errors in his bid; or
 3. If the Bidder having been notified of the acceptance of his bid by the Employer during the period of Bid Validity
 - (i) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders when required or
 - (ii) Fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders.

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 any of the above conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including **two hundred fifty-five days (255) days** after the date of bid submission.

At the request of the Employer the Bid validity period may be extended by mutual agreement between the Employer and the Bidder and we undertake to extend the validity of this surety accordingly without you having to inform us of such an extension of the Bid validity period if within this period the Bidder has been notified of the acceptance of his Bid. This Surety shall remain valid up to the time the Contract Agreement has been executed.

SIGNATURE AND SEAL OF THE BANK/INSURANCE COMPANY

..... DATE

NAME OF SIGNATORY

.....

TITLE OF SIGNATORY

NAME OF THE WITNESS

SIGNATURE OF THE WITNESS DATE

ADDRESS OF THE WITNESS

SECTION 4:

INSTRUCTIONS TO BIDDERS

SECTION 4: INSTRUCTIONS TO BIDDERS

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CONDITIONS OF BID AND INSTRUCTIONS TO BIDDERS

APPENDIX TO THE INSTRUCTIONS TO BIDDERS (Amendments to Instructions to Bidders, Section 4 & 5)

Section 4, Sub-Clause 4.1& Section 5, Sub Clause 1.4

The clauses shall be amended to read ;

Proof of registration with the National Construction Authority (NCA) in Class NCA 1 as a Roads Contractor

Further, Foreign contractors shall be subject to the NCA Revised Regulation of 2011 and subsequent regulation No.41 of 2017 so as to proof by way of undertaking that they shall sub contract or enter into joint venture with local firms for not less than 30% of the value of the contract work and that they shall transfer technical skills not available locally to a local person or local firm.

The foreign contractors wishing to bid shall therefore provide proof by written undertaking through NCA and acknowledged by NCA in line with NCA Act No. 41 of 2011 Regulations 2014 Section 12 3(d) (i),iii.

Sub - Clause 20.3(b)

The clause shall be amended to read ;

The bid shall be without alterations, omissions or conditions except as necessary to correct errors made by the bidder. Errors /oversights shall be corrected for quantity or line PC or LS and the corrections shall be applied as follows:

- I. The altered quantity shall be reinstated but maintain the inserted rate
- II. The corrected amount obtained by using the right quantity and inserted rate shall be compared with the entire Bill Items total. The variations so determined shall not exceed 15% of the Bill total and if it exceeds, the tender shall be rejected.

The above error corrections shall be done as guided pursuant to sub clause 29.1(b)

To safe guard the Employer against non -performance of the affected work item, the bidder having such errors corrected as prescribed above will, if he wins the tender, be required to enhance the performance guarantee from 5% of Bid Sum 1 to 10% before signature of Contract failure to which the offer will be withdrawn, bid bond recalled and Employer may if deemed fit enter to negotiations with the next lowest responsive bidder.

Clause 29.1(b)

The clause shall be amended to read ;

Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the line item total will govern, and the unit rate will be adjusted, and the error shall be corrected and distributed within bill items where the error has occurred in such a way that the BID Sum remains unaltered.

Clause 29.2

The clause shall be amended to read ;

Any error by the Bidder in pricing or extending the Bills of Quantities or carrying forward to the summary or BID Sum, shall be corrected in such a way that the BID Sum remains unaltered and the Bidder shall within seven (7) days after issuance of the written notice by the Employer, or

such further time as the Employer may allow, correct his BID in such a manner as may be agreed or directed by the Employer failing which the BID may be absolutely rejected and the Bid Security forfeited in accordance with Sub-Clause 17.6 . Any discrepancy quantification that results in variation of more than 15% of the total of bill items (not in line item) where the error has occurred shall result in rejection of the Tender

A. GENERAL

1 SCOPE OF BID

- 1.1 The Employer, as defined in the Conditions of Contract Part II hereinafter referred to as “the Employer” wishes to receive bids for the construction of works as described in Section 1, clause 102 of the Special Specifications –“Location and extent of the Works”
- 1.2 The successful bidder will be expected to complete the Works within the period stated in the Appendix to Bid from the date of commencement of the Works.
- 1.3 Throughout these bidding documents, the terms bid, BID and tender and their derivatives (bidder/Bidder, bid/Bided, bidding/Bidding, tenderer, tendered, tendering etc) are synonymous, and day means calendar day. Singular also means plural.

2 SOURCE OF FUNDS

- 2.1 The source of funding is the Government of Kenya (Development Vote)

3 CORRUPT PRACTICES

- 3.1 The Government requires that the bidders, suppliers, sub-contractors and supervisors observe the highest standard of ethics during the procurement and execution of such contracts. in this pursuit of this policy, the government;
 1. Defines for the purposes of this provision, the terms set forth below as follows:
 - (i) “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in the execution, and
 - (ii) “fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practices among bidders (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the Employer of the benefits of free and open competition
 2. Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the Contract, and
 3. Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a government contract if it at any times determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a Government

financed contract.

4 ELIGIBLE BIDDERS

- 4.1 This invitation to bid is open to all Bidders who are legally registered or incorporated in the Republic of Kenya as of the time of bid submission. Registration with National Construction Authority (NCA) as a Contractor is mandatory. For bids that preference has been given to Women, Youth and Persons with disabilities, this will be clearly indicated in the bid document.
- 4.2 Bidders shall not have a conflict of interest. Bidders shall be considered to have conflict of interest, if they participated as a consultant in the preparation of the design, documentation or technical specifications of the works that are the subject of this bidding other than as far as required by the Employer.
- 4.3 A firm that is under a declaration of ineligibility by the Employer in accordance with clause 3, at the date of submission of the bid or thereafter, shall be disqualified.
- 4.4 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5 QUALIFICATION OF THE BIDDER

- 5.1 Bidders shall as part of their bid:
 1. Submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and
 2. Up-date any information submitted with their bids and update in any case the information indicated in the schedules and continue to meet the minimum threshold criteria set out in the bid documents.
- 5.2 As a minimum, Bidders shall provide latest information set out below:
 1. Submission of audited accounts or if not required by the law of the applicant's country, other financial statements acceptable to the Employer, for the last three [3] years for tenders to demonstrate: the current soundness of the applicant's financial position and its prospective long-term profitability, and capacity to have a cash flow amount of min. Kshs. 500,000,000 (Five Hundred Million) equivalent working Capital
 2. current litigation information,
 3. availability of critical equipment
 4. Registration with National Construction Authority for the applicable class valid at the date of tender submission and a valid annual practicing license.
 5. Certified Certificate of Incorporation
 6. Certified Current CR12 of the last 12months before submission of the bid with the Directors' identification documents
 7. VAT Registration Certificate

-
8. Valid current Tax compliance certificate
 9. PIN registration certificate
 10. Certificate of Bidders visit to site – duly signed
 11. Duly filled business questioner including declaration of conflict of interest
 12. Serialisation of all the pages (this should be in the format of 1,2,3,4,5.....)from the first page to the last page

5.3 Bidders shall also submit proposals of work methods and schedule in sufficient detail to demonstrate the adequacy of the bidder's proposals to meet the technical specifications and the completion time referred to in Clause 1.2 above.

6 ONE BID PER BIDDER

6.1 Bidders are free to participate in all distinct Bids (Tenders) as advertised. However no Bidder is allowed to participate in the same bid as an individual and again in a Joint Venture.

7 COST OF BIDDING

7.1 The bidder shall bear all costs associated with the preparation and submission of his bid and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

8 SITE VISIT

8.1 The bidder is informed that PRE-BID site visit is mandatory and he/she shall examine the Site of Works and its surroundings and obtain for himself all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the site shall be at the bidder's own expense.

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

8.3 The Employer will conduct a Site visit **at a date, venue and time as indicated in the invitation to Bid**, attendance for which is mandatory for all bidders. Failure to attend the site visit by any bidder will lead to disqualification of his /her bid.

B. BIDDING DOCUMENTS

9 CONTENTS OF BIDDING DOCUMENTS

9.1 The set of documents comprising the BID includes the following together with any addenda issued in accordance with Clause 11:

-
1. Invitation to Bid
 2. Instructions to bidders
 3. Qualification Criteria
 4. Conditions of Contract - Part I
 5. Conditions of Contract - Part II
 6. Standard Specifications
 7. Special Specifications
 8. Form of Bid, Appendix to Form of Bid and Bid Security
 9. Bills of Quantities
 10. Schedules of Supplementary information
 11. Form of Contract Agreement
 12. Form of Performance Security
 13. Drawings
 14. BID addenda (BID notices)

9.2 The bidder is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the bidding documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Bids that are not substantially responsive to the requirements of the bidding documents will be rejected.

10 CLARIFICATION OF BIDDING DOCUMENTS

10.1 The prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter the term cable is deemed to include telex and facsimile) at the Employer's mailing address indicated in the Bidding Data. Bidders shall send in their questions and clarifications by the Last Date for receiving questions and clarifications as given in the schedule of Bidding Process.

10.2 The Employer will respond in writing to any request for clarification that he receives earlier than 7 days prior to the deadline for the submission of bids. Copies of the Employer's response to queries raised by bidders (including an explanation of the query but without identifying the sources of the inquiry) will be sent to all prospective bidders who will have purchased the bidding documents.

11 AMENDMENT OF BIDDING DOCUMENTS

11.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing subsequent Addenda.

11.2 The Addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause 10.1 and shall be communicated in writing or cable to all purchasers of the bidding documents. Prospective bidders shall promptly acknowledge receipt of each Addendum in

writing or by cable to the Employer.

- 11.3 In order to afford prospective bidders reasonable time in which to take an Addendum into account in preparing their bids, the Employer may, at his discretion, extend the deadline for the submission of bids in accordance with Clause 22.

C. PREPARATION OF BIDS

12 LANGUAGE OF BID

12.1 The bid prepared by the bidder and all correspondences and documents relating to the bid exchanged by the bidder and the Employer shall be written in the English Language. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the bid, the English language shall prevail.

13 DOCUMENTS COMPRISING THE BID

13.1 The bid to be prepared by the bidder shall comprise:

- a. Duly filled-in the Form of Bid and Appendix to form of bid;
- b. Bid security;
- c. Priced Bills of Quantities;
- d. Work Methodology;
- e. Schedules of information;
- f. Qualification Criteria;
- g. Engineering drawings for the works; and
- h. Any other materials required to be completed and submitted in accordance with the Instructions to Bidders embodied in these bidding documents.

13.2 These Forms, Bills of Quantities, work methodology and Schedules provided in these bidding documents shall be used without exception (subject to extensions of the Schedules in the same format).

14 BID PRICES

14.1 Unless explicitly stated otherwise in the bidding documents, the contract shall be for the whole works as described in Sub-Clause 1.1, based on the basic unit rates and prices in the Bill of Quantities submitted by the bidder.

14.2 The bidder shall fill in rates and prices for all items of Works described in the Bills of Quantities, whether quantities are stated or not.

14.3 All duties, taxes (excluding VAT) and other levies payable by the Contractor under the Contract, or for any other cause as of the date 28 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total Bid Price submitted by the bidder.

-
- 14.4 Unless otherwise provided in the Bidding Data and Conditions of Particular Application the rates and prices quoted by the bidder are subject to adjustment during the performance of the contract in accordance with the provisions of Clause 70 of the Conditions of Contract.

15 CURRENCIES OF BID AND PAYMENT

- 15.1 Bids shall be priced in Kenya Shillings.

16 BID VALIDITY

- 16.1 The bid shall remain valid and open for acceptance for a period of **two hundred and fifty five (255) days** from the specified date of bid opening specified in Clause 22.2.
- 16.2 In exceptional circumstances prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required nor permitted to modify his bid, but will be required to extend the validity of his bid security for the period of the extension, and in compliance with Clause 17 in all respects.

17 BID SECURITY

- 17.1 The bidder shall furnish, as part of his bid, a bid security in the amount shown in the Appendix to Form of Bid.
- 17.2 The bid security shall be in the form of unconditional bank guarantee from a reputable bank selected by the bidder and located in Kenya, or insurance bond issued by a bonding or insurance company acceptable to the Employer and approved by the PPOA. The format of the bank/ insurance guarantee shall be in accordance with bid security included in Section 1. The bid security shall remain valid for a period of **two hundred and fifty five (255) days** beyond the date of bid submission and beyond any period of extension subsequently requested under Sub-Clause 16.2.
- 17.3 Any bid not accompanied by an acceptable bid security will be rejected by the Employer as non-responsive.
- 17.4 The bid securities of unsuccessful bidders will be discharged/ returned as promptly as possible but not later than 28 days after the expiration of the period of bid security validity.
- 17.5 The bid security of the successful bidder will be discharged upon the bidder signing the Contract Agreement and furnishing the required performance security.
- 17.6 The bid security may be forfeited:

-
- a. if a bidder withdraws his bid, except as provided in Sub-Clause 24.1 and 24.2.
 - b. if the bidder does not accept the correction of any errors, pursuant to Sub-Clause 29.2 or
 - c. in the case of a successful bidder, if he fails within the specified time limit to:
 - (i) sign the Contract Agreement or
 - (ii) furnish the necessary performance security

18 NO ALTERNATIVE OFFERS

- 18.1 The bidder shall submit one offer, which complies fully with the requirements of the bidding documents.
- 18.2 The bid submitted shall be solely on behalf of the bidder. A bidder who submits or participates in more than one bid will be disqualified.
- 18.3 A price or rate shall be entered in indelible ink against every item in the Bills of Quantities with the exception of items which already have Prime Cost or Provisional sums affixed thereto and items that have been indicated as Not Applicable (N/A). The bidders are reminded that no “nil” or “included” rates or “lump-sum” discounts will be accepted. The rates for various items should include discounts if any. Bidders who fail to comply will be disqualified.

19 PRE-BID MEETING

- 19.1 There will be no pre-bid meeting

20 FORMAT AND SIGNING OF BIDS

- 20.1 The bidder **SHALL** prepare one original of the documents comprising the bid as described in Clause 13 of these Instructions to Bidders, bound with the section containing the Form of Bid and Appendix to Bid, and clearly marked “ORIGINAL”. In addition, the bidder shall submit two hard copies and also a digital copy of the bid clearly marked “COPIES”. In the event of discrepancy between them, the original shall prevail.
- 20.2 The original and copies of the bid shall be typed or written in indelible ink (in the case of copies, photocopies are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the bidder pursuant to Sub-Clause 51. The person or persons signing the bid shall initial all pages of the bid where entries or amendments have been made.
- 20.3 The bid shall be without alterations, omissions or conditions except as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the bid.

D. SUBMISSION OF BIDS

21 SEALING AND MARKING OF BIDS

21.1 The bidder shall seal the original and each copy of the bid in separate envelopes duly marking the envelopes “ORIGINAL” and “COPY”. The envelopes shall then be sealed in an outer separate envelope. **All pages of the submitted documents to be serialized/paginated**

21.2 The inner and outer envelopes shall be:

- (a) addressed to the Employer at the address provided in the Appendix to Form of Bid.
- (b) bear the name and identification number of the contract. In addition to the identification required in sub-Clause 21.2, the inner envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared “late” pursuant to Clause 23.1, and for matching purposes under Clause 24.

21.3 If the outer envelope is not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening of the bid. If the outer envelope discloses the bidder's identity the Employer will not guarantee the anonymity of the bid submission, but this shall not constitute grounds for rejection of the bid.

22 DEADLINE FOR SUBMISSION OF BIDS

22.1 Bids must be received by the Employer at the address specified in Sub Clause 21.2(a) **not later than the time and date specified in the Invitation to Bid or as amended in addenda.**

22.2 The Employer may, at his discretion, extend the deadline for the submission of bids through the issue of an Addendum in accordance with Clause 11 in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

23 LATE BIDS

23.1 Any bid received by the Employer after the deadline for submission of bids prescribed in Clause 22 will be returned unopened to the bidder.

24 MODIFICATION, SUBSTITUTION AND WITHDRAWAL OF BIDS

24.1 The bidder may modify, substitute or withdraw his bid after bid submission, provided that written notice of modification or withdrawal is received by the Employer prior to the prescribed deadline for submission of bids.

24.2 The bidder’s modification, substitution or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause 21, with the outer and inner envelopes additionally marked “MODIFICATION” or “WITHDRAWAL” as

appropriate.

- 24.3 No bid may be modified subsequent to the deadline for submission of bids, except in accordance with Sub-Clause 28.1.
- 24.4 Any withdrawal of a bid during the interval between the deadline for submission of bids and expiration of the period of bid validity specified in Clause 17 may result in the forfeiture of the bid security pursuant to Sub-Clause 17.6.

E. BID OPENING AND EVALUATION

25 BID OPENING

- 25.1 The Employer will open the bids, including withdrawals and modifications made pursuant to Clause 24, in the presence of bidders' designated representatives who choose to attend, **at the time, date and location specified in the Invitation to Bid or as amended in the addenda.** The bidders' representatives who are present shall sign a register evidencing their attendance.
- 25.2 Envelopes marked "WITHDRAWAL" and "SUBSTITUTION" shall be opened first and the name of the bidder shall be read out. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 24 shall not be opened.
- 25.3 The bidder's name, the Bid Prices, including any bid modifications and withdrawals, the presence (or absence) of bid security, and any such details as the Employer may consider appropriate, will be announced by the Employer at the opening. Subsequently, all envelopes marked "MODIFICATION" shall be opened and the submissions therein read out in appropriate detail. No bid shall be rejected at bid opening except for late bids pursuant to Clause 23.
- 25.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with Sub-Clause 25.3.
- 25.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

26 PROCESS TO BE CONFIDENTIAL

- 26.1 Information relating to the examination, evaluation and comparison of bids, and recommendations for the award of contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful bidder has been announced. Any effort by a bidder to influence the Employer's processing of bids or award decisions may result in the rejection of the bidder's bid.

27 CLARIFICATION OF BIDS AND CONTACTING OF THE EMPLOYER

- 27.1 To assist in the examination, evaluation, and comparison of bids, the Employer may, at its discretion, ask any bidder for clarification of its bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in accordance with Clause 29.
- 27.2 Subject to Sub-Clause 26.1, no bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the Employer, he should do so in writing.
- 27.3 Any effort by the bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the bidder's bid.

28 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

- 28.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid (a) has been properly signed; (b) is accompanied by the required securities; (c) is substantially responsive to the requirements of the bidding documents; and (d) provides any clarification and/or substantiation that the Employer may require to determine responsiveness pursuant to Sub-Clause 28.2.
- 28.2 A substantially responsive bid is one that conforms to all the terms, conditions, and specifications of the bidding documents without material deviation or reservation and has a valid BID bank guarantee. 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 bidding documents, the Employer's rights or the bidder's obligations under the contract; or (c) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.
- 28.3 If a bid is not substantially responsive, it will be rejected by the Employer and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

29 CORRECTION OF ERRORS

- 29.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:
1. Where there is a discrepancy between the amounts in figures and in words, the amount in words as indicated in the Form of Bid will govern; 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 line item total will govern and the unit rate will be adjusted accordingly in such a way that the BID Sum remains unaltered.

- 29.2 Any error by the Bidder in pricing or extending the Bills of Quantities or carrying forward to the summary or BID Sum, shall be corrected in such a way that the BID Sum remains unaltered and the Bidder shall within seven (7) days after issuance of the written notice by the Employer, or such further time as the Employer may allow, correct his BID in such a manner as may be agreed or directed by the Employer failing which the BID may be absolutely rejected and the Bid Security forfeited in accordance with Sub-Clause 17.6 . Any discrepancy that results in variation of more than 15% of the corrected figure shall result in rejection of the Tender.

30 EVALUATION AND COMPARISON OF BIDS

- 30.1 The Employer will then evaluate and compare only the bids determined to be substantially responsive in accordance with Clauses 28 and 29. Any variation, deviation and alternative offers will be rejected and shall not be taken into account in bid evaluation.
- 30.2 If the bid, which results in the lowest Evaluated Bid Price is unbalanced or front loaded in relation to the Engineer's estimate of the items of work to be performed under the contract, the Employer **shall** require the bidder to produce detailed price analyses for any or all items of the Bills of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated contract payments, the Employer may require that the amount of the Performance Security set forth in Clause 35 be increased at the expense of the bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the contract.
- 30.3 Preference shall be applied in accordance with Part XII of the Public Procurement and Disposal Act 2015 as amended in Legal Notice No. 207 of 24th December 2015 (Preference and Reservation in Procurement).

F. AWARD OF CONTRACT

31 AWARD

- 31.1 Subject to Clause 32, the Employer will award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest Evaluated Bid Price pursuant to Clause 30, provided that such bidder has been determined to be (a) eligible in accordance with the provisions of Sub-Clause 4.1, and (b) qualified in accordance with the provisions of Clause 5.

32 EMPLOYER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

- 32.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Employer's action.

33 NOTIFICATION OF AWARD

- 33.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder in writing or by cable confirmed by registered letter that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called "Letter of Acceptance") shall specify the sum, which the Employer will pay the Contractor in consideration of the execution and completion of the works and the remedying of any defects therein by the Contractor as prescribed by the contract (hereinafter and in the Conditions of Contract called "the Contract Price").
- 33.2 At the same time that the Employer notifies the successful bidder that his bid has been accepted, the Employer shall notify the other bidders that their bids have been unsuccessful and that their bid securities will be returned as promptly as possible, in accordance with sub-clause 17.4.

34 SIGNING OF AGREEMENT

- 34.1 At the same time that the Employer notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Agreement in the form provided in the bidding documents, incorporating all agreements between the parties.

Within 14 days of receipt of the Agreement, the successful bidder shall sign the Form of Agreement and return it to the Employer, together with the required performance security.

35 PERFORMANCE SECURITY

- 35.1 Within 28 days of receipt of the Letter of Acceptance from the Employer, the successful bidder shall furnish to the Employer a performance security in the form stipulated in the Conditions of contract. The form of performance security provided in Section 8 of the bidding documents shall be used.
- 35.2 The successful bidder shall provide a performance security in the form of an Unconditional Bank Guarantee from a reputable bank located in Kenya.
- 35.3 Failure by the successful Bidder to lodge the required Performance Guarantee within 60 days of the receipt of the Letter of Acceptance shall constitute sufficient grounds for the annulment of the Award and forfeiture of the Bid Surety; in which event the Employer may make the award to another bidder or call for new bids.

36 CONTRACT EFFECTIVENESS

- 36.1 The Contract will be effective only upon signature of the Agreement between the Contractor and the Employer.

SECTION 5:
QUALIFICATION CRITERIA

SECTION 5: QUALIFICATION CRITERIA

This Section contains all the factors, methods and criteria that the Employer shall use to evaluate applications. The information to be provided in relation to each factor and the definitions of the corresponding terms are included in the respective Application Forms.

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Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
1. Eligibility							
1.1	Eligibility	Nationality in accordance with Sub-Clause 4.1.	Must meet requirement	Existing or intended JV must meet requirement	Must meet requirement	N / A	Section 7, Schedule 1
1.2	Conflict of Interest	No conflicts of interest in Sub-Clause 4.2.	Must meet requirement	Existing or intended JV must meet requirement	Must meet requirement	N / A	Section 7, Schedule 1
1.3	Employer Ineligibility	Not having been declared ineligible by the Employer, as described in Sub-Clause 4.3.	Must meet requirement	Existing JV must meet requirement	Must meet requirement	N / A	Section 7, Schedule 1
1.4	Incorporation & Registration	Pursuant to sub-clause 4.1 the following shall be provided; - Certified Copy of Certificate of incorporation to show that the applicant is a registered company and legally authorised to do business in Kenya - Proof of registration	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Section 7, Schedule 1

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
		with the National Construction Authority (NCA) in Classes NCA1 as a Road Works Contractor					
1.5	Submission of the Bid Document	All pages of the submitted documents to be serialized/paginated by the Bidder.	Must meet requirement	Must meet requirement	Must meet requirement	Must meet requirement	Instructions to Bidders, Section D clause 21.1

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non performance of a contract did not occur within the last five (5) years prior to the deadline for application submission based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the applicant have been exhausted.	Must meet requirement by itself or as party to past or existing JV	N / A	Must meet requirement by itself or as party to past or existing JV	N / A	Section 7, Schedule 6
2.2	Pending Litigation	All pending litigation shall in total not represent more than thirty percent (30%) of the Applicant's net	Must meet requirement by itself or as party to past or existing JV	N / A	Must meet requirement by itself or as party to past or	N / A	Section 7, Schedule 10

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
		worth and shall be treated as resolved against the Applicant.			existing JV		
3. Financial Situation							
3.1	Financial Performance	Submission of audited accounts or if not required by the law of the applicant's country, other financial statements acceptable to the Employer, for the last three [3] years for tenders to demonstrate: (a) the current soundness of the applicant's financial position and its prospective long-term profitability, and (b) capacity to have a cash flow amount of min. 500,000,000 (Five Hundred) Million equivalent working	Must meet requirement (a) Must meet requirement (b) Must meet requirement	N / A (a) N / A (b) Must meet requirement	Must meet requirement (a) Must meet requirement (b) N / A	N / A (a)N / A (b) N / A	Section 7, Schedule 9

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
		capital					
3.2	Average Annual Construction Turnover	Minimum average annual construction turnover of KShs. 750 Million [750,000,000] calculated as total certified payments received for contracts in progress or completed, within the last three [(3)] years	Must meet requirement	Must meet requirement	Must meet ((100-50)/(n-1))% of the requirement where n= number of joint venture members	Must meet fifty (50%) percent of the of the requirement	Section 7, Schedule 9
4. Experience							
4.1	General Construction Experience	Experience under construction contracts in the role of contractor, subcontractor, or management contractor within the last three (3) years prior to the	Must meet requirement	N / A	Must meet requirement	N / A	Section 7, Schedule 6

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
		applications submission deadline					
4.2(a)	Specific Construction Experience	Participation as contractor, management contractor or subcontractor, in at least two (2) contracts, each with a value of at least KShs. 750 million that have been successfully and substantially completed or at more than 70% complete and that is similar to the proposed works. The similarity shall be based on the physical size, complexity, methods/technology or other characteristics as described in Section 6, Scope of Works	Must meet requirement	Must meet requirement	N / A	Must meet requirement for one contract	Section 7, Schedule 6

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
4.2(b)		b) For the above or other contracts executed during the period stipulated in 4.2(a) above, a minimum construction experience in at least one (1) of: <ul style="list-style-type: none"> - Rehabilitation of bitumen roads. - New Construction to bitumen standards - New construction of bridges and approach roads - Other similar road works (gravel, concrete paving blocks.) 	Must meet requirements	Must meet requirement	N / A	Must meet requirement	Section 7, Schedule 6
4.3	Work Methodology	Submission of a brief work methodology in accordance with sub-clause 5.3	Should demonstrate understanding of the scope of works and other general	Should demonstrate understanding of the scope of works and	N/A	N/A	Section 7, Schedule 11

Qualification Criteria		Compliance Requirements			Documentation		
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Parties Combined	Each Party	One Party	
			requirements	other general requirements			

5. Site Staff							
		The site staff shall possess minimum levels set below;	Must meet requirements	Must meet requirements	N/A	N/A	Section 7, Schedule 5
	Site Agent	Qualification = Bachelors in Civil Eng. Reg. Eng General Experience = 7 yrs, Specific Experience = 5 Yrs					
	Dep. Site Agent/ Site Engineer	Qualification = Bachelors in Civil Eng General Experience = 5 yrs, Specific Experience = 3 Yrs					
	Senior Foreman	Qualification =Diploma in Civil Eng. General Experience = 7 yrs, Specific Experience = 5 Yrs					
	Site Surveyor	Qualification = Diploma in Survey General Experience = 7 yrs Specific Experience = 5 Yrs					

	Foremen	Qualification = Certificate in Civil Eng. General Experience = 7 yrs Specific Experience = 5 Yrs					
6.0	On-going contracts	The total value of current works on the ongoing contracts must not exceed KShs. Ten Billion	Must meet requirements	Must meet requirement	N / A	Must meet requirement	

7. Schedule of the Major Items of Plant to Be Used On the Proposed Contract.

The Bidder must indicate the core plant and equipment considered by the company to be necessary for undertaking the project together with proof ownership. (* Mandatory minimum number of equipment required by the Employer for the execution of the project that the bidder must make available for the Contract).

Item No.	Equipment Details	Minimum Number Required for the execution of the Contract	No. of owned by the Bidder	No. To be leased by the bidder	No. to be availed for the project	No of equipment to be made available for the Contract by the Bidder
1	<p>A) General plant</p> <p>1. Primary/Secondary /Crusher Unit/Power Screen Min capacity 60/hr</p> <p>2. Concrete batching plant Min Cap 20m3/hr</p> <p>Subtotal for A</p>	<p>Optional</p> <p>Optional</p>				
2	<p>B) Bituminous Plants</p> <p>1. Bitumen pressure distributor</p> <p>2. Bitumen heater tank (10,000 litres)</p> <p>3. Asphalt plant</p> <p>4. Paver</p> <p>5. Pneumatic Roller</p> <p>Subtotal for B</p>	<p>1</p> <p>Optional</p> <p>Optional</p> <p>1</p> <p>1</p> <p><u>3</u></p>				

Item No.	Equipment Details	Minimum Number Required for the execution of the Contract	No. of owned by the Bidder	No. To be leased by the bidder	No. to be availed for the project	No of equipment to be made available for the Contract by the Bidder
3	<p>C) Compactors</p> <p>1. Vibrating compaction plate 300mm wide</p> <p>2. Vibrating compaction plate 600mm wide</p> <p>Subtotal for C</p>	<p>1</p> <p>1</p> <p><u>2</u></p>				
4	<p>D) Mobile Compressors</p> <p>1. Medium rock drill (1.5 m³/min)</p> <p>2. Heavy rock drill (1.5 m³/min)</p> <p>Subtotal for D</p>	<p>2</p> <p>1</p> <p><u>3</u></p>				
5	<p>E) Concrete Equipment</p> <p>1. Mobile concrete mixers</p> <p>2. Truck mounted mixers</p> <p>3. Concrete vibrators</p> <p>4. Continuous pugmill mixer</p> <p>Subtotal for E</p>	<p>3</p> <p>1</p> <p>3</p> <p>1</p> <p><u>8</u></p>				

Item No.	Equipment Details	Minimum Number Required for the execution of the Contract	No. of owned by the Bidder	No. To be leased by the bidder	No. to be availed for the project	No of equipment to be made available for the Contract by the Bidder
6	<p>F) Transport (Tippers, dumpers, water tankers)</p> <p>1. 4x2 tippers payload 7-12 tonnes</p> <p>2. 6x4 tippers payload 16-20 tonnes</p> <p>3. Articulated trailers (low loaders)</p> <p>4. Dump trucks</p> <p>5. Flat bed lorries</p> <p>6. Water tankers (18,000-20,000 lts capacity)</p> <p>7. Water tankers (8,000-10,000 lts capacity)</p> <p>Subtotal F</p>	<p>4</p> <p>6</p> <p>1</p> <p>Optional</p> <p>2</p> <p>1</p> <p>2</p> <p><u>16</u></p>				
7	<p>G) Earth moving equipment</p> <p>1. Tractor dozers with dozer attachment (D6-D9)</p> <p>2. Tracked loaders</p> <p>3. Wheel loaders</p> <p>4. Motor scrappers</p> <p>5. Motor graders (93-</p>	<p>1</p> <p>Optional</p> <p>2</p> <p>1</p> <p>3</p>				

Item No.	Equipment Details	Minimum Number Required for the execution of the Contract	No. of owned by the Bidder	No. To be leased by the bidder	No. to be availed for the project	No of equipment to be made available for the Contract by the Bidder
	205KW) 6. Trench excavators Subtotal G	optional <u>7</u>				
8	H) Diesel Generators 1. Diesel generators (15-200KVa) Subtotal H	2 <u>2</u>				
9	I) Excavators 1. Hydraulic crawler mounted (7-10 tonnes) – 0.25-0.4m ³ SAE bucket 2. Hydraulic wheel mounted (10-16 tonnes) – 0.4-0.6m ³ SAE bucket Subtotal for I	1 1 <u>2</u>				
10	J) Rollers 1. Self-propelled single drum vibrating (various types, 12 tonnes and above) 2. Pneumatic rubber tyre (1-2 tonnes/wheel) 3. Sheep foot roller 4. Double drum vibrating	2 2 1 2				

Item No.	Equipment Details	Minimum Number Required for the execution of the Contract	No. of owned by the Bidder	No. To be leased by the bidder	No. to be availed for the project	No of equipment to be made available for the Contract by the Bidder
	pedestrian roller Subtotal for J	<u>7</u>				
11	K) Stabilization 1. Pulvimixer Subtotal for K	1 <u>1</u>				

We hereby certify that notwithstanding the list of plant detailed above, we will provide sufficient, suitable and adequate plant in good working order for the successful completion of works.

.....
(Signature of Contractor)

.....
(Date)

SECTION 6:
CONDITIONS OF CONTRACT

SECTION 6A: CONDITIONS OF CONTRACT PART I: GENERAL CONDITIONS OF CONTRACT

The Conditions Of Contract Part 1 – General Conditions shall be those forming Part 1 of the Conditions of Contract for works of Civil engineering construction Fourth Edition 1987, reprinted in 1992 with further amendments, prepared by the Federation Internationale des Ingenieurs Conseils (FIDIC)

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

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Tel: 2249085

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SECTION 6B: CONDITIONS OF CONTRACT PART II: (CONDITIONS OF PARTICULAR APPLICATION)

The following Conditions of Particular Application shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The Particular Condition is preceded by the corresponding clause number of the General Conditions to which it relates.

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CONDITIONS OF CONTRACT PART II (CONDITIONS OF PARTICULAR APPLICATION)

SUB-CLAUSE 1.1 – DEFINITIONS

Amend this sub-clause as follows:

(a) (i) The “Employer” is the Government of Kenya, represented by the Director General, Kenya Rural Roads Authority.

(iv) The “Engineer” is the Director (Development) Kenya Rural Roads Authority.

(b) (i) Insert in line 2 after the Bills of Quantities”, the following, “the rates entered by the Contractor (whether or not such rate be employed in computation of the Contract Price),”

Amend sub-paragraph (b) (v) of Sub-Clause 1.1 by adding the following words at the end:

The word “BID” is synonymous with “Tender” and the word “Appendix to BID” with “Appendix to Tender” and the word “BID documents” with “bidding documents”.

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

(h) (i) “Materials” means materials and other things intended to form or forming part of the Permanent Works.

SUB-CLAUSE 2.1 - ENGINEER’S DUTIES AND AUTHORITY.

With reference to Sub-Clause 2.1 (b), the following shall also apply: The Engineer shall obtain the specific approval of the Employer before taking any of the following actions specified in Part 1:

(a) Consenting to the sub-letting of any part of the works under Clause 4;

(b) Certifying additional cost determined under Clause 12;

(c) Determining an extension of time under Clause 44;

(d) Issuing a variation under Clause 51;

(e) Fixing rates or prices under Clause 52

SUB-CLAUSE 5.1 - LANGUAGE AND LAW

(a) The Contract document shall be drawn up in the ENGLISH LANGUAGE. Communication between the Contractor and the Engineer’s Representative shall be in this given language.

(b) The Laws applicable to this Contract shall be the Laws of the Republic of Kenya.

SUB-CLAUSE 5.2 – PRIORITY OF CONTRACT DOCUMENTS

Delete the documents listed 1-6 and substitute:

- (1) The Contract Agreement (if completed)
- (2) The Letter of Acceptance;
- (3) The Bid and Appendix to Bid;
- (4) The Conditions of Contract Part II;
- (5) The Conditions of Contract Part I;
- (6) The Special Specifications;
- (7) The Standard Specification for Road and Bridge Construction, 1986;
- (8) The Drawings;
- (9) The priced Bills of Quantities
- (10) Other documents as listed in the Appendix to form of Bid

SUB-CLAUSE 10.1 - PERFORMANCE SECURITY

Replace the text of Sub-clause 10.1 with the following:

“The Contractor shall provide security in, **respect of the value of the BID SUM 1 for upgrading works**, for his proper performance of the Contract within 28 days after receipt of the Letter of Acceptance. The Performance Security shall be in the form of a bank guarantee, as stipulated by the Employer in the Appendix to Bid. The performance security shall be denominated in the types and proportions of currencies in which the contract price is payable. The Contractor shall notify the Engineer when providing the Performance Security to the Employer”.

At the start of the performance based contract and before release of the performance guarantee for IMPROVEMENT works, The Contractor shall provide security in, **in respect of the value of the BID SUM 2 for performance based maintenance works** for his proper performance of the Contract within 28 days after the date of issue of the Substantial Completion Certificate. The Performance Security shall be in the form of a bank guarantee, as stipulated by the Employer in the Appendix to Bid. The performance security shall be denominated in the types and proportions of currencies in which the contract price is payable. The Contractor shall notify the Engineer when providing the Performance Security to the Employer”.

“If the performance security is a bank guarantee, it shall be issued either (a) by a bank located in the country of the Employer or a foreign bank through a correspondent bank located in the country of the Employer, or (b) directly by the foreign bank that has been determined in advance to be acceptable to the Employer.

“Without limitation to the provisions of the preceding paragraph, whenever the Engineer determines an addition to the Contract Price as a result of a change in cost, the Contractor, at the Engineers written request, shall promptly increase the value of the Performance Security by an equal percentage”.

SUB-CLAUSE 10.2 - VALIDITY OF PERFORMANCE SECURITY

Replace the text of Sub-clause 10.2 with the following:

“The Performance Security in respect of the value of the BID SUM 1 for upgrading works shall be valid for the contract period, Defects Liability Period (12 months) plus 28 days after the date of issue of the Completion Certificate. The security shall be returned to the Contractor within 14 days of expiration”.

“The Performance Security in respect of the value of the BID SUM 2 for performance based maintenance works shall be valid until a date 28 days after the date of expiry of the performance based maintenance contract. The security shall be returned to the Contractor within 14 days of expiration”.

SUB-CLAUSE 10. 3- CLAIMS UNDER PERFORMANCE SECURITY

Delete the entire sub-clause 10.3.

SUB-CLAUSE 10. 4- COST OF PERFORMANCE SECURITY

The cost of complying with the requirements of this clause shall be borne by the Contractor.

SUB-CLAUSE 11. 1- INSPECTION OF SITE

Delete the last paragraph completely and replace with the following:

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

SUB-CLAUSE 11.2 - ACCESS TO DATA

Data made available by the Employer in accordance with Clause 11.1 shall be deemed to include data listed elsewhere in the Contract as open for inspection at the address stipulated in the Appendix to Bid.

SUB-CLAUSE 14.1 PROGRAM TO BE SUBMITTED

The time within which the program shall be submitted shall be as specified in the Appendix to the Form of Bid. This detailed program shall be based upon the program submitted by the Contractor as part of his BID, where this was required, and shall in no material manner deviate from the said program.

The program shall be in the form of a Critical Path Method Network (CPM Network) showing the order of procedure and a description of the construction methods and arrangements by which the Contractor proposes to carry out the works. It should also be supplemented by a time-bar chart of the same program. The program shall be coordinated with climatic, groundwater and other conditions to provide for completion of the works in the order and by the time specified. The program shall be revised at three-month intervals and should include a chart of the principle quantities of work forecast for execution monthly.

The Contractor shall submit to the Engineer not later than the day or date mentioned in the Appendix to the Form of Bid, a general description of his proposed arrangements and methods for the execution of the Works, including temporary offices, buildings, access roads, construction plant and its intended production output, working shift arrangements, labour strength, skilled and unskilled, supervision arrangements, power supply arrangements, supply of materials including a materials utilization program, stone crushing, aggregate production and storage, cement handling, concrete mixing and handling, methods of excavation, dealing with water, testing methods and facilities.

During the execution of the works, the Contractor shall submit to the Engineer full and detailed particulars of any proposed amendments to the arrangements and methods submitted in accordance with the foregoing. If details of the Contractors proposals for Temporary Works are required by the Engineer for his own information the Contractor shall submit such details within (14) fourteen days of being requested to do so.

The various operations pertaining to the works shall be carried out in such a progressive sequence as will achieve a continuous and consecutive output of fully completed road-works inclusive of all bridge works and culverts within the time limits specified in the Contract. Generally the Contractor shall start at one end of the road and progress continuously towards the other without leaving any isolated section or sections of uncompleted road provided always that the site of the works has been acquired in its entirety and the encumbrances and services thereon removed.

The Contractor shall allow in his programme for the following public holidays per calendar year during which the Contractor shall not be permitted to work.

- New Years Day (1st January)
- Good Friday
- Easter Monday
- Labour day (1st May)
- Madaraka Day (1st June)
- IddUIFitr
- Mashujaa Day (20th October)
- Jamhuri day (12th December)
- Christmas Day (25th December)
- Boxing day (26th December)

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

SUB-CLAUSE 14.3- CASH FLOW ESTIMATE

The time within which the detailed cash flow estimate shall be submitted shall be as specified in the Appendix to the Form of Bid.

SUB-CLAUSE 15.1- CONTRACTOR’S SUPERINTENDENCE

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

“The Contractor shall, within seven (7) days of receipt of the Engineer’s order to commence the works inform the Engineer in writing the name of the Contractor’s Representative and the anticipated date of his arrival on site.”

Add the following Sub-clause 15.2

SUB-CLAUSE 15.2-LANGUAGE ABILITY AND QUALIFICATIONS OF CONTRACTOR’S AUTHORISED AGENT

The Contractor’s Representative on the site shall be the Site Agent who shall be a Professional Engineer registered by The Engineer’s Act, 2011 or have equivalent status approved by the Engineer and shall be able to read and write in English.

The Contractor’s Agent or Representative shall have at least 7 years relevant experience as a Professional Engineer i.e. 7years from the date of registration as

SUB-CLAUSE 16.2- ENGINEER AT LIBERTY TO OBJECT

At the end of this Clause add,

“by a competent substitute approved by the Engineer and at the Contractor’s own expense.”

Add the following Sub-Clauses 16.3 and 16.4:

SUB-CLAUSE 16.3-QUALIFICATION AND LANGUAGE ABILITY OF SUPERINTENDING STAFF

The Contractor’s superintending staff shall meet the following minimum qualifications:

- (a). Should have a working knowledge of English or Kiswahili. Should any of the superintending staff not be able to meet this condition, the Contractor shall propose to the Engineer arrangements for provision of a sufficient number of interpreters of approved qualifications. The Engineer, at his discretion, may amend, approve or reject such arrangements or reject deployment of superintending staff not meeting the language requirements. The Engineer may at any time during the duration of the Contract amend any approved arrangements made for interpreters, which shall be implemented at the Contractors expense.
- (b) The key staff listed below must have academic qualifications from Government recognised institutions or equivalent institutions of the levels set out in Section 5, Part 6.

- Site Agent

- Deputy Site Agent
 - Site Engineer
 - Senior Foreman
 - Site Surveyor
 - Foremen
- (c) The key staff listed below must have minimum experience set out in Section 5, Part 6:
- Site Agent
 - Deputy Site Agent
 - Site Engineer
 - Senior Foreman
 - Site Surveyor
 - Foremen
- (d) Qualifications as above shall be subject to verification and approval on site by the Engineer or his representative on site before commencement of the said works.

SUB-CLAUSE 16.4 – EMPLOYMENT OF LOCAL PERSONNEL

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

SUB-CLAUSE 19.1- SAFETY, SECURITY AND PROTECTION OF THE ENVIRONMENT

Add sub-paragraph (d) to Sub-Clause 19.1 as follows:

- d) Notwithstanding the Contractor’s obligation under paragraph (a), (b) and (c) of Sub-Clause 19.1 of the Conditions of Contract, the Contractor shall observe the following measure with a view to reducing or eliminating adverse environmental effects by the site works:
- (i) All quarries and borrow pits shall be filled and landscaped to their original state after extraction of construction material;
 - (ii) Soil erosion due to surface runoff or water from culverts or other drainage structures should be avoided by putting in place proper erosion control measures that shall include, but are not limited to grassing and planting of trees;
 - (iii) Long traffic diversion roads shall be avoided so as to minimize the effect of dust on the surrounding environment. In any case all diversions shall be kept damp and dust free;
 - (iv) Spillage of oils, fuels and lubricants shall be avoided and if spilt, shall be collected and disposed off in such a way as not to adversely affect the environment;

- (v) Rock blasting near settlement areas shall be properly coordinated with the relevant officers of the Government so as to minimize noise pollution and community interference.

SUB-CLAUSE 20.4 - EMPLOYERS RISKS

Delete Sub-paragraph (h) and substitute with;

- (h) any operation of the forces of nature (in-so-far as it occurs on site) which an experienced contractor:
 - (i) could not have reasonably foreseen, or
 - (ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
 - (A) prevent loss or damage to physical property from occurring by taking appropriate measures or
 - (B) insure against such loss or damage.

SUB-CLAUSE 21.1 - INSURANCE OF WORKS AND CONTRACTOR'S EQUIPMENT

Delete the first sentence of this Clause and replace with the following:

“Prior to commencement of the Works the Contractor shall, without limiting his or the Employer’s obligations and responsibilities under Clause 20, insure to the satisfaction of the Employer:”

Add the following words at the end of Sub-paragraph (a) and immediately before the last word of Sub-paragraph (b) of Sub-Clause 21.1:

“It being understood that such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred”

SUB-CLAUSE 21.2 – SCOPE OF COVER

Amend sub-paragraph (a) of Sub-Clause 21.2 as follows:

Delete words “from the start of work at the site” and substitute the words “from the first working day after the Commencement Date”

Add the following as Sub-paragraph (c) under Sub-Clause-Clause 21.2

(c) It shall be the responsibility of the Contractor to notify the insurance company of any change in the nature and extent of the Works and to ensure the adequacy of the insurance coverage at all times during the period of the Contract.

SUB-CLAUSE 21.4 - EXCLUSIONS

Amend Sub-Clause 21.4 to read as follows:

“There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by the risks listed under Sub-Clause 20.4 sub-paragraph (a) to (h) of the General Conditions of Contract”.

SUB-CLAUSE 23.2 – MINIMUM AMOUNT OF INSURANCE

Add the following at the end of this Clause:

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

SUB-CLAUSE 25.1 – EVIDENCE AND TERMS OF INSURANCES

Amend Sub-Clause 25.1 as follows:

Insert the words “as soon as practicable after the respective insurances have been taken out but in any case” before the words “prior to the start of work at the site”

Add the following Sub-Clauses 25.6 and 25.7

SUB-CLAUSE 25.6 – INSURANCE NOTICES

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

SUB-CLAUSE 25.7 – NOTIFICATION TO INSURERS

It shall be the responsibility of the Contractor to notify insurers under any of the insurance referred to in the preceding clauses 21, 23 and 24 on any matter or event, which by the terms of such insurance are required to be so notified. The Contractor shall indemnify and keep indemnified the Employer against all losses, claims, demands, proceedings, costs, charges and expenses whatsoever arising out of or in consequence of any default by the Contractor in complying with the requirements of this Sub-Clause whether as a result of avoidance of such insurance or otherwise.

SUB-CLAUSE 28.2 – ROYALTIES

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

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

SUB-CLAUSE 29.1 – INTERFERENCE WITH TRAFFIC

Supplement Sub-Clause 29.1 by adding the following sentence at the end:

“The Contractor will be permitted to use existing public roads for access to the site. The Contractor shall pay vehicle license tax and road maintenance duty in accordance with relevant regulations and shall obtain any necessary permits or licenses from relevant authorities for transporting his equipment.”

Add the following sub-clause 29.2:

SUB-CLAUSE 29.2 – REINSTATEMENT AND COMPENSATION FOR DAMAGES TO PERSONS AND PROPERTY

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

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

The Contractor shall refer to the Employer without delay all claims which may be considered to fall within the provisions of Clause 22.1.

Add the following Sub-Clauses, 34.2 to 34.8 after Clause 34.1

SUB-CLAUSE 34.2 – CONDITIONS OF EMPLOYMENT OF LABOUR

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

SUB-CLAUSE 34.3 – FAIR WAGES

The Contractor shall, in respect of all persons employed anywhere by him in the execution of the Contract, and further in respect of all persons employed by him otherwise than in the execution of the Contract in every factory, Workshop or place occupied or used by him for the execution of the Contract, observe and fulfil the following conditions:

- (a) The Contractor shall pay rates of wages, observe hours of labour and provide conditions of labour, housing, amenities and facilities not less favourable than those required by the latest Regulation of Wages (Building and Construction Industry) Order as at the time of bid submission, and subsequent amendments thereto, or in any wage scales, hours of work or conditions agreed by the

Ministry of Labour or other Government Departments in consultation with the appropriate wage fixing authority and generally recognized by other employees in the district whose general circumstances in the trade or industry in which the Contractor is engaged are similar.

- (b) In the absence of any rates of wages, hours or conditions of labour so established the Contractor shall pay rates of wages and observe hours and conditions of labour which are not less favourable than the general level of wages, hours and conditions observed by other Employers whose general circumstances in the trade or industry in which the Contractor is engaged are similar.
- (c) Where the absence of established rates of wages, hours and conditions of labour or the dissimilarity of the general circumstances in the trade of industry in which the Contractor is engaged prevent the Contractor from observing rates of wages, hours and conditions of labour ascertained under sub-paragraph (a) and (b) above the Contractor in fixing the rates of wages, hours and conditions of labour of his employees shall be guided by the advice of the Labour Department.
- (d) The Contractor shall recognize the freedom of his employees to be members of trade unions.
- (e) The Contractor shall maintain records in English of the time worked by, and the wages paid to, his employees. The Contractor shall furnish to the Engineer or Employer, if called upon to do so, such particulars of the rates, wages and conditions of labour as the Employer or Engineer may direct.
- (f) The Contractor shall at all times during the continuance of the contract display, for the information of his employees in every factory, workshop or place occupied or used by him for the execution of the Contract, a copy of this clause together with a notice setting out the general rates of wages, hours and conditions of labour of his employees.
- (g) The Contractor shall be responsible for the observance of this clause by sub-Contractors employed in the execution of the works.

SUB-CLAUSE 34.4 – BREACH OF FAIR WAGES CLAUSE

Any Contractor or Sub-Contractor who is found to be in breach of Fair Wages Clause shall cease to be approved as a Contractor or Sub-Contractor for such period as the Employer may determine.

Should a claim be made to the Employer alleging the Contractor's default in payment of Fair Wages of any workman employed on the Contract and if proof thereof satisfactory to the Employer is furnished by the Labour Authority, the Employer may, failing payment by the Contractor, pay the claims out of any monies due or which may become due to the Contractor under the Contract.

SUB-CLAUSE 34.5 – RECRUITMENT OF UNSKILLED LABOUR

Any additional unskilled labour which is required by the Contractor for the works and which is not in his employ at the time of the acceptance of the BID shall be recruited by the Contractor from the Labour Exchange or Exchanges nearest to the site or sites of the work.

SUB-CLAUSE 34.6 – COMPENSATION FOR INJURY

The Contractor shall in accordance with the Workmen’s Compensation Act of the Laws of Kenya and any other regulations in force from time to time pay compensation for loss or damage suffered in consequence of any accident or injury or disease resulting from his work to any workman or other person in the employment of the Contractor or any Sub-contractor.

SUB-CLAUSE 34.7 – LABOUR STANDARDS

- (a) The Contractor shall comply with the existing local labour laws, regulations and labour standards
- (b) The Contractor shall formulate and enforce an adequate safety program with respect to all work under his contract, whether performed by the Contractor or sub-contractor. The Contractor has assurance from the Employer of cooperation where the implementation of these safety measures requires joint cooperation.
- (c) Upon written request of the Employer the Contractor shall remove or replace any of his employees employed under this Contract.

SUB-CLAUSE 34.8 – MINORITIES AND PERSONS WITH DISABILITIES

The Contractor shall ensure that no more than Two Thirds of either gender is engaged in the Contract.

Add the following Sub-Clause 35.2 and 35.3.

SUB-CLAUSE 35.2 – RECORDS OF SAFETY AND HEALTH

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.

SUB-CLAUSE 35.3 – REPORTING OF ACCIDENTS

The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means. The Contractor shall also notify the relevant authority whenever the Laws of Kenya require such a report.

SUB-CLAUSE 41.1 – COMMENCEMENT OF WORKS

Amend Sub-Clause 41.1 as follows:

Delete the words “as soon as is reasonably possible” in the first sentence and replace with “within the period stated in the Appendix to Bid” whether or not the advance payment as provided under the 60.12 shall have been made.

SUB-CLAUSE 43.1 – TIME FOR COMPLETION

Amend Sub-Clause 43.1 as follows:

Delete the words “within the time” to “such extended time” and substitute “by the date or dates stated or implied in Clause 14 of these Conditions of Particular Application.

SUB-CLAUSE 44.1 – EXTENSION OF TIME FOR COMPLETION

Add at the end of Sub-Clause 44.1 the following:

“Neither rains falling within the rainy seasons as occurs in Kenya nor floods caused by such rains shall be deemed exceptional weather conditions such as may fairly entitle the Contractor to an extension of time for the completion of the work.”

SUB-CLAUSE 45.1 – RESTRICTION ON WORKING HOURS

Add at the end of Sub-Clause 45.1 the following:

“If the Contractor requests permission to work by night as well as by day, then if the Engineer shall grant such permission the Contractor shall not be entitled to any additional payments for so doing. All such work at night shall be carried out without unreasonable noise or other disturbance and the Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out night work and from and against all claims, demands, proceedings, costs, charges and expenses what-so-ever in regard or in relation to such liability.

“In addition the Contractor will be required to provide, for any work carried out at night or recognized days of rest, adequate lighting and other facilities so that the work is carried out safely and properly.

“In the event of the Engineer granting permission to the Contractor to work double or rotary shifts or on Sundays, the Contractor shall be required to meet any additional costs to the Employer in the administration and supervision of the Contract arising from the granting of this permission.”

SUB-CLAUSE 47.2 – REDUCTION OF LIQUIDATED DAMAGES

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

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

The Employer shall pay no bonus for early completion of the Works to the Contractor.

The sum stated in the Appendix to Bid as liquidated damages shall be increased by a sum equivalent to any additional amount payable by the Employer to the Contractor under clause 70.1 in respect of

an increase in costs in such a period that would not have been incurred by the Contractor if the works had been completed by the due date for completion prescribed by Clause 43.”

SUB-CLAUSE 48.2 – TAKING OVER OF PARTS OF WORKS

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

The minimum section for Taking Over shall be as described in the Special Specifications

SUB-CLAUSE 52.2 – POWER OF ENGINEER TO FIX RATES

Add new Clause 52.2(c)

No change in the unit rates or prices quoted shall be considered for items included in the schedule of Day-works rates, or Provisional Sums and items, or for any item in the BOQ.

SUB-CLAUSE 52.4 – DAYWORKS

Add the following at the end of Sub-Clause 52.4:

The work so ordered shall immediately become part of the works under the contract. The Contractor shall, as soon as practicable after receiving the Day-works order from the Engineer undertake the necessary steps for due execution of such work. Prior to commencement of any work to be done on a Day-works basis, the Contractor shall give an advance notice to the Engineer stating the exact time of such commencement.

SUB-CLAUSE 54.1 – CONTRACTORS EQUIPMENT, TEMPORARY WORKS AND MATERIALS:EXCLUSIVE USE FOR THE WORKS

Amend Sub-Clause 54.1 as follows:

Line 5: add “written” between “the” and “consent”.

Delete Sub-Clauses 54.2 and 54.5.

SUB-CLAUSE 55.2 – OMMISIONS OF QUANTITIES

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

Add the following Sub-Clause 58.4:

SUB-CLAUSE 58.4 – PROVISIONAL ITEMS

Provisional items shall be read as Provisional Sums and shall be operated as such in accordance with Sub-Clauses 58.1 to 58.3.

CLAUSE 60: – CERTIFICATES AND PAYMENTS

Clause 60 of the General Conditions is deleted and substituted with the following:-

SUB-CLAUSE 60.1 – MONTHLY STATEMENT

The Contractor shall submit a statement to the Engineer at the end of each month, in a tabulated form approved by the Engineer, showing the milestone attained by the Contractor and which makes the contractor to be entitled for payment. The statement shall include the following items, as applicable;

- the value of the Permanent Work executed up to the end of previous milestone
- Such an amount (not exceeding 75 percent of the value) as the Engineer may consider proper on account of materials for permanent work delivered by the Contractor in the site. These payments shall be made on for designated materials and only for quantities adequate to cover the subsequent Milestone. The designated materials for payment under this provision shall be
 - i. Bitumen and Bituminous products (with exclusion of fuels, oils and lubricants)
 - ii. Reinforcement and structural steel
 - iii. Cement
 - iv. Lime
 - v. Chippings
 - vi. Aggregates
- such amount as the Engineer may consider fair and reasonable for any Temporary Works for which separate amounts are provided in the Bill of Quantities
- adjustments under Clause 70
- any amount to be withheld under retention provisions of Sub-clause 60.3
- any other sum to which the Contractor may be entitled under the Contract

If the Engineer disagrees with or cannot verify any part of the statement, the Contractor shall submit such further information as the Engineer may reasonably require and shall make such changes and corrections in the statement as may be directed by the Engineer. In cases where there is difference in opinion as to the value of any item, the Engineer's view shall prevail.

SUB-CLAUSE 60.2 - INTERIM PAYMENT CERTIFICATE

Interim Payment Certificates shall be per milestone as agreed between the Employer and the Contractor in the Schedule of Payment.

The Contractor shall forward to the Engineer an Interim Payment Certificate based on the milestone achieved as corrected above and, should it be necessary in the Engineers opinion, shall promptly make any further amendments and corrections to the Interim Payment Certificate.

The Engineer shall not unreasonably withhold certifying an Interim Payment Certificate and in case of likely delay in establishing the value of an item, such item may be set aside and the remainder certified for payment.

Within 30 days after receipt of the Interim Payment Certificate and subject to the Contractor having made such further amendments and corrections as the Engineer may require, the Engineer will forward to the Employer the certified Interim Payment Certificate.

Provided that the Engineer shall not be bound to certify any payment under this Clause if the net amount thereof, after all retentions and deductions, would be less than the minimum amount of Interim Payment Certificate's stated in the Schedule of Payment. However, in such a case, the uncertified amount will be added to the next interim payment, and the cumulative unpaid certified amount will be compared to the minimum amount of interim payment.

SUB-CLAUSE 60.3 – PAYMENT OF RETENTION MONEY

A retention amounting to the percentage stipulated in the Appendix to Bid shall be made by the Engineer in the first and following Interim Payment Certificates until the amount retained shall reach the "Limit of Retention Money" named in the Appendix to Form of BID.

Upon the issue of the Taking-Over Certificate, with respect to the whole of the works one half of the retention money shall become due and shall be paid to the Contractor when the Engineer shall certify in writing that this section of the works has been substantially completed.

The other half of the retention money will be paid to the contractor when he provides an acceptable Bank Retention Guarantee.

Upon expiration of the Maintenance Period for the works, the Bank Retention Guarantee will be discharged.

Provided that in the event of different Maintenance Periods being applicable to different Sections of the Permanent Works pursuant to Clause 48, the expression "expiration of the Maintenance Period" shall, for the purpose of this sub-clause, be deemed to mean the expiration of the latest of such periods.

Provided also that if at such time, there remain to be executed by the Contractor any work instructed, pursuant to Clause 49 and 50, in respect of the works, the Engineer shall be entitled to withhold certification until completion of any such work or so much of the balance of the Retention money as shall in the opinion of the Engineer, represents the cost of the remaining work to be executed.

SUB-CLAUSE 60.4– CORRECTION OF CERTIFICATES

The Engineer may in any Interim Payment Certificate make any correction or modification to any previous Interim Payment Certificate signed by him and shall have authority, if any work is not being carried out to his satisfaction to omit or reduce the value of such work in any Interim Payment Certificate.

SUB-CLAUSE 60.5– STATEMENT AT COMPLETION

Not later than 84 days after the issue of the Taking-Over Certificate in respect of the whole of the works, the Contractor shall submit to the Engineer a statement at completion showing in detail, in a form approved by the Engineer;

The final value of all work done in accordance with the Contract up to the date stated in such Taking-Over Certificate.

- (a) Any further sums which the Contractor considers to be due; and
- (b) An estimate of amounts that the Contractor considers will become due to him under the Contract.

Estimate amounts shall be shown separately in the Statement at Completion. The Contractor shall amend and correct the Statement as directed by the Engineer and submit a Certificate at Completion to be processed as in Sub-Clause 60.2.

SUB-CLAUSE 60.6 – FINAL STATEMENT

Not later than 56 days after the issue of the Defects Liability Certificate pursuant to Sub-Clause 62.1, the Contractor shall submit to the Engineer for consideration a draft final statement with supporting documents showing in detail, in the form approved by the Engineer;

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

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

SUB-CLAUSE 60.7– DISCHARGE

Upon submission of the Final Statement, the Contractor shall give to the Employer, with a copy to the Engineer, a written discharge confirming that the total of the Final statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Provided that such discharge shall become effective only after payment under the Final Payment Certificate issued pursuant to Sub-Clause 60.8 has been made and the Performance Security referred to in Sub-Clause 10.1 has been returned to the Contractor.

SUB-CLAUSE 60.8 – FINAL PAYMENT CERTIFICATE

Upon acceptance of the Final Statement as given in Sub-Clause 60.6, the Engineer shall prepare a Final Payment Certificate which shall be delivered to the Contractor's authorized agent or representative for his signature. The Final Payment Certificate shall state:

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

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

SUB-CLAUSE 60.9– CESSATION OF EMPLOYER’S LIABILITY

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

SUB-CLAUSE 60.10 – TIME FOR PAYMENT

The amount due to the Contractor under any Interim Payment Certificate or Final Payment Certificate issued pursuant to this Clause or to any other term of the Contract, shall, subject to Clause 47, be paid by the Employer to the Contractor as follows:

- (i) In the case of Interim Payment Certificate, within the time stated in the Appendix to Form of Bid, after the Engineer has signed the Interim Payment Certificate.
- (ii) In the case of the Final Payment Certificate pursuant to Sub-clause 60.8, within the time stated in the Appendix to Form of Bid, after the Engineer has signed the Final Payment Certificate.
- (iii) In the event of the failure of the Employer to make payment within the times stated, the Employer shall make payment to the Contractor of simple interest at a rate equal to two percentage points above the average bank lending rates obtained from Central Bank of Kenya. The provisions of this sub-clause are without prejudice to the Contractor’s entitlements under Clause 69 or otherwise.

SUB-CLAUSE 60.11 – CURRENCY OF PAYMENT

The Contract Price shall be designated in Kenyan Currency.

All work performed by the Contractor under the Contract shall be valued in Kenya Shillings using the rates and prices entered in the Bills of Quantities together with such other increases to the Contract Price, except for variation of price payments in accordance with Clause 70.1.

SUB-CLAUSE 60.12 – ADVANCE PAYMENT

“The Employer will make an interest free advance payment to the Contractor for the cost of mobilization in respect of the Works, in a lump sum of 10% of the Contract Sum. Payment of such advance amount will be due under a separate certification by the Engineer after:

- (i) Provision by the Contractor of the Performance Security (Unconditional Bank Guarantee) in accordance with Clause 10 of the Conditions of Contract, and
- (ii) Provision by the Contractor of a Bank Guarantee shall remain effective until the advance payment has been completely repaid by the Contractor out of current earnings under the Contract and certified accordingly by the Engineer.

A form of Bank guarantee acceptable to the Employer is included in the Tender Documents. The advance payment shall be used by the Contractor exclusively for mobilization expenditures and execution of works to achieve the first Milestone. The advance payment shall not be subject to retention money.

Partial payment or non-payment of such advance will not attract interests, claim for Extension of Time or any other claim by the Contractor.

The reimbursement of the lump sum advance payment 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 the means of the formula:

$$RI = \frac{A(x-X)}{80-20}$$

Where:

RI = the amount to be reimbursed.

A = the amount of the advance which has been granted.

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

X = 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%.

With each reimbursement the guarantee will be reduced accordingly.

SUB-CLAUSE 60.13 MATERIALS FOR PERMANENT WORKS

With respect to materials brought by the Contractor to the site for incorporation into the permanent works, the Contractor shall,

-Receive a credit in the month, in which these materials are brought to site,

-Be charged a debit in the month in which these materials are incorporated in the permanent works.

Both such credit and debit to be determined by the Engineer in accordance with the following provisions:

- (a) No credit shall be given unless the following conditions shall have been met to the Engineers satisfaction
 - (i) The materials are in accordance with the specifications for the works;
 - (ii) The materials have been delivered to site and are properly stored and protected against loss, damage or deterioration;
 - (iii) The Contractor's record of the requirements, orders receipts and use of materials are kept in a form approved by the Engineer, and such records are available for inspection by the Engineer;
 - (iv) The Contractor has submitted a statement of his cost of acquiring and delivering the materials and plant to the Site, together with such documents as may be required for the purpose of evidencing such cost;
 - (v) The materials are to be used within a reasonable time the next six months after delivery to site.
- (b) The amount to be credited to the Contractor shall not be more than 75% of the Contractor's reasonable cost of the materials delivered to site, as determined by the Engineer after review of the documents listed in subparagraphs (a) (iv) above;
- (c) The amount to be debited to the Contractor for any materials incorporated into the works shall be equivalent to the credit previously granted to the Contractor for such materials pursuant to Clause (b) above as determined by the Engineer.

SUB-CLAUSE 67.1 – ENGINEER'S DECISION

Delete the entire sub-clause 67.1 and add the following;

“If a dispute of any kind what-so-ever arises between the Employer and the Contractor in any connection with, or arising out of, the Contract or the execution of the works, whether during the execution of the works or after their completion and whether before or after repudiation or other termination of the Contract including any dispute as to any opinion, instruction, determination, certificate or valuation of the Engineer, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state it is made pursuant to this clause. No later than 28 (twenty eight) days after the day on which he received such reference the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state it is made pursuant to this clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the works with all due diligence and the Contractor and the Employer shall

give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided, in an Amicable Settlement, Adjudicator's or Arbitrator's award.

If either the Employer or the Contractor be dissatisfied with the decision of the Engineer, or if the Engineer fails to give notice of his decision on or before the 28th (twenty eighth) day after the date on which he received the reference, then either the Employer or the Contractor may, on or before the 28th (twenty eighth) day after the day on which he received notice of such decision, or on or before the 28th (twenty eighth) day after the day on which the said period of 28 days expired, as the case may be, give notice to the other party, with a copy for information to the Engineer, of his intention to commence Adjudication, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence Adjudication, as hereinafter provided, as to such dispute; no adjudication in respect thereof may be commenced unless such notice is given.

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

SUBCLAUSE 67.2 – AMICABLE SETTLEMENT

Delete the entire sub-clause 67.2 and replace with the following;

67.2 (a) Amicable Settlement

"Where notice of intention to commence adjudication as to a dispute has been in accordance with sub-clause 67.1, the parties shall attempt to settle such dispute amicably before the commencement of Adjudication, provided that, unless the parties otherwise agree, Adjudication may be commenced on or after the 14th (fourteenth) day after the day on which notice of intention to commence adjudication of such dispute was given, even if an attempt at amicable settlement thereto has been made."

67.2 (b) Adjudication

The adjudication shall commence when it shall be referred in writing to the Dispute Adjudication Board (the "Board") for its decision. Such reference shall state that it is made under this clause.

1. Unless the member or members of the board have been previously mutually agreed upon by the parties and named in the Contract, the parties shall within 28 days of the Engineer's Decision date jointly ensure the appointment of the Board. The Board shall comprise of suitably qualified persons as members, the number of members being either one or three as stated in the Appendix to form of Tender. If the board is to comprise three members each party shall nominate one member and the two members shall mutually agree upon and appoint the third member (who shall act as chairman)
2. The terms of appointment of the Board shall include: -

- a) An hourly rate which if not otherwise agreed shall be the average of the rates set by the Chartered Institute of Arbitrators for the class of membership of the member save that the rates for associate membership shall apply to non - members;
 - b) A retainer monthly rate equal to 12 times the hourly rate;
 - c) The hourly rate shall apply when the board members are attending site, travelling and/or engaged in actual dispute resolution work. A member of the board throughout his appointment will act independently at all times without bias or favour;
 - d) Members of the board to act impartially and in accordance with the Contract;
 - e) Undertakings by the parties (to each other and to Board) that the members of the Board shall under no circumstances be liable for anything done or omitted in the discharge of their functions unless the act or omission is shown to have been in bad faith;
 - f) The Board shall be free to pay and seek refund from the parties of any expenses paid out by members of the board in connection with their work;
 - g) The Employer and the Contractor shall each be responsible for paying one half of the Board's remuneration.
3. The appointment of any member of the Board may be terminated (other than on a member's own initiative) only by mutual agreement of the Employer and the Contractor. The appointment of each member of the Board shall expire when the discharge referred to in sub-clause 60.7 shall have become effective, or at such other time as the parties may mutually agree.
4. If the parties so agree, they may at any time, appoint a suitably qualified person or persons to replace (or to be available to replace) any or all members of the Board. Unless the parties agree otherwise, the appointment will cease if a member of the Board declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. If any of such circumstances occur and no such member is available, the member shall be replaced in the same manner as he had been nominated or agreed upon.
5. If any of the following conditions apply, namely: -
- a) The parties fail to agree upon the appointment of the sole member of a one-person Board within 28 days of the commencement date;
 - b) Either party fails to appoint a member in a Board of three members, within 28 days of the commencement date;
 - c) The two members of the Board fail to agree upon the appointment of the third member (to act as chairman) for a Board of three members within 28 days from date of appointment of latest member;

- d) The parties or the members fail to appoint a replacement member of the Board within 28 days of the date on which a member of the Board declined to act or is unable to act as a result of death, disability, resignation or termination of appointment;

then the appointing body or official named in the Appendix to Form of Tender shall appoint such member of the Board on request of any party and such appointment shall be final and conclusive.

67.2 (c) Dispute Adjudication Board's Decision

1. When in accordance with sub-clause 67.2 (b) a dispute is referred by one party to the Board, a copy of such reference shall be sent by that party to the other party and (for information) to the Engineer. The parties shall promptly make available to the Board all such additional information, further access to the site, and appropriate facilities as the Board may require for the purposes of rendering a decision.
2. The rules published by the Chartered Institute of Arbitrators Kenya branch shall apply.
3. The Board shall have full power among other things to open up, review and revise any opinion, instruction, determination, certificate or valuation of the Engineer related to the dispute. No later than the 28th day after the day on which it received such a reference the Board acting as a panel of experts and not as arbitrator(s) shall give notice of its decision to the parties and for information to the Engineer. Such decision, which shall be reasoned, shall state that it is given under this Sub-Clause.
4. Unless the Contract has already been repudiated or terminated, the Contractor shall in every case continue to proceed with the works with all due diligence and the Contractor and the Employer as well as the Engineer shall give effect forthwith to every decision of the Board notwithstanding the fact that there may be a party dissatisfied as shown thereunder.
5. If either party is dissatisfied with the Board's decision, then either party on or before the 28th (twenty eighth) day after the day on which it received notice of such decision, may refer the decision to Arbitration.
6. If the Board has given notice of its decision as to a matter in dispute to the Employer, the Contractor and the Engineer and no notice of dissatisfaction has been given by either party on or before the 28th (twenty eighth) day after the day on which the parties received the Board's decision, then the Board's decision shall become final and binding upon the Employer and the Contractor.

67.2 (d) Failure to Comply with the Board's Decision

Where neither party has given notice of dissatisfaction within the period in Sub-Clause 67.2 (c) and Board's related decision, if any has become final and binding either party may, if the other party fails to comply with such decision and without prejudice to any other rights it may have, refer the failure

itself to Arbitration under Sub-Clause 67.3. The provisions of Sub-clause 67.2 shall not apply to any such reference.

67.2 (e) Expiry of the Board's Appointment

When the appointment of the members of the Board, including any replacement, has either been terminated or has expired, any such dispute referred to in Sub-clause 67.2 shall be finally settled by Arbitration pursuant to Sub-clause 67.3. The provisions of Sub-clause 67.2 shall not apply to any such reference.

SUBCLAUSE 67.3 – ARBITRATION

Delete all the words from line 6 onwards beginning with the words "unless otherwise" up to line 8 ending with the words "... under such rules", and substitute with the following:

"by an arbitrator to be agreed upon between the parties or failing agreement to be nominated on the application of either party by the appointee designated in the form of Tender for the purpose and any such referee shall be deemed to be a submission to arbitration within the meaning of the Arbitration Laws of the Republic of Kenya.

SUB-CLAUSE 68.2 – NOTICES TO EMPLOYER AND ENGINEER

Delete in Sub-Clause 68.2 the words "nominated for that purpose in Part II of these conditions".

- a. The Employer's address is:
The Director General
Kenya Rural Roads Authority
Blue Shield Towers, 6th Floor
P.O. Box 48151 – 00100
NAIROBI.

- b. The Engineer's address is:
The Director (Development)
Kenya Rural Roads Authority
Blue Shield Towers, 6th Floor
P.O. Box 48151 – 00100
NAIROBI.

SUB-CLAUSE 68.4 – CORRESPONDENCES

All letters and notices from the Contractor to the Employer and/or the Engineer must be signed by the Managing Director or the person given written power of Attorney.

CLAUSE 69 – DEFAULT OF EMPLOYER

Delete in Sub-Clause 69.1 (a) the words ("28 days") and insert the words "Fifty Six (56) days".

Delete Sub-Clause 69.1 (c)

Delete in Sub-Clause 69.4 line 4 the words "(28 days)" and insert the words "sixty (60) days".

In Sub-Clause 69.4 add at the end of the first paragraph the following “the period of such suspension shall be as agreed upon by both parties and in any case not more than six (6) months”.

In Sub-Clause 69.4 (b) insert at the end “The amounts of such costs which shall be added to the Contract Price shall exclude any cost due to idle time for equipment, plant and labour”.

CLAUSE 70 – CHANGES IN COST AND LEGISLATION

SUB-CLAUSE 70.1- PRICE ADJUSTMENT

The amounts payable to the Contractor, in various currencies pursuant to Sub-Clause 60.1, shall be adjusted in respect of the rise or fall in the cost of labour, Contractor’s Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause.

SUB-CLAUSE 70.2- OTHER CHANGES IN COST

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

SUB-CLAUSE 70.3-ADJUSTMENT FORMULAE

The adjustment to the Interim Payment Certificates in respect of changes in cost and legislation shall be determined from separate formulae for each of the currencies of payment and each of the types of construction work to be performed and Plant to be supplied. The formulae will be of the following general type:

$$pn = A + b \frac{Ln}{Lo} + c \frac{Mn}{Mo} + d \frac{En}{Eo} + etc.$$

Where:

pn is a price adjustment factor to be applied to the amount in each specific currency for the payment of the work carried out in the subject month, determined in accordance with Paragraph 60.1 (d), and with Paragraphs 60.1 (e) and (f), where such variations and day works are not otherwise subject to adjustment;

A is a constant, specified in the Appendix to Bid, representing the non-adjustable portion in contractual payments;

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

Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements in the specific currency of origin for month “**n**,” determined pursuant to Sub-Clause 70.5, applicable to each cost

element; and **Lo, Mo, Eo**, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 70.5.

If a price adjustment factor is applied to payments made in a currency other than the currency of the source of the index for a particular indexed input, a correction factor **Zo/Zn** will be applied to the respective component factor of **pn** for the formula of the relevant currency. **Zo** is the number of units of currency of the country of the index, equivalent to one unit of the currency of payment on the date of the base index, and **Zn** is the corresponding number of such currency units on the date of the current index.

SUB-CLAUSE 70.4- SOURCES OF INDICES AND WEIGHTINGS

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

SUB-CLAUSE 70.5-BASE, CURRENT, AND PROVISIONAL INDICES

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

SUB-CLAUSE 70.6- ADJUSTMENT AFTER COMPLETION

If the Contractor fails to complete the Works within the time for completion prescribed under Clause 43, adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favourable to the Employer, provided that if an extension of time is granted pursuant to Clause 44, the above provision shall apply only to adjustments made after the expiry of such extension of time.

SUB-CLAUSE 70.7-WEIGHTINGS

The weightings for each of the factors of cost given in the Appendix to Bid shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work already executed or instructed under Clause 51 or for any other reason.

SUB-CLAUSE 70.8-SUBSEQUENT LEGISLATION

If, after the date 28 days prior to the latest date for submission of bids for the Contract, there occur in the country in which the Works are being or are to be executed changes to any National or State

Statute, Ordinance, Decree, or other Law or any regulation or by-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation, or by-law that causes additional or reduced cost to the Contractor, other than under the preceding sub-clauses of this clause, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same shall already have taken into account in the indexing of any inputs to the Price Adjustment Formulae in accordance with the provisions of Sub-Clauses 70.1 to 70.7.

SUB- CLAUSE 70.9: MAXIMUM PRICE ADJUSTMENT

Despite the provisions of sub- clause 70.1 to 70.8 the maximum Price Adjustment shall not exceed 15% of the value of works during the approved construction period.

SUB- CLAUSE 70.10: PRICE ADJUSTMENT FOR MAINTENANCE WORKS

Maintenance works will be subjected to VOP adjustment

CLAUSE 72 – RATES OF EXCHANGE COST

Delete clause 72 in its entirety and substitute the following:

The currency of BID and payment is Kenya Shillings and rates of exchange requirements are not applicable.

CLAUSE 73 – BRIBERY AND COLLUSION

Add new Clause 73.1:

“The Contractor shall not:

- (a) Offer or give or agree to give to any person in the service of the Government of Kenya any gift or consideration or 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 to which the Government of Kenya is a party or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Government of Kenya.
- (b) Enter into this or any other contract with the Government of Kenya in connection with which commission has been paid or agreed to be paid by 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) or the commission of any offence by the Contractor or by anyone employed by him or acting on his behalf in relation to this or any other contract to which the Government of Kenya is a party shall entitle the Employer to determine the Contract (See Condition 63 hereof) and/ or to recover from the Contractor the amount or value of any such gift, consideration or commission.

Any dispute or difference of opinion arising in respect of either the interpretation effect or application of this condition or of the amount recoverable hereunder by the Employer from the Contractor shall be decided by the Employer, whose decision shall be final and conclusive.

CLAUSE 74: - CONTRACT TO BE CONFIDENTIAL

Add new Sub-Clause 74.1:

The Contractor shall treat the details of this Contract as Private and Confidential and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere (save in so far as may be necessary for the purpose thereof) without the previous consent in writing of the Government. If any dispute arises as to the necessity of any publication or disclosures for the purposes of this Contract the same shall be referred to the decision of the Engineer mentioned in the said Conditions of Contract whose award shall be final.

SECTION 7:

SCHEDULES OF SUPPLEMENTARY INFORMATION

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SCHEDULE 1: CONFIDENTIAL BUSINESS QUESTIONNAIRE

This Confidential Business Questionnaire of the Government of Kenya shall be completed by the Bidder.

REPUBLIC OF KENYA

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2(b) or 2(c) 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

.....

Plot No.Street/Road

Postal Address.....Tel No.

Nature of business.....

.....

Current Trade Licence No.Expiring date

Maximum value of business which you can handle at any one time:

Kshs.....

Name of your bankers.....

Branch.....

Are you registered as a contractor with National Construction Authority? Yes/No**

Part 2(a) - Sole Proprietor:

Your name in full

.....

Age.....

NationalityCountry of origin

*Citizenship details

Part 2(b) - Partnership:

Give details of partners as follows:

Name	Nationality	Citizenship Details*	Shares
1.....			
2.....			
3.....			
4.....			
5.....			

Part 2(c) - Registered Company:

Private or public

State the nominal and issued capital of the company-

Nominal Kshs.

Issued Kshs.

Give details of all directors as follows:

Name	Nationality	Citizenship Details*	Shares
1.....			
2.....			
3.....			
4.....			
5.....			

Part 2(d)- Interest in the Firm:

Is there any person / persons in the Kenya Rural Roads Authority who has interest in this firm? Yes /No**

.....
Date

.....
Signature of Bidder

- * Attach proof of citizenship
(Compulsory)
- ** Delete as necessary

SCHEDULE 2: FORM OF WRITTEN POWER OF ATTORNEY

The Bidder shall state here below the name(s) and address of his representative(s) who is/are authorized to receive correspondence and act on his behalf in connection with the Bid.

.....
(Name of Bidder's Representative in block letters)

.....
(Address of Bidder's Representative)

.....
(Signature of Bidder's Representative)

Alternate:

.....
(Name of Bidder's Representative in block letters)

.....
(Address of Bidder's Representative)

.....
(Signature of Bidder's Representative)

NOTE: TO BE FILLED BY ALL BIDDERS.

SCHEDULE 4: SCHEDULE OF BASIC RATES OF MATERIALS

(Ref: Conditions of Contract Part II, Clause 70)

This schedule has been omitted in view of the clarifications on clause 70 of the Conditions of Contract Part II (COPA), given in Section 6B.

I certify that the above information is correct.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 5: KEY PERSONNEL

DESIGNATION	NAME	NATIONALITY	SUMMARY OF QUALIFICATIONS AND EXPERIENCE		
			Educational	General Experience (Yrs)	Relevant Experience (Yrs)
Headquarters Partner/Director or other key staff (give designation)					
Site Office Site Agent Deputy Site Agent/Site Engineer. Senior Foreman Site Surveyor Other Key Staff Foremen (i) Earthworks/Pavement (ii) Bituminous works (iii) structures/Drainage					

Note: The Bidder shall list in this schedule the key personnel he will employ from the Contractor’s headquarters and from the Contractor’s site office to direct and execute the work together with their qualifications, experience, position held and nationality in accordance with Clause 15.2 and 16.3 of the Conditions of Contract Part II (where required, use separate sheets to add extra data for column 4).

Bidders shall attach CV’s of key personnel, which should be signed by the staff and certified by a Commissioner of Oaths.

I certify that the above information is correct.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 6: SCHEDULE OF ROADWORKS CARRIED OUT BY THE BIDDER

DESCRIPTION OF WORKS	NAME AND ADDRESS OF CLIENT/ EMPLOYER	CONTRACT SUM (KSHS) *	YEAR STARTED	YEAR COMPLETED
<u>A) Non-completed Works</u>				
<u>B) Completed Works</u>				
<u>C) Specific Construction Experience</u>				

I certify that the above works were successfully carried out by me(the bidder), and that the above information is correct (**attach completion certificates**).

.....
(Signature of Bidder)

.....
(Date)

**Value in KShs using Central Bank of Kenya mean exchange rate at a reference date 7 days before date of BID opening.*

SCHEDULE 7: SCHEDULE OF ONGOING PROJECTS

DESCRIPTI ON OF WORKS	NAME AND ADDRESS OF CLIENT	DATE OF COMMEN CEMENT	DATE OF COMPLETI ON	CONTRAC T SUM (KSHS)	VALUE COMPLETED TO-DATE %	PHYSICALL Y COMPLETE D UP TO DATE %

--	--	--	--	--	--	--

I certify that the above works are being carried out by me and that the above information is correct **(attach award letters)**.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 8: SCHEDULE OF LOCAL LABOUR BASIC RATES

(Ref: Conditions of Contract Part II, Clause 70)

This schedule has been omitted in view of the Clarifications on Clause 70 of the Conditions of Contract Part II (COPA), given in Section 6B.

NOTE: Categories to be generally in accordance with those used by the Kenya Building Construction Engineering and Allied Trade Workers Union, Collective Bargaining Agreement (CBA).

I certify that the above information is correct.

.....
Signature of Bidder

.....
Date

SCHEDULE 9: FINANCIAL STANDING

- 1 Submit copies of audited profit and loss statements and balance sheet for the last three calendar years with certified English translation where appropriate.
- 2 Give turnover figures for each of the last three (3) financial years. Quote in millions and decimal thereof.

	Year 2018	Year 2017	Year 2016
	Kshs.	Kshs.	Kshs.
Roadworks			
Other Civil Engineering Works			
Other (specify)			
Total			

SUMMARY OF ASSETS AND LIABILITIES OF THE AUDITED FINANCIAL STATEMENTS OF THE LAST THREE (3) FINANCIAL YEARS

	Year 2018	Year 2017	Year 2016
	KShs.	KShs.	KShs.
1. Total Assets			
2. Current Assets			
3. Bank Credit Line Value			
4. Total Liabilities			
5. Current Liabilities			
6. Net Worth (1-4)			
7. Working capital (2+3-5)			

- (a) Name/Address of Commercial Bank providing credit line specific to the project

.....

- (b) Total amount of credit line KShs.....

Attach certified copies of financial bank statements of the last three years.

Attach a certified copy of Undertaking of the Bank to providing the credit.

SCHEDULE 10: OTHER SUPPLEMENTARY INFORMATION

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

.....

2. Evidence of access to financial resources to meet the qualification requirements. Cash in hand, lines of credit etc. List below and attach copies of supporting documents. Lines of Credit should be supported by credit ratings from a recognised Credit Rating Bureau approved by the Central Bank of Kenya (Otherwise they will be assumed to be invalid).

.....

3. Name, address, telephone, telex, fax numbers of the Bidders Bankers who may provide reference if contacted by the Contracting Authority.

.....

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

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

I certify that the above information is correct.

.....
Signature of Bidder

.....
Date

SCHEDULE 11: WORK METHODOLOGY

Give a brief description of how you intend to carry out the work including traffic management, quality assurance of works and any designs to be carried out by the Bidder, in not less than five (5) pages and not more than fifteen (15) pages.

SECTION 8:
FORM OF AGREEMENT

SECTION 8: FORM OF AGREEMENT

THIS AGREEMENT is made on the day of 20 between the The Director General, Kenya Rural Roads Authority of P. O. Box 48151-00100, Nairobi, Kenya hereinafter called "the Employer" of the one part and hereinafter called "the Contractor" of the other part.

WHEREAS the Employer is desirous that certain works should be executed, viz.

Upgrading to Bitumen Standards and Performance Based Routine Maintenance Of: IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO - GACHATHA, GACHATHA – KANGAITA – ITHEKAHUNO - GATIKI ROADS(Rwc 561)

and has accepted a Bid by the Contractor for the execution completion and maintenance of such works,

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 document shall be deemed to form and be read and construed as part of this Agreement, viz.:
 - a). The Letter of acceptance
 - b). The said BID and Appendix to Tender
 - c). The Conditions of Contract Part II
 - d). The Conditions of Contract Part I
 - e). The Special Specifications
 - f). The Standard Specifications for Road and Bridge Construction, 1986 Edition.
 - g). The Drawings
 - h). Schedules of Supplementary Information
 - g). The Priced Bill of Quantities
 - i). Other documents as may be agreed and listed

All aforesaid documents are hereinafter referred to as "The Contract"

3. In consideration of the payment to be made by the Employer to the Contractor, the

Contractor hereby covenants with the Employer to execute, complete and maintain the works in conformity in all respects with the provisions of the Contract.

The Employer hereby covenants to pay the Contractor in consideration of the execution, completion and maintenance of the works the Contract Price at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused their respective common seals to be hereto affixed (or have hereunto set their respective hands and seals) on the day and year first above written.

SIGNED SEALED AND DELIVERED

By the said Employer:
(Director General, Kenya Rural Roads Authority)
For and on behalf of the said Employer

In the presence of:
(Name and Designation of Witness)
.....
(Signature of Witness)
.....
(Address of witness)

By the said Contractor:

In the presence of:
(Name and Designation of Witness)
.....
(Signature of Witness)
.....
(Address of witness)

TO: **The Director General** _____ [Date]

**Kenya Rural Roads Authority
Blue Shield Towers - 6th Floor
P. O. Box 48151 - 00100
Nairobi**

Upgrading to Bitumen Standards and Performance Based Routine Maintenance Of: IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO - GACHATHA, GACHATHA – KANGAITA – ITHEKAHUNO - GATI KI ROADS(Rwc 561)

Dear Sir,

1. **IMPROVEMENT Works:** In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities/Schedule of Rates for the execution of the above 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
Shilling _____
_____ [Amount in words]- VAT Included.
2. **Performance based Routine maintenance:** We offer to execute in conformity with the Bidding Document the routine maintenance and repairs on and off carriageway and emergency works as instructed for the Contract period of **30** months. Our bid price is Kshs. _____ [Amount in figures] Kenya
Shillings _____
_____ [Amount in words]- VAT Included.
3. **Total Bid Price** (1) + (2) Kshs. _____ [Amount in figures]
Kenya Shillings _____
_____ [Amount in words].
4. We undertake, if our Tender is accepted, to commence the Works on the commencement date and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix.

5. 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.
6. 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.
7. 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 _____

SECTION 9:

FORMS OF UNCONDITIONAL;

- i. PERFORMANCE BANK GUARANTEE**
- AND**
- ii. ADVANCE PAYMENT GUARANTEE**

PERFORMANCE BANK GUARANTEE

To: The Director General,
Kenya Rural Roads Authority,
Blue Shield Towers, 6th Floor,
P.O. Box 48151-00100,
NAIROBI

WHEREAS
(hereinafter called “the Contractor”)

has undertaken in pursuance of Contract No Datedto
execute the **Upgrading To Bitumen Standards And Performance Based Routine
Maintenance Of: IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO -
GACHATHA, GACHATHA – KANGAITA – ITHEKAHUNO - GATIKI ROADS(Rwc
561)**

(“hereinafter called the “Contract”)

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 in the Appendix
to Form of Bid 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 in
figures)

Kshs.....

...

.....(amount
in words)

and we undertake to pay to you, upon your first written demand and without cavil or argument,
any sum or sums within and up to the limits as aforesaid without your needing to prove or show
grounds or reasons for the sum specified therein.

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

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

This Guarantee shall be valid until 28 days after issuing of the Taking over certificate.

SIGNATURE AND SEAL OF GUARANTOR (BANK).....

Name of Signatory.....**Designation**.....

Name of Bank.....

Address.....**Date**.....

BANK GUARANTEE FOR ADVANCE PAYMENT

To: The Director General,
Kenya Rural Roads Authority,
Blue Shield Towers, 6th Floor,
P.O. Box 48151 - 00100,
NAIROBI.

**Upgrading to Bitumen Standards and Performance Based Routine Maintenance Of:
IHWA - IHURURU, NDUGAMANO – GURA/ NDUGAMANO - GACHATHA,
GACHATHA – KANGAITA – ITHEKAHUNO - GATIKI ROADS
CONTRACT RWC 561**

Dear Sir,

In accordance with the provision of the Conditions of Contract, sub-clause 60.12 (“Advance Payment”) of the above – mentioned contract,.....

.....
..
(hereinafter called the “Contractor”) shall deposit with the Director General, Kenya Rural Roads Authority, a Bank Guarantee to guarantee his proper and faithful performance under the said Clause of the contract in an amount equal to ten (10) % of the contract price, i.e.

Kshs.....(amount in figures)

Kshs.....
...

.....(amount in words)

We, (The Bank)..... as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to the Director General, Kenya Rural Roads Authority, on his first demand without what-so-ever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding,

Kshs.....(amount in figures)

Kshs.....
...

.....(amount
in words)

in the event that the obligations expressed in the said clause of the above mentioned contract have not been fulfilled by the Contractor giving right of claim to the Employer for recovery of the whole or part of the advance payment from the Contractor under the contract.

We further agree that no additional to or other modification of the terms of the Contract or of the Works to be performed there under or of the Contract documents which may be made between the Director General, Kenya Rural Roads Authority and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any change or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the contract until the Director General, Kenya Rural Roads Authority, P.O. Box 48151-00100 Nairobi- Kenya, receives full payment of the same amount from the Contractor.

This guarantee shall be reduced pro rata with the deductions from the down payment made on the Interim Certificates in Accordance with Sub – Clause 60.12 of the Conditions of Contract.

Any dispute over the interpretation of the conditions of this letter of Guarantee shall be subject to the Laws of the Republic of Kenya.

After expiry, this document shall be returned to us for cancellation.

SIGNATURE AND SEAL OF BANK:

.....

Name **of**
Signatory.....**Designation**.....

Name **of**
Bank.....

Address.....**Date**.....

SECTION 10:
STANDARD SPECIFICATIONS

SECTION 10: STANDARD SPECIFICATIONS

The Standard Specifications referred to in this document is the *Standard Specifications for Road and Bridge Construction, 1986 Edition* published by the Ministry of Transport and Communications. This document shall form part of the Contract.

Work shall be carried out in accordance with the Standard Specification except as supplemented or revised in the Special Specification.

REPUBLIC OF KENYA



STANDARD SPECIFICATION FOR ROADS

AND

BRIDGE CONSTRUCTION

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SECTION 1 – GENERAL

100 SPECIAL SPECIFICATIONS.

Special specification is supplementary to the Standard Specifications and the two must be read in conjunction. In any case where there appears to be conflict between the two then the Special Specifications will take precedence.

101 LOCATION OF PROJECT

The project roads are located in Nyeri County Tetu Constituency and are approximately 32 km long. Comprising of loops listed in the table below;

S/NO.	Link Name	Length (Km)
1	Ihwa - Ihururu	9
2	Ndugamano – Gura/ Ndugamano - Gachatha	10
3	Gachatha – Kangaita – Ithekahuno - Gatiki Roads	13
Total		32

The roads traverse hilly with Coffee, tea, and horticulture being the main cash crops. Maize, beans, bananas and sweet potatoes are also grown for substance consumption. Dairy farming is also practised in the area.

102 EXTENT OF CONTRACT.

The major works to be executed under the Contract comprise mainly of but are not limited to the following:

1. Provision of facilities to the supervising Engineers.
2. Site clearance and top soil removal.
3. Earthworks.
4. Construction of 150mm improved subgrade as shown on the drawings or as instructed by the Engineer.
5. Provision of lime improved gravel for Subbase of minimum CBR of 30% (G30) to a finished thickness of 150mm or as instructed by the Engineer. Extend this to the shoulders
6. Construction of Cement/lime Improved Gravel Base of finished thickness of 125mm and minimum CBR of 160% (CIG160) on carriageway and shoulders.
7. Provision of asphalt concrete type II as wearing course to carriageway to a finished thickness of 35mm or as instructed by the Engineer. Extend this to the shoulders
8. The carriageway shall be 6m wide with shoulders (each 0.5m wide) constructed with the material and thickness for sub-base and base as above.

9. Construction of standard pipe culverts, bridges, box culverts and the improvement of other drainage and soil erosion protection works.
10. Relocation of services as necessary
11. Installation of road furniture.
12. Maintenance of passage of traffic through and around the works.
13. Maintenance of works during construction and defects liability period. The defects liability period shall be 12 months.
14. Any other activity not listed above in either category but deemed to be necessary by the Engineer, shall be subject to the Engineer's formal instructions and within the mode of payment stipulated either by day-works or on a measured basis.

104 PROGRAMME OF EXECUTION OF THE WORKS

The Contractor shall provide the works programme, required under clause 14 of the Conditions of Contract, within 21 days of receipt of the Engineer's Order to commence work.

The programme shall be co-ordinated with climatic and other conditions to provide for the completion of the works in the order and by the time specified.

The Contractor shall carry out the contract in accordance with the programme agreed with the Engineer, but he shall in no manner be relieved by the Engineer's approval of the programme, of his obligation to complete the works in the prescribed order and by the prescribed completion date and he shall from time to time review his progress and make such amendments to his rate of execution of the works as may be necessary to fulfil his obligations.

105 ORDER OF EXECUTION OF WORKS

In addition to Clause 105 of the Standard Specification the Contractor shall carry out the Works such that a continuous and consecutive output of fully completed work is achieved.

107 TAKING OVER CERTIFICATE

The minimum portion of the Works for which a certificate will be issued is a **sections/road links of not less than 20km** as stated in Clause 101 of Section 1 of the Special Specifications when substantially completed.

108 METHOD OF CONSTRUCTION AND HOURS OF ATTENDANCE BY THE ENGINEER'S REPRESENTATIVE ON SITE

- a) At the commencement of the contract the Contractor will submit in writing to the Engineer, the hours which shall be considered normal working hours, together with the day of the week to be set aside for rest. When approved these shall be maintained throughout the continuance of the Contract.
- b) Notwithstanding the provision of the last paragraph of clause 108 of the Standard Specification, the Engineer's Representative normal working hours shall be 8 hours from Monday to Friday and 5 hours on Saturday with Sunday set aside for rest.

If the Contractor wishes to execute permanent works outside these hours, he shall meet any extra costs arising thereof in addition to giving a day's notice in writing.

109 NOTICE OF OPERATIONS

Add the following sub- Clause.

Notification Terms

It shall be the Contractor's responsibility to notify the Engineer when any item of works scheduled are completed and ready for approval, and the Contractor shall give sufficient notice to allow control test to be performed.

Explosive and Blasting

- (a) The requirements of the Laws of Kenya governing explosives and other requirements and regulations of Government of Kenya and other authorities shall be complied with.
- (b) No explosives of any kind shall be used without prior written consent of the Engineer.
- (c) The Contractor shall be solely responsible for the provision, handling, and storage and transporting of all explosives, ancillary materials and all other items of related kind whatsoever required for blasting.

117 HEALTH, SAFETY AND ACCIDENTS

Add the following:

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

The contractor shall take an active role in civic and public health education for his employees and the community in general. To this end, he shall liaise with the Ministry of health District AIDS Coordinator with respect to drawing up and carrying out HIV/AIDS awareness programmes and VCT campaigns for his staff, and initiate and coordinate these as detailed in Clause 143 of the Specifications.

Bill No. 25 is included in the Bills of Quantities for HIV/AIDS awareness/counselling/VCT activities. The Contractor shall in consultation with local service providers/National Aids Council District Office develop and include in his tender an HIV/AIDS awareness, VCT programme and cost estimates for approval by the Supervisor, to be funded under this item.

The Contractor shall allow the dissemination and appropriate intervention and remedial measures to curb the spread of HIV/AIDS scourge within his camps. These measures will include making condoms readily available to all his staff.

The Contractor shall maintain records of health and safety and make reports concerning the health and safety of his employees as the Supervisor may from time to time prescribe. The Contractor shall at all times take the necessary precautions to protect all staff and labour employed on the site from insect nuisance, rats and other pests and reduce the dangers to health and the general nuisance occasioned by the same. The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the site an adequate supply of drinking and other water for the use of his staff and labour.

The Contractor shall allow in his prices and be responsible for the cost of all site welfare arrangements.

119 USE OF EXPLOSIVES

The Contractor shall ensure that he complies with the current Government regulations with regard to explosives. No explosives of any kind shall be used without prior consent of the Supervisor. The Contractor shall be solely responsible for the provision, handling, storage and transporting of all explosives ancillary materials and all other items of related kind whatsoever required for blasting.

120 PROTECTION OF EXISTING WORKS

The appropriate provisions of Section 1 of the Standard Specifications in regards to protection of existing works and services shall be adhered to in all respects.

The Contractor's attention is drawn to the fact that it is essential to maintain existing power, telephone, water, sewage and other services throughout the Contract Period.

The Contractor shall give all assistance to Engineers of the Telkom Kenya, the Kenya Power and Lighting Co. Ltd., the Ministry of Water and other relevant authorities to maintain the serviceability of their installations.

DIVERSION OF SERVICES

The Contractor shall acquaint himself with the location of all existing services such as telephone lines, electricity cables, water pipes, sewers etc., before execution of any works that may affect the services. The cost of determining the location of the existing services together with making good or repairing of any damage caused all to the satisfaction of the Engineer shall be included in the BID rates.

If it should become necessary, for the proper execution of the work, temporary, to remove or divert any existing pipe, cable, drain or other service, the Contractor shall obtain permission from the competent authority or owner for removal or diversion to be effected. The Contractor shall carry out all necessary work in such a manner and at such times as may be approved by such authority or owner. The cost of all removal, diversion and reinstatement and all things connected therewith shall be paid for by the Contracting Authority through the Construction Contract.

If in the opinion of the Supervisor or of the competent authority or owner, it should become necessary permanently to remove or realign any existing pipe, cable or other service, the Contractor shall obtain permission from the competent authority or owner for the removal or realignment to be effected. The Contractor shall carry out all necessary work in such a manner and at such times as may be approved by such authority or owner and the completed work shall be to the satisfaction of such authority or owner. The cost of all permanent removal and realignment and all things connected therewith shall be paid for by the Contracting Authority through the Construction Contract.

Any of the work involving repair, replacement of existing pipes, cables or other services shall be carried out by the competent authority or owners if they so desire, in which case the Contractor shall allow them the facilities and assistance they may require and shall pay the full expense of such work and all things connected therewith in the first instance, but the cost shall be paid for by the Contracting Authority through the Construction Contract.

The Contractor shall allow in his rates for the programming of his work to allow for the necessary diversion of any services.

Subject to the agreement with the Engineer, the Contractor shall be responsible for removal of alteration and relocation of existing services.

The Contractor shall indemnify the Employer against claims originating from damage to existing services or works.

123 LIAISON WITH GOVERNMENT AND POLICE OFFICIALS

The Contractor shall keep in close touch with the Police and the other Government officials of the area regarding their requirements in the control of traffic, or other matters, and shall provide all assistance or facilities, which may be required by such officials in the execution of their duties.

124 LAND FOR ALL CAMPS SITES AND FOR THE CONTRACTOR'S OWN PURPOSES, INCLUDING TEMPORARY WORKS.

On or before completion of the Contract, the Contractor shall remove all temporary works and shall restore all such land to the condition in which it was immediately prior to the occupation thereof as far as is reasonable and practicable. No separate payment will be made to the Contractor on account of these items and the Contractor must make due allowance for them in his rates.

Notwithstanding Clause 120 of the Standard Specifications, the Contractor shall be required to appoint competent surveyors who will liaise with the Engineer on matters related to the demarcation of the existing road reserve, site measurements, removal and reinstatement of existing services.

126 MATERIAL AND MANUFACTURED ARTICLES

Notwithstanding the provision of clause 126 of the Standard Specification, the Contractor's attention is drawn to his obligation with regard to quality and delivery schedule of materials and goods obtained from suppliers. Should the Engineer at any time be dissatisfied with any goods and materials intended for use or used by the contractor upon the works, he shall be empowered to reject goods and materials and shall order that they be replaced by others of acceptable quality. Any more work that may consequently have to be redone and the cost thereof of the new suppliers shall all be borne by the Contractor.

127 INFORMATION FROM EXPLORATORY BORING AND TEST PITS

Notwithstanding the provisions of clause 127 of the Standard Specification, the materials report if made available to bidders will not form part of the contract documents and will only be for information. The Engineer will not be responsible for the suitability of the borrow pits provided by him or shown on the drawings.

128 STORAGE OF MATERIALS

All materials shall be stored on Site in a manner approved by the Engineer and the Contractor shall carefully protect from the weather all work and materials which may be affected thereby.

129 TEST CERTIFICATES

When instructed by the Engineer the Contractor shall submit certificates of test from the suppliers of materials and goods required in connection with the works as the Engineer may require.

Such certificates shall certify that the materials or goods concerned have been tested in accordance with the requirements of the specifications and shall give the results of all the tests carried out. The Contractor shall provide adequate means of identifying the materials and goods delivered to the site with the corresponding certificates.

131 SIGNBOARDS

The Contractor shall provide and erect six (6) publicity signboards on the site as directed. The Engineer shall, as shown in the Drawings, direct the minimum dimensions of the boards. The boards shall be prepared, primed and painted cream and lettered in black. The boards shall be of stout construction, resistant to the effects of weather.

132 HOUSING ACCOMMODATION FOR THE RESIDENT ENGINEER AND HIS STAFF, OFFICE AND LABORATORY INCLUDING FURNITURE

132.1 HOUSING AND ACCOMMODATION FOR THE ENGINEER'S SENIOR STAFF

The contractor shall provide rent for the Engineer's site staff. This staff will generally comprise but not limited to the following;

Designation	Number
Resident Engineer	1
Assistant Resident Engineer	1
Materials Engineer	1
Surveyor	1
Senior Inspector	1
Senior Lab. Technologist	1
Inspectors	4
Lab Technician	3
CAD Technician	1

Payment shall be as per the bills of quantities.

132.4 HOUSING ACCOMMODATION FOR ENGINEER'S JUNIOR STAFF

The Contractor shall provide rent for the Engineer's junior staff.

132.5 LIST OF FURNITURE FOR ENGINEER'S STAFF HOUSES

The contractor shall provide new furniture, equipment and fittings to the approval of the Engineer.

All the furniture mentioned below shall revert to the contractor after the completion of the contract.

New furniture to the approval of the Supervisor shall be provided in each staff house on the following scale:

<u>SCALE OF FURNITURE</u>	<u>TYPE I</u>
Double bed with mattress, pillows, sheets and blankets	1
Single bed with mattress, pillows, sheets and blankets	4
Dressing table with mirror	2
Stool (for dressing table)	2
Chest of 5 No. drawers (with mirrors)	2
Wardrobe (built-in or movable)	4
Bedside cabinet	4
Bedside light	4
Stool (for bathroom)	1
Towel rail	4
Bedroom chair	4
Dining table	1
Dining chairs	6
Side board	1
Settee (7-seats)	1
Armchair with cushions	4
Coffee Table	1
Occasional tables	3
Bookcase	1
Standard lamp	2
Writing table with chair	1
Water filter	1
Refrigeration (400 litre capacity) incl. 1 deep freeze Compartment (100 litre capacity)	1
Lampshades	For all lights
Curtains with pelmets windows	On all

External security lights	4
Dustbins	2
Electric Cooker (with four rings, grill and oven)	1
or Gas Cooker (four burners, grill and oven, with two gas cylinders)	1
Kitchen shelves (per sq.m)	2
Kitchen Table	1
Kitchen chairs	5
Electric Kettle	1
Glass ware, cutlery, crockery, kitchen utensils, etc. for 6 persons	

SCALE OF FURNITURE

TYPE II

Double bed with mattress, pillows, sheets and blankets	1
Single bed with mattress, pillows, sheets and blankets	3
Dressing table with mirror	1
Stool (for dressing table)	2
Chest of 5 No. drawers (with mirrors)	2
Wardrobe (built-in or movable)	3
Bedside cabinet	3
Bedside light	3
Stool (for bathroom)	1
Towel rail	3
Bedroom chair	3
Dining table	1
Dining chairs	6
Side board	1
Settee (5-seats)	1
Armchair with cushions	3
Coffee Table	1
Occasional tables	2
Bookcase	1
Standard lamp	2
Writing table with chair	1
Water filter	1
Refrigeration (400 litre capacity) incl. a deep freeze	
Compartment (100 litre capacity)	1
Lampshades	For all lights
Curtains with pelmets windows	On all

External security lights	2
Dustbins	1
Electric Cooker (with four rings, grill and oven)	1
or Gas Cooker (four burners, grill and oven, with two gas cylinders)	1
Kitchen shelves (per sq.m)	2
Kitchen Table	1
Kitchen chairs	4
Electric Kettle	1
Glass ware, cutlery, crockery, kitchen utensils, etc. for 6 persons	

SCALE OF FURNITURE

TYPE III

Single bed with mattress, pillows, sheets and blankets	3
Chest of drawers (with mirrors)	2
Bedside cabinet	3
Bedside light	3
Bedroom chair	2
Wardrobe (built-in or movable)	2
Towel rail	2
Dining table	1
Dining chairs	4
Side board	1
Settee (3-seats)	1
Coffee Table	1
Occasional tables	1
Bookcase	1
Standard lamp	2
Writing table	1
Kitchen Cabinet	1
Water filter	1
Refrigeration (300 litre capacity) incl. a deep freeze	
Compartment (100 litre capacity)	1
Lampshades	For all lights
Curtains with pelmets windows	On all
External security lights	2
Dustbins	1
Electric Stove (with four rings, grill and oven)	1
or Gas Stove (four burners, grill and oven, with two gas cylinders)	1

Glass ware, cutlery, crockery, kitchen utensils, etc. for 6 persons

SCALE OF FURNITURE

TYPE IV

Single bed with mattress, pillows, sheets and blankets	2
Chest of drawers (with mirrors)	1
Bedside cabinet	2
Bedside light	2
Bedroom chair	2
Wardrobe (built-in or movable)	1
Towel rail	1
Dining table	1
Dining chairs	4
Side board	1
Standard lamp	2
Writing table with chair	1
Kitchen Cabinet	1
Water filter	1
Refrigeration (200 litre capacity)	1
Lampshades	For all lights
Curtains with pelmets windows	On all
External security lights	2
Dustbins	1
Electric Stove (with 3 rings)	1
or Gas Stove (two burners, with one gas cylinder)	1
Glass ware, cutlery, crockery, kitchen utensils, etc. for 6 persons	

SCALE OF FURNITURE

TYPE V

Single bed with mattress, pillows, sheets and blankets	1
Chest of drawers (with mirrors)	1
Bedside light	2
Wardrobe (built-in or movable)	1
Towel rail	1
Dining table	1
Dining chairs	4
Side board	1
Standard lamp	2
Kitchen Cabinet	1

Water filter	1
Refrigeration (200 litre capacity)	1
Lampshades	For all lights
Curtains with pelmets windows	On all
External security lights	2
Dustbins	1
Electric Stove (with 3 rings)	1
or Gas Stove (two burners, with one gas cylinder	1

All furniture mentioned above shall revert to the contractor after the completion of the contract.

Payments shall be made under the relevant provisions in the Bills of Quantities.

132.7 ENGINEER'S OFFICE, FURNITURE AND EQUIPMENT

The Contractor shall provide a furnished and equipped main office of plan area not smaller than 155 metre squares that is equivalent of the MOR Standard Resident Engineer's Office. This office shall be of weather-proof construction, provided with mosquito proof and burglar-proof windows and lockable doors and suitably insulated against heat and cold, all to the satisfaction of the Engineer. The room to be occupied by the Engineer's Representative and its front office shall be provided with a floor carpet to be approved by the Engineer. All other floors shall be given a PVC tile finish using approved adhesive including 150mm wood skirting or superior finish. The windows shall be fitted with curtains and blinders.

The office for the Resident Engineer shall be completely separate from that of the Contractor.

Latrines and washrooms graded to staff seniority, together with a drinkable water supply and waterborne sewage disposal shall be provided for the office. The Contractor shall also provide 24 hours a day security and electricity supply to the offices and shall allow for any water and electricity consumed and for any statutory charges associated.

The main office shall revert to the Contractor at the end of the project.

The Contractor may be instructed by the Engineer under clause 58 of the General Conditions of Contract to make payments of general receipted accounts for such

items as stationery, stores, furniture and equipment, claims and allowances for supervision personnel and any miscellaneous claims or the Engineer may direct the Contractor to purchase or pay for the above. The Contractor will, on provision of receipts, be paid under appropriate bill items in the BOQ.

Further, the Contractor shall, as provided for in the Bills of Quantities provide and maintain the listed office furniture and equipment as specified in the Appendix to Bill item 1.03 of Bill of Quantities with a dealer's certificate and warranty accompanying the furniture and equipment.

All office furniture and equipment bought under the Contract shall revert to the Employer at the end of the project. Payment for provision of the office including the furniture shall be paid against the appropriate bill items in the BOQ.

132.8 ENGINEER'S LABORATORY AND SURVEY EQUIPMENT

The Contractor shall provide Engineer's laboratory as shown in the Book of Drawings and provide all the laboratory equipment, reagents and survey equipments as required by the Engineer. The Contractor shall be paid under appropriate bill items in the Bills of Quantities or on provision of receipts as required by the Engineer.

The Contractor may be directed to pay for stationery, equipment or reagents that are foresaid and also pay for servicing and repair of the laboratory equipment being used on the project.

The Contractor shall provide, install and maintain in a good state of repair, such laboratory, survey and other equipment as listed for the duration of the contract.

Such equipment shall be of approved manufacture, and shall be made available to the Engineer for the Engineer's exclusive use throughout the Contract, not later than three (3) weeks after the Engineer's order to supply. All equipment shall be ready to use and complete to perform the tests. The equipment shall revert to the Employer on completion of the Contract

Any delays to the Contractor or the Contractor's activities caused by the Engineer being unable to perform survey work, field or laboratory tests due to the Contractor's failure to supply and/or maintain the said equipment shall be deemed to have been caused entirely by the Contractor's own actions, and any consequences of such delays shall be interpreted as such.

The payment to comply with this requirement is provided in the Bill of Quantities and ownership of all equipment shall revert to the Employer after the completion of the Works.

Failure by the Contractor to provide or maintain the equipment shall make him responsible to bear all costs that may be incurred as a result of the Engineer's staff using alternative means of communication, including delays in supervision and approval of Works by the Engineer. List of Laboratory and Survey Equipment shall revert to the Employer at the end of the Contract.

The laboratory equipment shall be purpose-made for use in highways materials testing laboratories and shall comply with the relevant British (BS) or American (AASHTO) Standards.

Resident Engineer's Laboratory Furniture and Equipments

As listed in Appendix to Item 1.04 and 1.05 of the bills of quantities.

Resident Engineer's Survey Equipments

As listed in Appendix to Item 1.06 of the bills of quantities.

137.1 ATTENDANCE UPON THE ENGINEER AND HIS STAFF

The Contractor shall pay wages (including all overtime) and house (if the staff is not housed under sub clause 132.1 of this specification) all attendant staff to fulfil the requirements of Clause 137 of the Standard Specification. The number of staff required for these duties shall be about: 4 (Four) No. Office attendants, 6 (Six) No chainmen, 6 No. (Six) graded artisans and 10 No. Labourers. The Contractor will be paid on a prime cost basis plus a percentage for overheads and profits under appropriate items in the Bills of Quantities.

137.2 CAPACITY TRANSFER

The contractor shall also absorb (at his Cost) at least 2 No interns in each field of Civil Engineering, Survey construction foremen, plants operators for capacity transfer and provide quarterly training reports for each and will form part of handing over requirements.

138 VEHICLES AND DRIVERS FOR THE ENGINEER AND HIS STAFF AND METHOD OF PAYMENT

The Contractor shall when instruct to do so provide and maintain in good working condition for the exclusive use of the Engineer and his staff throughout the contract:

- (i) One (1) new diesel propelled 4WD fully Station Wagon of engine capacity 3000cc.
- (ii) One (1) new diesel propelled 4WD fully loaded double cabin pick-up of engine capacity 3000cc.
- (iii) Two (2) new diesel propelled 4WD standard double cabin pick-ups of engine capacity 3000cc.

(iv) Two (2) new diesel propelled 4WD standard single cabin pick-up with fibre glass body and cushion benches of engine capacity 3000cc.

The Contractor shall insure comprehensively the vehicles for any licensed drivers and shall provide competent drivers during normal working hours and whenever required by the Engineer.

Should any vehicle supplied not be in road worthy condition, the Contractor shall provide an acceptable equivalent replacement vehicle until such time as the original vehicle is repaired to the satisfaction of the Engineer and returned for use.

Payment for the vehicles (up to 5,000Km.), shall be by vehicle months. Payment for mileage above 5,000Km shall be made at a rate per Kilometre. These payments shall be inclusive of all fuels, lubricants, servicing, insurance, maintenance, drivers and repairs. The rate shall include any overtime the drivers might be due or any other allowances in addition to the normal working hours. Payment shall be made under appropriate items in the Bills of Quantities.

The vehicles shall revert to the Contractor at the end of the contract.

139 RECEIPTED ACCOUNTS

The Contractor maybe instructed by the Engineer to make payments of general miscellaneous accounts for such items as stationary, stores and equipment and miscellaneous supervision personnel and claims or the Engineer may direct the Contractor to purchase or pay for the above. The Contractor will be paid on a prime cost basis plus a percentage for overheads and profits under appropriate items in the Bills of Quantities.

140 PAYMENT OF OVERTIME FOR ENGINEER'S JUNIOR STAFF

Delete this clause entirely and substitute with:

“If the Contractor wishes to execute permanent work outside the Supervisor’s normal working hours, as stated in Clause 108 of the Special Specification, then the payment for the overtime for the Supervisor’s Junior Staff shall be reimbursed in full by the Contractor to the Supervisor’s Representative including 20% for Administrative overheads

If the Contractor wishes to execute works on the regular basis outside the Supervisor’s normal working hours (Clause 108) over a prolonged period, the Supervisor may, if he deems necessary, employ additional supervisory staff for which the required salaries including the percentage for administrative overheads shall be in full by the Contractor to the Supervisor’s Representative and the Contractor shall provide the required adequate accommodation facilities for such staff at his own costs.

The Contractor shall not be reimbursed any of these costs.”

141 MEASUREMENT AND PAYMENT

All measurements and payments shall be as per the Standard Specifications.

142 LIQUIDATED DAMAGES

Liquidated Damages at the rate of Kshs. 100,000/- per day shall apply in the event of the work not being completed within the time for completion plus any extension of time which may be determined by the Engineer.

144 COMPLIANCE WITH SPECIFICATIONS AND REMEDIAL WORK

All materials, plant, labour and workmanship in and connected with the execution of the works shall be the best of their respective kinds without regard to any trade terms and the Contractors shall comply to these and in other respects with the relevant clauses and shall carry out the contract in a proper and workmanlike manner and in strict accordance with the working drawings and instructions of the Supervisor.

When any part of the Works or any plant or material is found upon examination by the Supervisor not to conform to the requirements or is at any stage before final acceptance damaged so that it no longer conforms to the requirements of the Specifications, the Supervisor may order its complete removal and replacement, at the Contractor's expense, with satisfactory work, plant or material or he may permit the Contractor to apply remedial measures in order to make good any such defects or damage. The actual remedial measures taken shall at all times be entirely at the Contractor's own initiative, risk and cost, but subject to the Supervisor's approval regarding the details thereof.

In particular, remedial measures must ensure full compliance with the Specifications for the final product, shall not endanger or damage any other part of the Works and shall be carefully controlled and submitted to the Supervisor for examination when completed or at any intermediate stage as may be required.

For the guidance, an indication is given below of what would normally be required in the more common cases of defects or damage, but the Supervisor will in no way be bound to approve of or adhere to the measures given below as the actual remedial measures will be dictated by the circumstances of each particular case.

(a) Earthworks

- i) Where a cut slope has been over excavated or under cut, backfilling will not normally be allowed and the entire slope may have to be re-trimmed to obtain a uniform slope.
- ii) Where the floor of a cutting has been taken too deep, it will normally require backfilling and re-compacting with selected gravel in the case of soil or gravel excavations and with crushed stone material or suitably sized rock in the case of hard excavations. All necessary measures shall be taken to drain away ground water that may accumulate in backfilled sections.
- iii) Excess widths of fills will have to be trimmed back.
- iv) Where erosion has damaged the surface of cuts or fills, the damage shall be made good by backfilling with suitable material and re-trimming. In more serious cases, the slopes may have to be cut back and back-filled by benching and compacting to the required standard of compaction with suitable small equipment and then re-trimmed.

(b) Stabilising

Any sections failing to meet the requirements specified or damaged to the extent that they require breaking up and re-compaction will have to be re-stabilised with the type and quantity of stabilising agent ordered by the Supervisor. The Supervisor may also order that the layer be removed entirely and replaced with fresh material to be stabilised.

(c) Local Defects in Pavement Layers

Where remedial measures are taken to make good local defects, the length and width of the area to be repaired by machines shall be such as will be necessary to accommodate the full width of the machines used and a reasonable length to ensure effective operation.

The depth to which material will have to be removed will depend on the type of material. Gravel will require breaking up to a depth of at least 75mm and crushed

stone will usually require breaking up over its full depth. Asphalt material will normally require removal for its full depth.

(d) Concrete

Concrete work will normally require the cutting back and complete removal of any weak or honeycombed sections and making good using special epoxy adhesives to bind fresh concrete to old concrete. Cracks when permitted to remain, shall be injected with suitable epoxy compounds and test cores drilled to test the efficiency of the injection process.

145 AVAILABILITY OF MATERIALS

The Contractor shall be responsible for obtaining all materials from any local or foreign source. The Contracting Authority shall not be liable for any additional costs due to shortage of materials.

The material located by the Contractor shall be subject to the approval of the Supervisor before use of the Works.

146 ENVIRONMENTAL QUALITY PROTECTION

146.1 Landscape Preservation

a) The Contractor shall exercise care to preserve the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, approved construction roads, or excavation operations, all trees, native shrubbery, and vegetation shall be preserved and shall be protected from damage by the Contractor's construction operations and equipment. The edges of clearings and cuts through trees, shrubbery and vegetation shall be irregularly shaped to soften the undesirable visual impact of straight lines. Movement of crews and equipment within the right-of-way and over routes provided for access to the work shall be performed in a manner to prevent damage to grazing land, crops and other property.

(b) Reseeding and Replanting

Special reseeding or replanting will not be required under these specifications; however, on completion of the work, all non-permanent works shall be scarified and left in a condition that will facilitate natural re-vegetation, provide for proper drainage, and prevent erosion. All non-permanent works destruction, scarring,

damage or defacing of the landscape resulting from the Contractor's operations shall be repaired, replanted, reseeded, or otherwise corrected as directed by the Supervisor and at the Contractor's expense.

(c) Construction Roads

The location, alignment and grade of construction roads shall be subject to approval of the Supervisor. When no longer required by the Contractor, construction roads shall be restored to the original contour and made impassable to vehicular traffic. The surfaces of such construction roads shall scarified as needed to provide a condition which will facilitate natural re-vegetation, provide for proper drainage and prevent erosion.

(d) Construction Facilities

The Contractor's camp, workshop, office, and any other construction facilities shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On completion of the Works, all storage and construction buildings, including concrete footings and slabs, and all construction materials and debris shall be removed from the site. The area shall be re-graded, as required, so that all surfaces drain naturally, blend with the natural terrain and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage and prevent erosion.

(e) Blasting Precautions

The Contractor shall adopt precautions when using explosives which will prevent scattering of rocks, stumps, or other debris outside the work area and prevent damage to surrounding trees, shrubbery and vegetation.

146.2 Preservation of Trees and Shrubby

a) Preservation

All trees and shrubbery which are not specifically required to be cleared or removed for construction purposes shall be preserved and shall be protected from any damage that may be caused by the Contractor's construction operations and equipment.

Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage, or other operations; and the Contractor shall adequately protect such trees by use of protective barriers or other methods approved by the Supervisor. The removal of trees or shrubs will be permitted only after prior approval by the Supervisor.

The layout of the Contractor's construction facilities such as workshops, warehouses, storage areas and parking areas; location of access and haul routes; and operations in borrow and spoil areas shall be planned and conducted in such manner that all trees and shrubbery not approved for removal by the Supervisor shall be preserved and adequately protected from either direct and indirect damage by the Contractor's operations. Except in emergency cases or when otherwise approved by the Supervisor, trees shall not be used for anchorage. Where such use is approved, the trunk shall be wrapped with a sufficient thickness of approved protective material before any rope, cable or wire is placed.

b) Repair of Treatment of Damage

The Contractor shall be responsible for injuries to trees and shrubs caused by his operations. The term "injury" shall include, without limitation, bruising, scarring, tearing and breaking of roots, trunk or branches. All injured trees and shrubs shall be repaired or treated without delay, at the Contractor's expense. If damage occurs, the Supervisor will determine the method of repair or treatment to be used for the injured trees and shrubs as recommended by an experienced horticulturist or a licensed tree surgeon provided by and at the expense of the Contractor. All repairs or treatment of injured trees shall be performed under the direction of an experienced horticulturist or a licensed tree surgeon provided by and at the expense of the Contractor.

Where tree climbing is necessary, the use of climbing spurs will not be permitted. If climbing is necessary, safety ropes will be required.

c) Replacement

Trees or shrubs [hat, in the opinion of the Supervisor, are beyond saving shall be removed and replaced early in the next planting season. The replacements shall be the same species, or other approved species, and of the maximum size that is practicable to plant and sustain growth in the particular environment. Replacement trees and shrubs shall be guyed, watered and maintained for a period of 1 year. Any replacement tree or shrub that dies shall be removed and replaced as directed by the supervisor, with such replacements being maintained for a period of 1 year from the date of replacement.

146.3 Prevention of Water Pollution

a) General

The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage of solid matter, contaminants, debris and other pollutants and wastes into streams, flowing or dry watercourses, lakes, and underground water sources. Such pollutants and wastes include, but are not

restricted to, refuse garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oils, bitumen and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

b) Dewatering

Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams of watercourses by construction of intercepting ditches, bypass channels, barriers, setting ponds or by other approved means. Excavated materials or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water of storm runoff or can in any way encroach upon the watercourse itself.

c) Turbidity

Turbidity increases in a stream or other bodies of water that are caused by construction activities shall be limited to the increases above the natural turbidities permitted under the water quality standards prescribed for that stream or body of water. When necessary to perform required construction work in a stream channel, the prescribed turbidity limits may be exceeded, as approved by the Supervisor, for the shortest practicable period required to complete such work.

This required construction work may include such work as diversion of a stream, construction or removal of cofferdams, specified earthwork in or adjacent to a stream channel, pile driving and construction of turbidity control structures. Mechanized equipment shall not be operated in flowing water except as necessary to construct crossings or to perform the required construction.

d) Wastewater

Wastewater from aggregate processing, concrete batching or other construction operations shall not be allowed to enter streams, watercourses, or other surface waters without the use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates or other approved methods. Any such wastewater discharged into surface waters shall contain the least concentration of settleable material possible. For the purpose of these specifications, settleable material is defined as that material which will settle from the water by gravity during a t-hour quiescent detention period.

e) Compliance with Laws and Regulations

The Contractor shall comply with applicable local laws, orders, regulations and water quality standards concerning the control and abatement of water pollution.

146.4 Abatement of Air Pollution

- a) The Contractor shall comply with applicable local laws and regulations concerning the prevention and control of air pollution.
- b) In the conduct of construction activities and operation of equipment, the Contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants. The emission of dust into the atmosphere will not be permitted during the manufacture, handling and storage of concrete aggregates, and the Contractor shall use such methods and equipment as are necessary for the collection and disposal, or prevention, of dust during these operations. The Contractor's methods of storing and handling cement and pozzolans shall also include means of eliminating atmospheric discharges of dust.
- c) Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, shall not be operated until corrective repairs or adjustments are made.
- d) Burning of materials resulting from clearing of trees and bush, combustible construction materials, and rubbish will be permitted only when atmospheric conditions for burning are considered favourable and when authorized by appropriate local air pollution or fire authorities. In lieu of burning, such combustible materials may be disposed of by other methods as provided in Clause 145.9. Where open burning is permitted, the burn piles shall be properly constructed to minimize smoke. In no case shall unapproved materials, such as tyres, plastics, rubber products, asphalt products, or other materials that create heavy black smoke or nuisance odours, be burned.
- e) Storage and handling of flammable or combustible materials, provisions for fire prevention, and control of dust resulting from drilling operations shall be in accordance with the applicable provisions of construction industry safety standards.
- f) Dust nuisance resulting from construction activities shall be prevented in accordance with Clause 145.5.

146.5 Dust Abatement

- a) During the performance of the work required by these specifications or any operations appurtenant thereto, whether on right-of-way provided by the Contracting Authority or elsewhere, the Contractor shall furnish all the labour, equipment, materials, and means required, and shall carry out proper and efficient measures, wherever and as often as necessary to reduce the dust nuisance, and to prevent dust which has originated from his operations from damaging crops, orchards, cultivated fields, and dwellings, or causing a nuisance to persons. The Contractor will be held liable for any damage resulting from dust originating from his operations under these specifications on Contracting Authority right-of-way or elsewhere. The Supervisor may direct additional sprinkling or other measures for dust abatement if necessary to obtain adequate control.

146.6 Noise Abatement

The Contractor shall comply with applicable local laws, orders, and regulations concerning the prevention, control and abatement of excessive noise. Night time blasting, the use of jackhammers, pile driving, or other operations producing high intensity impact noise may be performed only upon approval of the Supervisor.

146.7 Light Abatement

- a) The Contractor shall exercise special care to direct all stationary floodlights to shine downward at an angle less than horizontal. These floodlights shall also be shielded so as not to be a nuisance to surrounding areas. No lighting shall include a residence in its direct beam.
- b) The Contractor shall be responsible for correcting lighting problems when they occur as approved by the Supervisor.

146.8 Preservation of Historical and Archaeological Data

- a) Local legislation provides for the protection, preservation and collection of scientific, pre-historical, historical and archaeological data (including relics and specimens) which might otherwise be lost due to alteration of the terrain as a result of any construction project.

If necessary, an archaeological survey will be made along the proposed haul roads to establish the presence of any archaeological or historic remains.

- b) Should the Contractor through his agent or any of his employees in the performance of this contract discover evidence of possible scientific, pre-

historical, historical, or archaeological data, he will notify the Supervisor immediately giving the location and nature of the findings. Written confirmation shall be forwarded within 2 days.

The Contractor shall exercise care so as not to damage artefacts of fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

- c) Where appropriate, by reason of discovery or archaeological finds, the Supervisor may order delays in the time of performance, or changes in the work, or both. If necessary, an archaeological survey should be made along the proposed haul roads to establish the extent of the cultural resources. If such delays, or changes, or both, are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general provisions of this contract.

The Contractor shall insert this paragraph in all sub-contracts, which involve the performance of work on the terrain of the site.

146.9 Pesticides

- a) Pesticides include herbicides, insecticides, fungicides, rodenticides, priscicides, surface disinfectants, animal repellants and insect repellants. Should the Contractor find it necessary to use pesticides in work areas of this contract, he shall submit his plan for such use to the Supervisor for written approval. Such plan shall be subject to submittal to and review by a Pest Control Specialist, if necessary, before the plan is approved. Pesticides shall only be those registered with the respective agency when using pesticides.
- b) The Contractor shall read and comply with all labelling requirements when using pesticides.

146.10 Cleanup and Disposal of Waste Material

- a) The Contractor shall, at all times, keep the construction area, including storage areas used by him, free from accumulations of waste materials or rubbish.
- b) Prior to completion of the work, the Contractor shall remove from the vicinity of the work all plant facilities, buildings, rubbish, unused materials, concrete forms and such like material, belonging to him or used under his direction during construction. All work areas shall be graded and left in a neat manner conforming to the natural appearance of the landscape as provided in Clause 145.1.

- c) Any residue deposited on the ground from washing out transit mix trucks or any similar concrete operations shall be buried or cleaned up in a manner acceptable to the Supervisor.
- d) In the event of the Contractor's failure to perform the above work, the work may be performed by the Contracting Authority, at the expense of the Contractor, and his surety or sureties shall be liable therefore.
- e) Disposal of Waste Material

- (i) General

- Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products, shall be disposed off by the Contractor. Disposal of combustible materials shall be by burying, where burial of such materials is approved by the Supervisor; by burning of approved materials is permitted in accordance with local laws; or by removal from the construction area. Disposal of non-combustible materials shall be by burying, where burial of such materials is approved by the Supervisor, or by removal from the construction area. Waste materials removed from the construction area shall be dumped at an approved dump area.

- ii) Disposal of Material by Burying

- Only materials approved by the Supervisor may be buried. Burial shall be in pits at locations shown on drawings or as otherwise approved by the Supervisor.

- The pits shall be covered by at least 06 metres of earth material prior to abandonment.

- iii) Disposal of Material by Burning

- All burning shall be in accordance with local laws. All materials to be burned shall be piled in designated burning areas in such a manner as will cause the least fire hazards.

- Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered pieces shall be removed from the construction area and disposed of as otherwise provided in this paragraph. The Contractor shall, at all times, take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations. The Contractor shall have available, at all times, suitable equipment and supplies for use in preventing and suppressing fires and shall be subject to all laws and

regulations locally applicable for pre-suppression, suppression and prevention of fires.

(iv) Disposal of Material by Removal

Material to be disposed of by removal from the construction area shall be removed from the area prior to the completion of the work under these specifications. Material to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the Contractor to make any necessary arrangements with private parties and with local officials pertinent to locations and regulations of such dumping. Any fees or charges required to be paid for dumping of materials shall be paid by the contractor.

146.11 Fire and Prevention

- a) The Contractor shall prepare and carry out an effective fire-protection and prevention Programme covering all phases of construction under this contract. The plan shall be submitted to the Supervisor, prior to the start of construction operations. At the option of the Contractor, the fire-protection and prevention Programme may be incorporated into a safety Programme.
- b) The Contractor shall provide and maintain in a ready condition near each active work location a fire-tool cache consisting of at least one 19 litre back pump filled with water, two axes, two McLeod tools, and enough shovels to equip five workers for fire fighting purposes. A sufficient number of employees familiar with use of the equipment shall be available at all times when work is in progress. In the event of a fire resulting from project operations, the local fire-protection agency having jurisdiction shall be notified, and the Contractor shall take immediate control action with any and all available equipment and manpower.
- c) In areas where significant fire hazard exists as determined by the Supervisor, the Contractor shall provide a fire patrol for 1 hour after shutdown of construction operations each day during the dry season
- d) In areas where grass, bush, or other natural fuels are present and where roads or creek beds will not serve the purpose. The Contractor shall establish a firebreak on the uphill side of the project. The firebreak shall be within the right-of-way acquired by the Contracting Authority

146.12 Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) prepared this project is presented at the end of this section. The Contractor will take this plan, upgrade, amend and

reconcile it, where appropriate, to his construction proposals. The Supervisor's Representative will then review this plan and make necessary amendments. This will then be referred to as the Project Environmental Management Plan (PEMP). The PEMP will form the principle document upon which all Environmental Monitoring will be based throughout the project.

146.13 Measurement and Payment

No separate measurement and payment shall be made for complying with Clause 146.1 to 146.12. The cost of all work required by these clauses shall be included in the Contractor's rates for other items of work under this Contract.

148 CONTRACTOR'S MOBILIZATION AND DEMOBILIZATION

No separate payment shall be made to the Contractor in respect of mobilization and demobilization of plant and equipment, and such costs shall be deemed to have been included in the rates entered by the Contractor in the Bills of Quantities.

SECTION 2 - MATERIALS AND TESTING OF MATERIALS

202 TESTING BY THE CONTRACTOR

Add the following paragraph to Clause 202 of the Standard Specifications

The onus rests with the Contractor to produce work which conforms in quality and accuracy of detail to the requirements of the Specifications and drawings, and the Contractor must, at his own expense institute a quality control system to ensure adequate supervision and positive control of the Works at all times, and the Contractor must provide chainmen and labourers for the Supervisor to carry out checks on the Works.

The Contractor shall submit to the Supervisor the results of the relevant tests, measurements and levels indicating compliance with the specifications on completion of every part of the work.

The Contractor shall make his laboratory accessible to the Supervisor's Representative for cross checking the test results and inspection during material testing in the laboratory.

204 SIEVES

Amend the following: -

204.1 Sieve sizes

A standard set of sieves for general use shall consist of the following sieve sizes mm: 100-63-50-37.5-25-20-14-10-6.3-5-4-2-1-0.6-0.5-0.425-0.300-0.150-0.075 mm. The sieves from 0.425 to 0.075 mm shall be suited for wet sieving.

205 SOILS AND GRAVEL

Whenever in the Contract Document a minimum California Bearing Ratio (CBR) is specified, the CBR of the material shall be determined at the specified state of compaction.

- i) After four days soaking in the case of neat materials and

- ii) After seven days curing plus seven days soaking in the case of cement improved materials.

207

CEMENT

Delete “KS 02-21” and replace with “KS 1725 2001 CEM 1 42.5”

211

BITUMINOUS BINDERS

(a) Requirements:-

(ii) Straight-run Bitumen

In addition to the requirements of the Standard Specification, the ash content of penetration grade bitumen shall not exceed 0.5% by weight.

b) Types of Bitumen

Prime coat shall be type MC 30

Tack coat shall be type K 1-70

For surface dressing, binder 80/100 cut back bitumen shall be used

For asphalt concrete, 80/100 penetration grade bitumen shall be used.

218

PAINT FOR ROAD MARKING

a) **Colour**

(i) White

Delete line 1 and 2 and insert:

“The colour of white marking material shall be to BS colour No. 102 of BSS 331C.”

(ii) Yellow

Delete line 1 and 2 and insert:

"The colour of yellow marking material shall be to BS colour No.305 (lemon) of BSS 331 C, 1964 (Colour 0-002BCC; 1955).

b) **Drying Time**

Delete line 1, 2, and 3 and insert instead:

"The material shall have a drying time such that it can be spread uniformly on the

road over the line width by the traffic line marker and shall dry sufficiently to withstand traffic within a maximum of 15 minutes after application. This condition shall be satisfied within the climate conditions obtained in any part of Kenya, provided that the bitumen surface shall be completely dry before application of the thermoplastic material and that the painted line shall remain free from water for 15 minutes from the application of the thermoplastic material by the machine or by brush."

c) **Reflectorization**

In line 3, delete "80%;" and insert instead "85%."

In line 4, delete "65%" and insert instead "60%".

d) **Materials**

(i) **White Pigment**

The pigment used for white shall contain sufficient titanium dioxide and be at least a minimum of 29% of the total pigment composition. The titanium dioxide shall comply with Type A (Anatase) or Type R (Rutile) of BSS 1851, 1967 except that the purity of titanium dioxide shall be 98%.

(ii) **Yellow Pigment**

Lead chromate yellow pigment shall be a minimum of 33% of the total pigment composition.

(iii) **Solid Content**

The thermoplastic material shall have a minimum solid content of 60%.

e) **Fineness of Grind**

The thermoplastic material shall have a fineness of grind reading not exceeding 75 μm .

f) **Specular Gloss at 60⁰**

The thermoplastic material shall have a specular gloss of the dry film not exceeding 20.

g) **Resistance to Cold Water**

The dry material film shall show no wrinkling or blistering immediately after

having been removed from the water. After a recovery period of two hours, the immersed portion of the film shall have a scratch resistance of at least 1500 g and shall have no whitening.

h) Flexibility

The material film shall not detach or show any signs of flaking or cracking along the bed after it has been tested with the appropriate mandrel.

i) Hiding Power

The thermoplastic material shall show a contact ratio of not less than 90% for white and 80% for yellow thermoplastic material.

j) Resistance to Grit Abrasion

The substrata shall not be visible after the abrasion test described in the standard being used.

k) Resistance to Bleeding

There shall be no colour change after the bleeding test is carried out in a manner prescribed in the standard being used.

l) Resistance to Diesel

The thermoplastic material shall show no signs of blistering after the diesel resistant test of the thermoplastic material applied on a panel.

m) Density

The specific gravity of road marking thermoplastic materials shall be between 1.0 and 1.8.

n) Consistency (Viscosity)

Before any dilution, the thermoplastic material should give a minimum viscosity of 70. k u (0.7 pas).

o) Durability (Degree of Erosion)

When tested as prescribed in the standard being used, the total wear index for the test area on each marked trial line shall not exceed 35 at each regular inspection interval over a 12 month period.

226

FREQUENCY OF TESTING

In (i) (ii) (iii) and (iv) delete "T99" and substitute "T180" instead.

xi) Reclaimed Bituminous Materials

The properties of reclaimed bituminous materials shall be determined at the same frequency as the constituent materials.

228

OUTLINE TESTING AND INSPECTION BY THE SUPERVISOR

The Supervisor will at regular intervals inspect and test materials and completed work for compliance with the specified requirements. Samples and lot sizes for routine testing shall be at the Supervisor's discretion.

All sections of completed work including all test results carried out by the Contractor, shall be submitted to the Supervisor for routine inspection and testing and the Contractor shall not cover up or construct any work on top of sections of completed work before written approval has been given by the Supervisor.

The Contractor shall arrange the submission of work for testing in such a manner that the Supervisor will have the opportunity to inspect and test the Works

SECTION 3 - SETTING OUT & TOLERANCES

301 SETTING OUT

a) Basic Survey

The basic survey provided by the Supervisor to the Contractor shall include:

- alongside
- (i) A traverse line which is referenced by steel pins in concrete located the works, and
 - (ii) A computer printout of the geometric centerline which will enable the Contractor to set out these lines.

shall Any abortive setting out resulting from survey errors on the part of the Contractor, and any construction work carried out on the basis of such abortive setting out, be rectified entirely at the Contractor's expense.

b) Detailed Setting Out

Reference pegs shall be 50 mm x 50 mm in section, 600 mm long, driven 400 mm firmly into the ground and painted white above ground. The offset from the centreline shall be indicated by a small nail, 20 mm to 25 mm long, with its head driven flush with the top of the peg.

of Chainages, offset and reference elevation shall be clearly indicated on the side(s) the peg to the satisfaction of the Supervisor, This pin shall be co-ordinated and heightened and result of the same shall be provided to the Engineer for approval.

Cost of these works shall be included in the rates as no separate item has been provided.

of All the main points of curves shall be referenced clear off the works on either side the centerline by pins in concrete class 20, All reference pegs shall be maintained as long as they are required by the Supervisor to check the accuracy of the Works,

to After cutting of benches and prior to commencement of earthworks or sub-grade works, Contractor shall take cross-sections again and submit the copy of the same Engineer for agreement. These cross-sections shall then be used as basis of measurement for all subsequent layers, unless otherwise stated.

has Commencement of the works shall not be permitted until this basic survey data been provided and approved by the Engineer for at least 5 Km of the road.

c) **Grid System**

The start and finish of geometric elements along the centerline of the horizontal alignment and intermediate points at regular intervals between these have been identified by coordinates which refer to UTM Grid System, The datum refers to Survey of Kenya Beacons, The Contractor shall make himself fully conversant with this system prior to commencement of any survey work.

302 TOLERANCES

a) **Surface regularity**

The tolerances below a straight edge for Base and Bituminous wearing course given in Table 3-1 are amended from 6 mm to 4mm

b) **Pavement Widths**

The edges of the wearing course, base and sub-base shall nowhere lie closer to the carriageway centreline than the dimensions shown on or calculated from the design data given on the drawings or as amended by the Supervisor in writing to the Contractor, and the half widths of wearing course, base and sub-base measured at any point along the road shall not exceed the nominal width by more than 50 mm for wearing course, base and sub-base.

c) **Drainage**

The maximum deviation from the specified horizontal line of a pipe culvert shall be 30 mm in 3 m and the vertical line 30 mm in 15 m. The Contractor shall correct any excess deviation before proceeding with the work.

The invert level of drainage ditches both lined and unlined shall be within +0 mm to-50 mm of that specified by the Supervisor and trimmed such that water does not pond. In the event of the Contractor over-excavating any lined or unlined drainage ditches or channels outside the specified tolerances, the Contractor will be held responsible for any additional work ordered by the Supervisor as being, in his opinion, necessary to maintain acceptable invert grades. Such remedial work shall be carried out entirely at the Contractor's expense. Replacement of the over-excavated material within the ditches and channels will not be permitted, unless such material is compacted and that part of the channel is lined, all to the satisfaction of the Supervisor. The Contractor should be aware that the most likely form of remedial work to be ordered by the Supervisor for unlined ditches would be the deepening of the remainder of the ditch or channel downstream of the over-excavated section for such length as the Supervisor deems necessary to avoid ponding, and, in his opinion, sufficient to adequately cope with the design flows.

SECTION 4- SITE CLEARANCE AND TOP SOIL STRIPPING

401 SITE CLEARANCE

Site Clearance shall be carried out as directed by the Engineer.

402 REMOVAL OF TOPSOIL

Topsoil shall include up to 200mm depth of any unsuitable material encountered and shall be removed only in areas instructed by the Supervisor. Topsoil shall be removed to a depth as directed by the Supervisor and evenly spread within the road reserve, or stockpiled for top soiling of side slopes as directed by, and to the satisfaction of the Supervisor.

403 REMOVAL OF STRUCTURES, FENCES AND OBSTRUCTIONS

When instructed by the Engineer, the Contractor shall demolish or remove any structure and payment for this shall be made on day works basis.

SECTION 5 - EARTHWORKS

504 PREPARATION PRIOR TO FORMING EMBANKMENT

Where benching is required for existing pavement to accommodate earthworks sub-grade or sub-base for widening the road, the rate for compaction of existing ground shall be deemed to cover this activity.

Excavation in the pavement of the existing road shall be kept dry. In the event of water penetrating the underlying layer, construction of the subsequent layers shall be postponed until the underlying layers are dry enough to accommodate the construction plant without deforming or otherwise showing distress.

Step construction shall be carried out per layer at the joint where excavating both vertically and perpendicular to the direction of the travel. The step shall be 500mm perpendicular to the direction of the travel and 150mm vertical unless otherwise instructed by the Engineer.

Special care shall be taken when compacting the new material at the joint ensuring that specified density is achieved.

505

CONSTRUCTION OF EMBANKMENTS

Only material approved by the Engineer shall be used in embankments. Fill material shall comply with the following requirements:

- Organic matter less than 5% by weight
- Swell less than 3%
- Plasticity Index less than 50%

Subgrade is defined on the Drawings, and subgrade material shall comply with the requirements of Clause 505 except that the CBR shall have a value of not less than 8% measured after a four (4) days soak on a laboratory mix compacted to a dry density of 100% MDD (AASHTO T99).

Improved subgrade is defined on the Drawings or as shall be specified by the Engineer and shall comply requirements:

- CBR of not less than 10% measured after 4 days soak on a laboratory mix compacted to a dry density of 95% (AASHTO T99)
- Plasticity Index less than 30%
- Swell less than 1% on the laboratory mix sample.
- Placed in layers not exceeding 175mm thick.

The improved subgrade thickness shall be as follows:

- Class S1 Native Subgrade (CBR 2-5%) : 275mm

Improved subgrade shall not be required where the average bearing strength of the in-situ soil exceeds 8%.

508

COMPACTION OF EARTHWORKS

At pipe culverts, all fill above ground level around the culverts shall be compacted to density of 100% MDD (AASHTO T.99) up to the level of the top of the pipes or top of the surround(s), if any and for a width equal to the internal diameter of the pipe on either side of the pipe(s) or surround(s) as applicable.

At locations adjacent to structures, all fill above ground level up to the underside of the sub-grade shall be compacted to density of 105% MDD (AASHTO T.99). In case of fill around box culverts this should be carried out for the full width of the fill and for a length bounded by the vertical plane passing through the ends of the wing walls.

Notwithstanding the provision of clause 503 of the Standard Specification, compaction of sub-grade material (i.e. material immediately below formation) in cut areas shall not be carried out by the Contractor in areas where the formation is formed in hard material, unless specific instructions to the contrary are issued by the Engineer.

Where improved sub-grade material shall be required, this shall be compacted and finished to the same standards and tolerances as those required for normal sub-grade and clauses in the specifications applying to normal sub-grade shall also apply.

511 BORROW PITS

The first part of the Standard Specification is amended as follows:-

Fill material which is required in addition to that provided by excavation shall be obtained from borrow pits to be located and provided by the Contractor but to the approval of the Engineer contrary to what has been stated.

517 MEASUREMENT AND PAYMENT

Notwithstanding the provisions of clause 517 of the standard specifications, the rate for compaction of fill in soft material shall allow for the requirements of clause 508 of the special specification and no extra payment shall be made for compaction around pipe culverts (100% MDD AASHTO T.99).

SECTION 6 - QUARRIES, BORROW PITS, STOCKPILES AND SPOIL AREAS

601 GENERAL

Notwithstanding any indications to the contrary in the Standard Specification the Engineer will not make available to the Contractor any land for quarries, borrow pits, stockpiles and spoil areas, except for those areas in road reserves specifically approved by him.

The Contractor will be entirely responsible for locating suitable sources of materials complying with the Standard and Special Specifications, and for the procurement, wining, haulage to site of these materials and all costs involved therein. Similarly the Contractor will be responsible for the provision and costs involved in providing suitable areas for stockpiling materials and spoil dumps. Should there be suitable sites for spoil dumps or stockpiles within the road reserve forming the site of the works the Contractor may utilise these subject to the approval of the Engineer.

No additional payment will be made to the Contractor to cover costs arising from the requirements for this Clause and the Contractor must include these costs in the rates inserted into the Bills of Quantities.

SECTION 7 - EXCAVATION AND FILLING FOR STRUCTURES

703 EXCAVATION OF FOUNDATIONS FOR STRUCTURES

Before commencing excavation for the foundation of any structure, the Contractor shall open up one or more trial pits within the areas of the foundation as directed by the Engineer's representative before excavating for the foundation. Where a trial pit is excavated to a level below the founding level of the structure, it shall be backfilled to that level with approved material or concrete as directed by the Engineer's representative.

Unless otherwise instructed by the Engineer, all excavated surfaces in material other than hard material, on which foundations for structures shall be placed, shall be compacted to 100% MDD (AASHTO T.99) immediately before structures are constructed.

Paragraph 4, last line: - Replace "95%" with "100%".

707 BACK-FILLING FOR STRUCTURES

Unless otherwise instructed by the Engineer, all backfilling material shall be compacted to a minimum of 100% MDD (AASHTO T.99).

709 EXCAVATIONS FOR RIVER TRAINING AND NEW WATER COURSES

Payments for river training and establishment of new water-courses shall only be made where such work constitute permanent works. Works done for road deviation or other temporary works shall not qualify for payment.

710 STONE PITCHING

Stone pitching will be undertaken as a soil conservation measure, with soil erosion minimised by ensuring that proper protection works are carried out along the drains using stone pitching. Most of the sections shall be stone pitched especially areas where we have steep slopes to minimise undermining of the road by rain water or as may be instructed by the Engineer.

Stone pitching to drains, inlets and outlets of culverts to embankments and around structures shall consist of sound unweathered rock, which when soaked will withstand a crushing stress of 20N/mm^2 , and approved by the Engineer.

The stone as dressed shall be roughly cubical in shape with minimum dimensions of 150 x 150mm for normal thickness of stone pitching. Grouting will be done for all stone pitching areas and the top line of the stone pitching should be grouted/sealed with concrete class 15/20.

The surface to receive the pitching shall be compacted and trimmed to slope and the stone laid, interlocked and rammed into the material to give an even finished surface.

In areas where stone pitching has been damaged, the Contractor shall identify such areas and notify the Engineer for his agreement of the extent of the Works required and his approval and instructions to proceed with the Works. Stone pitching repair and re-construction shall be carried out in accordance with Clause 710 of the Standard Specifications.

711 GABIONS

Where instructed by the Engineer the Contractor will install gabions as protection works to washout areas or bridge Piers and or Abutments. Gabions shall be constructed in accordance with Clause 711 of the Standard Specification.

In cases where existing gabions have been damaged, the Contractor shall identify them and notify the Engineer for his agreement of the extent of the Work required and his approval and instructions to proceed with the Works.

The Works shall involve removal of the damaged gabions / rocks, excavation to the correct levels and grades as directed by the Engineer, and in accordance with Clause 711 of the Standard Specifications and reconstruction with new gabions and other necessary materials as necessary. The damaged gabions shall be recovered and transported to the nearest KeRRA Engineer's Yard.

712 RIP-RAP PROTECTION WORK

Quarry waste or similar approved material shall be used to backfill scoured and eroded side, outfall and cut-off drain. The material shall be compacted to form a flat or curved surface preparatory to stone pitching of drainage channels, existing and new scour checks as directed by the Engineer.

The surface to receive the pitching shall be compacted and trimmed to slope and the stone hand laid, interlocked and rammed into the material to give an even finished surface. The interstices of the Pitching shall be rammed with insitu material. The insitu material immediately behind the pitching shall be compacted to minimum density of 100% MDD compaction (AASHTO T.99)

714 BACKFILL BELOW STRUCTURES

Where instructed this shall be carried out in compliance with the requirements of Clause 507 and 804 of the Standard Specification.

SECTION 8 - CULVERTS AND DRAINAGE WORKS

801 SCOPE OF SECTION

The operations specified in this section apply to the installation of drainage works and reinstatement and improvement of the same.

In addition, this Section covers: -

- Installation of 600mm, 900mm and 1200mm diameter pipe culverts
- Construction of associated inlet and outlet structures to specifications and/or instructions

804 EXCAVATION FOR CULVERTS AND DRAINAGE WORKS

In the Standard Specifications, make the following amendments: -

(a) In paragraph 6, line 3, and in paragraph 7, line 5 and in paragraph 11, line 6, delete "95%" and insert "100%".

(b) Removal of Existing Pipe Culverts

Where instructed by the Engineer, the Contractor shall excavate and remove all existing blocked or collapsed culvert pipes of 450mm, 600mm and 900mm diameter including concrete surround, bedding, inlet and outlet structure.

The void left after removal of culvert pipes shall be widened as necessary to accommodate new concrete bedding, pipe and haunching.

The payment of this work shall be per linear metre of pipes removed. The void left by removal of these pipes shall be carefully preserved in order to accommodate replacement 600mm or 900mm diameter pipe culverts as shall be directed by the Engineer.

(c) Removal of Other Existing Drainage Structures

When instructed by the Engineer, the Contractor shall demolish or remove any other structure and payment for this shall be made on day work basis.

(d) Excavation for Culverts and Drainage Works

The Contractor shall carry out all excavations for new culverts and drainage works to the lines, levels, inclinations, and dimensions shown on the drawings or as instructed by the Engineer.

805 EXCAVATION IN HARD MATERIAL

In the Standard Specifications, Sub-clauses 805(a) and 805 (b) delete "95%" and insert "100%".

In sub-clause 809(a), paragraph 1, line 1, substitute "95%" with "100%".

In sub-clause 809(c), paragraph 2, line 4, between the words "compacted" and "and shaped" insert the words "to 100% MDD (AASHTO T.99)".

Hard material is material that can be excavated only after blasting with explosives or barring and wedging or the use of a mechanical breaker fitted with a rock point in good condition and operated correctly. Boulders of more than 0.2m³ occurring in soft material shall be classified as hard material.

809 BEDDING AND LAYING OF PIPE CULVERTS

Concrete pipes shall be laid on a 150mm thick concrete bed of class 15/20 and the pipes shall be bedded on 1:3 cement: sand mortar at least 50mm thick, 150mm wide and extending the full length of the barrel.

The rates inserted shall allow for compaction of the bottom of excavation to 100% MDD (AASHTO T.99).

810 JOINTING CONCRETE PIPES

The concrete pipes for the culverts shall have ogee joints and will be jointed by 1:2 cement: sand mortar and provided with fillets on the outside as described in clause 810 of the Standard Specification.

812 BACKFILLING OVER PIPE CULVERTS

In the Standard Specifications, clause 812

- 1). Delete paragraph 6 "for pipe culvertsdepth of 150mm", entirely.
- 2). Wherever the expression "dry density of 95% MDD (AASHTO T. 99)" occurs delete and replace with "dry density of 100% MDD (AASHTO T.99)".

The rates entered for laying of pipe culverts shall allow for backfilling to pipe culverts and compacting to 100% MDD (AASHTO T.99) and these works shall **not** be measured and paid for separately.

814.1 SUBSOIL DRAINS

In the event of excavation for repairs exposing local seepage, springs or unacceptably high-water table, the Engineer may instruct the provision of counter fort or French drains.

These drains shall consist of a trench excavated to the alignment, width, depth and gradient instructed by the Engineer, and backfilled with approved compacted clean hard crushed rock material as specified in clause 815 of the standard specification. Where these drains lie within the carriageway the carriageway shall be reinstated with compacted stabilised gravel and surfaced with hot asphalt or a surface dressing as instructed by the Engineer.

814.2 FILTER FABRIC TO SUBSOIL DRAINS

A filter fabric shall be placed under, around and over rock fill of the subsoil drains. The provisions and placing of the fabric shall be in accordance with manufacturer's instructions and complying with Clause 804 and 814 of the Standard Specification. Payment shall be in metre square of the fabric used.

815 INVERT BLOCK DRAINS AND HALF ROUND CHANNELS

Invert Block Drains and Half Round Channels shall be constructed as shown in the drawings provided in accordance with the Standard Specifications where directed by the Engineer.

817 REPAIRS TO DRAINS

817.1 Cleaning and Repair of Existing Drains

In areas of existing side drains, mitre or outfall drains where such are blocked, the Engineer shall instruct the Contractor to clean and clear the drains to free flowing condition.

The work shall consist of:

- (a) Stripping and removal of any extraneous material to spoil including vegetation and roots in the drains to the satisfaction of the engineer.
- (b) Spreading of any spoil to the satisfaction of the Engineer.
- (c) Shaping the drains to free flowing condition as directed by the Engineer.

Measurement and Payment for cleaning drains shall be by linear metre of drain cleaned measured as the product of plan area and vertical depth of extraneous material instructed to be removed. No extra payment will be made for removal of vegetation and roots.

817.2 Channels

The Engineer may instruct that the Contractor provides open channels in place of existing sub-drains where the latter may be damaged or in any other place. The rates entered by the Contractor in the bills of quantities must include for removal and disposal of any sub-drain material, excavation to line and level, backfilling and compaction as directed by the engineer. The channels shall be constructed of precast class 20/20 concrete of minimum 80mm thickness and lengths or widths not exceeding 1000mm. Joints shall be at least 15mm wide filled with 1:2 cement sand mortar.

817.3 Spoil Material

The Contractor shall be responsible for removal from site of all materials excavated in the course of undertaking works in this section of the specification, unless suitable for re-use, and deposit of the material in a spoil dump to be approved by the Engineer.

818 SCOUR CHECKS

Scour checks are to be constructed in mass concrete in accordance with clause 818 of the standard Specifications and the drawings as shall be provided.

819 CLEANING AND MAINTENANCE

819.1 De-silting of Pipe Culverts

Where instructed, the Contractor shall de-silt the existing pipe culverts by removing all the material from the pipe to make them clean and free flowing.

Measurement and payment shall be by the linear metres of pipes de-silted, regardless of diameter size.

821 CONCRETE GUTTERS AT BUS-BAYS

Where raised Kerbs are provided at bus-bays, openings shall be provided through the raised Kerbs to facilitate drainage as shown on the drawings or directed by the Engineer.

The opening shall be constructed through the bus-bay berm and embankment backslope behind the berm into the adjoining roadside ditch.

The opening shall be of 200 mm width other dimensions being left as they are shown on the drawings, or as instructed by the Engineer.

Measurements and payment for gutters at bus-bays shall be per linear metre, the rate being inclusive of the costs for setting out, excavation to line and level, trimming, compacting the invert trench, disposal of excavated surplus material, providing, transporting and laying, of concrete and the necessary formwork, backfilling, watering and compacting of the concrete as required.

SECTION 9 - PASSAGE OF TRAFFIC

901 SCOPE OF THE SECTION

The Contractor shall so arrange his work to ensure the safe passage of the Traffic at all times and if necessary construct and maintain an adequate diversion for traffic complete with all the necessary road traffic signs.

The Contractor shall provide to the satisfaction of the Engineer adequate warning signs, temporary restriction signs, advance warning signs, barriers, temporary bumps and any other device and personnel equipped with two way radios to ensure the safe passage of traffic through the works.

When carrying out the Works the Contractor shall have full regard for the safety of all road users.

The Contractor shall also provide sign posts and maintain to the satisfaction of the Engineer all deviations necessary to complete the works. The Contractor should allow for the costs of complying with the requirements of this clause in his rates.

The Contractor will be deemed to have inspected the site and satisfied himself as to the adequacy of his bid for these works and no additional payments will be made to the Contractor for any expenditure on traffic control or the provision of deviations. The Employer shall not be liable for inadequate prior investigations of this nature by the Contractor.

904 CONSTRUCTION OF DEVIATIONS

a) General

The existing level of public traffic is light and the contractor is expected to generally pass the public traffic through the works along lengths of the project road. But in circumstances where this is not practically feasible, the contractor will bring this to the attention of the Engineer, and if directed by the Engineer, the contractor will construct and maintain deviations in accordance with Section 9 of the Standard Specifications.

In addition to requirement of this clause, the maximum length of deviation road shall be restricted to 5kms at any given time unless otherwise instructed. The Contractor shall construct and complete deviations to the satisfaction of the Engineer before commencing any permanent work on the existing road. Also during these works the Contractor is supposed to provide a detour of adequate pipe culverts for pedestrian and traffic crossing where there is bridge works.

Contractor will be allowed to open further 5 km of the deviation road only when 80% of the permanent work has been completed on the first one and he will not be allowed to open any further 5 km section till he has completed first 10 km of the road and has it opened to traffic. The sequencing of deviation road has been shown on the drawing.

Where the old road exists near the main road, Contractor shall use this road as deviation road.

b) **Geometry**

The carriageway width of the deviations shall not be less than 6m wide and suitable for 2-way lorry traffic unless otherwise specified.

c) **Construction**

Unless otherwise instructed gravel wearing course for the deviation shall be 150 mm compacted thicknesses complying with section 10 of the Standard Specification. The Contractor shall allow in his rate for removal of any unsuitable material before placing of gravel wearing course, as this will not be paid for separately.

In addition to provision of this clause, Contractor is required to sprinkle water at least 4 times a day at the rate of 1 to 1.4 litres/m²/day at regular interval to minimise the effects of dust. Latest sprinkling time shall be one hour before the sunset.

906 PASSAGE OF TRAFFIC THROUGH THE WORKS

The Contractor shall arrange for passage of traffic through the works during construction whenever it is not practicable to make deviations. The cost of doing so shall be deemed to have been included elsewhere in his rates and no separate payment shall be made for this. To this end, the Contractor shall be deemed to have inspected the site for himself and noted any locations where this may apply.

Any damage caused by passing traffic through the works shall be made good at the Contractor's own cost.

907 SIGNS, BARRIERS AND LIGHTS

Contractor shall provide signs, barriers and lights as shown in the drawing in Book of Drawings at the locations where the traffic is being carried off the existing road to the deviation and back again to existing road. The Contractor

shall provide ramps and carry out any other measures as instructed by the Engineer to safely carry traffic from the road to deviation.

Contrary to what has been specified in this clause the road signs provided shall be fully reflectorised and in conformity with clause 9.1 of the "Manual for Traffic Signs in Kenya Part II".

909 ASSISTANCE TO PUBLIC

In addition to provision of clause 909, Contractor shall maintain close liaison with the relevant authorities to clear any broken down or accident vehicles from the deviations and the main road, in order to maintain smooth and safe flow of the traffic.

912 MEASUREMENT AND PAYMENT

(a) Passage of traffic through the works

Payment shall be made on Lump Sum basis.

(b) Construct Deviation

(i) Road Deviation

The Contractor shall be paid only 50% of the rate for this when he completes deviation road to the satisfaction of the Engineer. The balance shall be paid in equal monthly instalments over the contract period, as he satisfactorily maintains the deviation (as per clause 904 and 905 above) when it is in operation.

(ii) Deviation using Pipe Culverts

The Contractor shall be paid only 50% of the rate for this when he completes deviation to the satisfaction of the Engineer. The balance shall be paid in equal monthly instalments over the contract period, as he satisfactorily maintains the deviation when it is in operation. The Contractor shall be paid full amount when the bridge under construction will be in use.

(c) Assistance to Public

The Contractor will be deemed to have included cost of this item in other items and no separate payment shall be made.

SECTION 11 – SHOULDERS TO PAVEMENT

1101 GENERAL

Shoulders shall be constructed to a width 1.5m, or as directed by the Engineer.

1102 MATERIAL FOR CONSTRUCTION OF SHOULDERS

The shoulders shall be constructed as directed by the Engineer, in accordance with sections 11, 12, 14 and 15 of the Standard Specification. The material for shoulders shall be the same as that of base and sub-base layers in the carriageway.

1105 SURFACE TREATMENT OF SHOULDERS

The shoulders to the whole stretch of the road shall have a double surface dressing of 6/10 and 14/20mm class 3 pre-coated chippings in accordance with Section 15 of the Standard Specifications.

1106 MEASUREMENT AND PAYMENT

Payment for shoulder construction shall be in accordance with the relevant clauses in sections 11, 12, 14, and 15 of the relevant Specifications. Payment for fill material on shoulder shall be in accordance with Section 5 of this specification.

SECTION 12 - NATURAL MATERIAL SUB-BASE AND BASE

1201 GENERAL

(a) Definitions

The term “natural material” includes lateritic gravel, quartzitic gravel, calcareous gravel, soft stone, coral rag, conglomerate, sand or clayey sand, a combination of any of these materials or a mixture of natural gravel and upto 30% of stone (crushed or not). A natural material is also referred to as “gravel”.

(b) Sources of materials

Natural material for subbase and base may be obtained from any of the following sources: -

- (i) Borrow pits
- (ii) Spoil areas
- (iii) Excavation in cuttings, widened if necessary.

In all cases the Engineer will instruct the Contractor as to the source of material to be used and the location in which it is to be placed.

(c) Inspection of site

Where a source of material is available for inspection during the Tender Period the Contractor shall satisfy himself as to the nature and amount of work involved particularly in respect of the volume of overburden, the quality and hardness of material, the degree of selection necessary, the method of extraction, and access to the source.

(d) Borrow pits

The Contractor shall comply with all the requirements of Section 6 of this Specification in respect of borrow pits.

1202 CLASSIFICATION OF MATERIAL

Natural material shall be material which can be extracted from a borrow area or a road cutting by ripping to a depth of 300 mm with a single tine hydraulic ripper acceptable to the Engineer drawn by a track type crawler tractor in good order complete with all equipment and accessories as supplied and rated at 300 BHP flywheel power and over with an operating weight of not less than 37.2 tonne and being operated in accordance with the manufacturer’s recommendations.

The material may require the use of either a grid or sheep foot roller with more than 8000 kg mass per metre width of roll to break it down and/or screening to achieve the specified grading.

1203 MATERIAL REQUIREMENTS

(a) Gravel with Minimum Soaked CBR Value of 25% (G25)

Material for G25 subbase shall include natural gravel or a mixture of natural gravel and up to 30% of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 63mm
- Passing 0.075mm sieve : Maximum 35%
- Plasticity Index : Maximum 15%
- CBR (4 days soak) : Minimum 25%

(b) Gravel with Minimum Soaked CBR Value of 30% (G30)

Material for G30 subbase shall include natural gravel or a mixture of natural gravel and up to 30 percent of sand or crushed stone aggregates and shall conform to the specifications given in Section 1203(a) of the Standard Specifications for Road and Bridge Construction but with maximum PI of 12%.

The material shall comply to the following grading envelope after compaction:

BS Sieve size (mm)	Percentage by weight passing
63	100
37.5	80-100
20	60-100
5	30-100
1.18	17-75
0.3	9-50
0.075	5-25

(c) Gravel with Minimum Soaked CBR Value of 50% (G50)

Material for G50 base shall include natural gravel or a mixture of natural gravel and up to 30% of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 50mm
- Passing 0.075mm sieve : 4 - 20%
- Plasticity Index : Maximum 12%
- Plasticity Modulus : Maximum 250
- LAA : Maximum 70%
- CBR (4 days soak) : Minimum 50%

The material shall conform to the following grading envelope after compaction:

BS Sieve size (mm)	Percentage by weight passing
50	100
37.5	95 - 100
28	80-100
20	60 - 100
10	35-90
5	20-75
2	12-50
1	10-40
0.425	7-33
0.075	4-20

(d) Gravel with Minimum Soaked CBR Value of 60% (G60)

Material for G80 base shall include natural gravel or a mixture of natural gravel and up to 80% of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 50mm
- Passing 0.075mm sieve : 4 - 20%
- Plasticity Index : Maximum 10%
- Plasticity Modulus : Maximum 250
- LAA : Maximum 70%
- CBR (4 days soak) : Minimum 60%

The material shall conform to the following grading envelope after compaction:

BS Sieve size (mm)	Percentage by weight passing
50	100
37.5	95 - 100
28	80-100
20	60 - 100
10	35-90
5	20-75
2	12-50
1	10-40
0.425	7-33
0.075	4-20

(e) Gravel with Minimum Soaked CBR Value of 80% (G80)

Material for G80 base shall include natural gravel or a mixture of natural gravel and up to 80% of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 50mm
- Passing 0.075mm sieve : 4 - 20%
- Plasticity Index : Maximum 10%
- Plasticity Modulus : Maximum 250
- LAA : Maximum 50%
- CBR (4 days soak) : Minimum 80%

The material shall conform to the following grading envelope after compaction:

BS Sieve size (mm)	Percentage by weight passing
50	100
37.5	95 - 100
28	80-100
20	60 - 100
10	35-90
5	20-75
2	12-50
1	10-40
0.425	7-33
0.075	4-20

(f) Material for Cement/Lime Improved Gravel of CBR 60% (CIG 60)

Material for CIG 60 base shall include natural gravel or a mixture of natural gravel and up to 30 percent of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 50mm
- Passing 0.075mm sieve : 5-35%
- Plasticity Index : Maximum 20%
- CBR (4 days soak) : Minimum 25%

After treatment the material shall have a CBR of at least 60% measured after 7 day cure and 7 day soak on the site mix compacted to at least 95% MDD AASHTO T180 and the treated material shall have a plasticity index less than 8% and a plasticity modulus less than 250.

(g) Material for Cement/Lime Improved Gravel of CBR 100% (CIG 100)

Material for CIG 100 base shall include natural gravel or a mixture of natural gravel and up to 30 percent of sand or crushed stone aggregates and shall conform to the following requirements:

- Maximum size : 50mm
- Passing 0.075mm sieve : 5-35%
- Plasticity Index : Maximum 20%
- CBR (4 days soak) : Minimum 25%

After treatment the material shall have a CBR of at least 100% measured after 7 day cure and 7 day soak on the site mix compacted to at least 95% MDD AASHTO T180 and the treated material shall have a plasticity index less than 6% and a plasticity modulus less than 250.

(h) Material for Cement/Lime Improved Gravel of CBR 160% (CIG 160)

Material for CIG 160 base shall include natural gravel or a mixture of natural gravel and up to 30 percent of sand or crushed stone aggregates and shall conform to the requirements given in Section 1203(d) of the Standard Specifications for Road and Bridge Construction but shall have Plasticity Index not exceeding 20% and 4 day soak CBR of at least 25%.

SECTION 14-CEMENT AND LIME TREATED MATERIALS

1403 CEMENT TREATMENT

a) Cement

In variation to this Sub-Clause, cement for improvement shall be ORDINARY PORTLAND CEMENT (OPC) complying with KS 1725: 2001 CEM I 42.5 N or equivalent, subject to the Engineer's approval. The cement content of the stabilised material shall be as indicated by the Engineer and will normally be about 4%. The Engineer shall exercise his discretion to any variation in the rate of application of the cement, which he may see fit to order from time to time.

b) Moisture content

The moisture content of the stabilised material shall be as directed by the Engineer but nevertheless within the range of 85% to 105% of the Optimum Moisture Content (AASHTO T180).

c) Mixing and Placing

The material to be stabilised and the cement shall be mixed by an approved mixing plant which will either be a mix-in-place pulvimixer or a stationary mixing plant for material to be used for pavement construction, widening and shoulders.

LIME TREATMENT

Lime treatment will be as outlined in the Standard Specifications for road and bridge construction. The lime content of the stabilised material shall be as indicated by the Engineer and will normally be about 2-4%.

1409 PROTECTION AND CURING

Protection and curing shall be carried out in accordance with the provisions of Clause 1409(i) of the Standard Specification but provision shall be made to wet the surface from time to time as directed by the Engineer.

1410 TRAFFIC

Traffic across the works will be restricted as outlined in the Standard Specifications.

1412 MEASUREMENT AND PAYMENT

Stabilizer : the provision of the stabilizer shall be measured by the tonne calculated as the specific weight of stabilizer added to the material.

Mix-in stabilizer :Mixing stabilizer into the material shall be measured by the cubic metre of treated material calculated as the product of the compacted sectional area treated and the length.

The Contractor may be required to carry out research on different soils stabilizing agents. Rates in relevant bills of quantities to apply.

SECTION 15 - BITUMINOUS SURFACE TREATMENTS

PART A - GENERAL

1501A GENERAL

Details of the spray rates for bitumen and the spread rates for chippings will be directed by the Engineer but the under listed is anticipated and can be used for guidance purpose i.e;

a) **Chippings**

-14/20mm size pre-coated chippings at a spread rate of 60-90 square meters per cubic meter.

-10/14mm size pre-coated chippings at a spread rate of 80-120square meters per cubic meter.

-6/10mm size pre-coated chippings at spread rate of 80-120 square meters per cubic meter.

b) Bitumen Spray Rates

- 1.0 – 1.4 l/m²for the first seal

- 0.6 - 1.0 l/m²for the second seal.

The Average Least Dimension (ALD) shall be determined in the field after crushing the rock for chippings and then determine the actual spray rates and chipping spread rates

PART B - PRIME COAT AND TACK COAT

1502B MATERIALS FOR PRIME COAT AND TACK COAT.

For prime coat, the binder shall be a medium-curing cutback MC 30 unless otherwise directed by the Engineer.

The rate of spray of bituminous prime coat refers to the gross volume of the cutback bitumen, that is to say the volume of the bitumen plus dilutants.

Prime coat shall be applied to gravel areas that are to receive double seal surface dressing or bituminous mixes as directed by the Engineer.

The tack coat shall consist of bitumen emulsion KI-60 unless otherwise directed by the Engineer.

The rates of spray of the binder shall be as instructed by the Engineer and shall generally be within the range 0.8-1.2 litres/square metre.

1503B PREPARATION OF SURFACE

In addition to requirements of Clause 1503B of the Standard Specifications, the Contractor shall prepare and repair cracks, edges, potholes and other failures as follows: -

- Where instructed, the Contractor shall prepare areas for the repair of potholes, road edges and other repair areas by excavating off unsuitable or failed material and debris, trimming off excavated edges, cleaning and compacting the resulting surfaces and applying MC 30 cut-back bitumen prime coat and bitumen emulsion KI-60 tack coat, all as directed by the Engineer. Measurement and payment shall be made under the relevant item of Bill No 15.
- Where the surface repair on potholes and edges are to be carried out, Asphalt Concrete Type I (0/14 gradation) shall be used. Bituminous material for repair of failures and other repair areas shall be paid for under the relevant item of Bill No 16

PART C – SURFACE DRESSING

1502C MATERIALS FOR SURFACE DRESSING

Binder

The bituminous binder shall be 80/100 penetration grade bitumen cut-back with kerosene fuel in accordance with prevailing road temperatures, and conforming to Clause 211 of the Standard Specification.

Chippings

Chippings shall be of class 2 material and shall comply in all respects with Clause 1502C of the Standard Specification. The Contractor's attention is drawn to the requirements of Clause 1501C of the Standard Specification with regard to cleanliness and dust content of chippings for surface dressing. Should it prove necessary in the Engineer's opinion to wash chippings, no extra payment will be made to the Contractor for this operation.

1503C SPRAY AND SPREAD RATES OF BITUMEN AND CHIPPINGS.

Spray and Spread Rates for bitumen and chippings cannot be calculated until samples of the chippings to be used are available for test.

After submission of samples and completion of laboratory tests on chippings and binder, the Contractor shall in the presence of the Engineer and the Chief Materials Engineer or representatives, lay trial sections of seal at various rates of spray and spread as directed by the Engineer and in accordance with clause 1503C of the Standard Specification.

Should any change occur in nature of source of chippings or bitumen, the Contractor shall advise the Engineer accordingly who will then decide if any revisions are required to the spray and spread rates.

If any changes are required, the Contractor shall carry out further trials as instructed by the Engineer.

Payment for binder and chippings will be based on the instructed spray and spread rates used which may not necessarily be those specified. The Engineer will specify the spray rates of bitumen as residual bitumen per square meter. Actual spray rates used by the Contractor must be adjusted to compensate for any cutter added.

1505C PRE-COATED CHIPPINGS

Chippings utilized for surface dressing works under this contract shall be pre-coated in accordance with clause 1505C of the Standard Specification. The binder used for pre-coating chippings shall be MC 30 cut-back bitumen.

The amount of bituminous binder used to pre-coat chippings will be as instructed by the Engineer and will normally be between 0.4% and 1.0% residual bitumen as percentage of the total dry weight.

Prior to laying any pre-coated chippings the Contractor shall prepare trial mixes of bitumen and chippings in the presence of the Engineer. After completion of trial mixes the Engineer shall issue written instructions to the Contractor indicating the amount of binder to be added in pre-coated chippings. The Contractor shall maintain this proportion unless the surface or nature of the chippings changes when the Contractor shall repeat the trials and the Engineer will issue revised instruction.

1511C MEASUREMENT AND PAYMENT

(a) Seal coat

Seal coats shall be measured by the litre, for each type of bituminous binder for each seal coat, calculated as the product of the area in square metres sprayed and the rate of application in litres/square metres, corrected to 15.6 ° C.

(b) Chippings

Chippings shall be measured by the cubic metre of each nominal size for each class calculated as the product of the area in square metres covered and the reciprocal of the instructed rate of application in square metres/cubic metre or the actual rate of application in square metres/cubic metre whichever calculation gives the lower volume.

SECTION 16 – BITUMINOUS MIX BASES, BINDER COURSES AND WEARING COURSES

PART B: ASPHALT CONCRETE FOR SURFACING

1601B Asphaltic Concrete Type II shall be used and shall meet all the requirements of the relevant Clauses of both Standard Specifications for Roads and Bridges construction of Ministry of Transport and Communication and the current (August 1987) Ministry of Roads and Public Works Road Design Manual Part III. Where the requirements of the two differ, those of Standard Specifications for Roads and Bridges shall prevail.

The material requirements will be as follows:

a) Bitumen shall be 80/100 penetration grade

b)Aggregates:

Stone Class b

Grading 0/14

c) Mineral filler - as per Clause 1602B (c)

Introduce the following amendments to Section 16 of Standard Specifications:

-1602B(b) - the aggregate for asphalt concrete Type I shall comply with the requirements for coarse aggregates class b as specified in clause 1602B(b) of standard specifications

- 1602B(c) - the grading for aggregate for binder course shall conform to the requirements for Type I binder course asphalt concrete as given in table 16B-1

- 1604B - the requirements for asphalt concrete shall conform to the specifications for Type I Binder course as given in clause 1604(B) of Standard Specifications table 16B-2

-1607B(b) Variation in binder content - there shall be no extra payment for variation of binder content from the that specified in the design mix.

SECTION 17 - CONCRETE WORKS

1703 MATERIALS FOR CONCRETE

This work shall consist of placing selected approved material of 250mm minimum diameter on the foundation put after excavation to receive levelling concrete in accordance with these specifications and in conformity with the lines, grades and cross sections shown on the Drawings as directed by the Engineer.

(a) Materials

Selected rock: The selected rock boulders to be placed for this work shall be hard, sound, durable quarry stones as approved by the Engineer. Samples of the stone to be used shall be submitted to and approved by the Engineer before any stone is placed.

The maximum size of the stone boulders shall be 300mm.

(b) Construction Method

After completion of the structural excavation the surface of the loose soil shall be levelled and compacted. Then the stone of the above sizes shall be placed in one layer of 250mm over the compacted bed where the bottom slab will rest. Coarse sand shall be spread to fill up the voids in the stone boulders, and compaction with vibratory compactors should be performed to make this layer dense whereon a concrete of levelling course shall be placed.

(c) Measurement and payment

Measurement for the bedding materials shall be made in cubic metres for the completed and accepted work, measured from the dimension shown on the Drawings, unless otherwise directed by the Engineer.

Payment for the bedding Materials for Levelling Concrete Works shall be full compensation for furnishing and placing all materials, all labour equipment, tools and all other items necessary for proper completion of the work in accordance with the Drawings and specifications and as directed by the Engineer.

1703(A) LEVELLING CONCRETE (CLASS 15/20) FOR BOTTOM SLAB INCLUSIVE OF COST OF FORM WORKS

This work shall consist of placing and levelling lean concrete class 15/20 over the prepared bed of stone boulders in the foundation for bottom slab and wing walls in

accordance with these specifications and which conformity with the lines, grades, thickness and typical cross-sections shown on the drawings unless otherwise directed by the Engineer.

(a) Materials for Levelling Concrete

Requirement for the concrete class 15/20 is specified as follows:-

Design compressive strength (28) days	:	15N/mm ²
Maximum size of coarse aggregate	:	20mm
Maximum cement content	:	300 kg/m ³ .
Maximum water/cement ration of 50% with slump of 80mm.		

(b) Construction Method

The bed of stone boulders upon which the levelling concrete will be placed shall be smooth, compacted and true to the grades and cross-section shall be set to the required lines and grades.

(c) Measurement and payment

Measurement for levelling concrete (class 15/20) shall be made in cubic metres completed and accepted levelling concrete work measured in place which is done in accordance with the Drawings and the Specifications.

Payment for this work shall be the full compensation for furnishing and placing all materials, labour, equipment and tools, and other incidentals to Specifications and as directed by the Engineer.

Pay item No. 17/02 Levelling Concrete Works (Class 15/20) for Box Culvert and wing walls inclusive of Cost of Form works.

1703(B) REINFORCING BARS OF WALLS AND SLABS

This work shall consist of furnishing, fabricating and placing in the concrete of the bottom slab, top slab, median wall, sidewalls, wing walls and aprons, reinforcing bars of the quality, type and size in accordance with these specifications in conformity with the requirements shown on the Drawings.

(a) Material:

Reinforcing bars shall be deformed and shall meet the requirements of British standard BS4461, unless otherwise called for the drawings or approved by the Engineer.

No reinforcing bar shall be delivered without a certificate guaranteeing the yield stress. The reinforcing bars shall be kept off the ground, free from

dirt, oil, grease, or avoidable rust and stored within a building or provided with suitable covers.

If it is necessary for the Engineer to ascertain the quality of the reinforcing bars, the Contractor shall test the reinforcing bars, at his own expense, by means as directed by the Engineer.

(b) Construction Method

(i) Bar Bending Schedule:

The Engineer shall provide the Contractor with bending schedule showing the location types, sizes, bending dimensions and cut lengths of the reinforcing bar required to be fixed in the works.

(ii) Cutting and Bending:

Qualified personnel shall be employed for the cutting and bending, and proper application shall be provided for such work.

Bars shall be cut and bent cold to the dimensions indicated and with equipment and methods approved by the Engineer.

Stirrups and tie bars shall be bent around a pin having a diameter not less than 15 times the minimum diameter of the bar. Bends of other bars, where full tension in the bar may occur, shall be made around a pin having a diameter not less than 7.5 times the bar diameter as shown on the Drawings.

Reinforcing bars shall be accurately formed to the shapes and dimensions indicated on the Drawings, and shall be fabricated in a manner that will not injure the materials.

(c) Placing

Reinforcing bars shall be accurately placed in proper position, and so that they be firmly held during placing of concrete.

Bars shall be tied at all intersections by using annealed iron wire 0.9mm or larger diameter, or suitable clips.

Distances from the forms shall be maintained, corrected by means of metal hangers, metal blocks, metal supports or other supports approved by the Engineer.

The Engineer shall inspect reinforcing bars after placing. When a long time has elapsed after placing reinforcing bars, they shall be cleaned and inspected again by the Engineer before placing concrete.

(d) Splicing and Joint

When it is necessary to splice reinforcing bars at points, position and methods of splicing shall be determined based on strength calculations and approved by the Engineer.

In lapped splices, the bars shall be lapped by the required length, and wired together at several points by using annealed iron wire larger than 0.9mm.

Exposed reinforcing bars intended for bonding with future extensions shall be effectively protected from injury and corrosion.

Oxyacetylene welding joint of reinforcing steel shall be done only if authorised by the Engineer in writing.

(e) Measurement and Payment

Bending and installation of reinforcing bar of piers and abutments shall be measured in terms of tons. The length of steel bar of each size will be shown on the drawings in which the bar length for splicing is excluded. In computing the weight to be measured, the theoretical weights of bars of the cross-section shown on the Drawings or authorised shall be used.

These weights are given in the following table: -

Bar type and the Cross-section in millimetres	Weight of Bar in Kilogramme— per 12m length of bar
Y10	7.40
Y12	10.66
Y16	18.95
Y20	29.60
Y25	46.30

1703 (C) FORMWORK FOR CULVERT WALLS AND SLABS

This work shall consist of all temporary moulds for forming the concrete for culvert walls and slabs together with all temporary construction required for their support. Unless otherwise directed by the Engineer all formworks shall be removed on completion of the walls and slabs.

(a) Materials

Forms shall be made of wood or metal and shall conform to the shape, lines and dimensions shown on the Drawings.

All timber shall be free from holes, loose material, knots, cracks, splits and warps or other defects affecting the strength or appearance of the finished structure.

Release Agents – Release agents shall be either neat oils containing a surface activating agent, cream emulsions, or chemical agents to be approved by the Engineer.

(b) Construction Method

i. Formworks

Formworks shall be designed to carry the maximum loads which may be imposed, and so be rigidly constructed as to prevent deformation due to load, drying and wetting, vibration and other causes. After forms have been set in correct location, they shall be inspected and approved by the Engineer before the concrete is placed.

If requested, the Contractor shall submit to the Engineer working drawings of the forms and also, if requested, calculations to certify the rigidity of the forms.

Unless otherwise described in the Contract, all form joints for exposed surfaces of concrete shall form a regular pattern with horizontal and vertical lines continuous throughout each structure and all construction joints shall coincide with these horizontal and vertical lines. PVC pipes of 50mm diameter for weep holes shall be arranged as shown on the Drawings.

Unless otherwise specified, formwork shall be designed to form chamfers at all external corners whether or not such chamfers are shown on the Drawings to prevent cracks and other damage from arising.

The inside surface of forms shall be cleaned and coated with a releasing agent to prevent adhesion of the concrete. Release agents shall be applied strictly in accordance with the manufacturer's detailed instructions. The release agent shall be applied to the formwork prior to erection. Release agent must not come into contact with reinforcement. Immediately before concrete is placed, the forms shall be thoroughly cleaned and freed from sawdust, shavings, dust, mud or other debris by hosing with water. Temporary openings shall be provided in the forms to drain away the water and rubbish.

ii. Scaffolding

All scaffolding required to support the forms shall be designed and constructed to provide necessary rigidity and support the loads without appreciable deflection or deformation.

Details, plans and structural and flexural calculations for scaffolding shall be submitted to the Engineer for approval, but in no case shall the Contractor be relieved of his responsibility for the results obtained by use of these plans, etc.

iii. Removal of formwork

The time at which the formwork is truck shall be the Contractor's responsibility and the forms shall not be removed until the concrete strength has reached 20 N/mm².

iv. Measurement and Payment

Formwork shall be measured as the net area, in square metres, in contact with the finished concrete surface of the walls and slabs. No measurement shall be allowed for formwork of temporary construction joints.

Payment for the Formworks shall be full compensation for furnishing, erecting, jointing all the forms for the concrete including furnishing and applying release agent, and construction of the required scaffolding to support the forms, all conforming to the shape, lines, grade and dimensions of the structure as shown on the Drawings, all in accordance with the Drawings and as directed by the Engineer.

1703(D) CONCRETE WORKS (CLASS 25/20)

This work shall consist of furnishing, mixing, delivering and placing of the concrete for the construction of culvert walls and slabs, in accordance with these Specifications and in conformity with the requirements shown on the Drawings.

Concrete class 25/20 shall be used for culvert wingwalls and slabs. The requirements of Concrete class 25/20 are provided as follows unless otherwise the Engineer will designate any alteration.

Design compressive strength (28 days)	: 25N/mm ²
Maximum size of coarse aggregates	: 20mm
Maximum water/cement ratio of 45% with slump of 80mm	

a) Concrete Materials

1. Cement:

Cement shall be of Ordinary Portland type and shall conform to the requirements of BS 12 or equivalent.

The Contractor shall select only one type or brand of cement or others. Changing of type or brand of cement will not be permitted without a new mix design approved by the Engineer. All cement is subject to the Engineer's approval, however, approval of cement by the Engineer shall not relieve the Contractor of the responsibility to furnish concrete of the specified compressive strength.

Conveyance of cement by jute bags shall not be permitted. Storage in the Contractor's silo or storehouse shall not exceed more than two (2) months, and age of cement after manufacture at mill shall not exceed more than four (4) months. The Contractor shall submit to the Engineer for his approval the result of quality certificate done prepared by the manufacturer.

Whenever it is found out that cement has been stored too long, moist, or caked, the cement shall be rejected and removed from the project.

2. Aggregates

Fine and coarse aggregates must be clean, hard, strong and durable, and free from absorbed chemicals, clay coating, or materials in amounts that could affect hydration, bonding, strength and durability of concrete.

Grading of aggregates shall conform to the following requirements:

a) Grading of Fine Aggregates

Sieve Size	Percentage by Weight Passing
10 mm	100
6.3mm	89-100
2.5 mm	60-100
1.2 mm	30-100
0.6 mm	15- 54
0.3 mm	5- 40
0.15 mm	0 - 15

Grading of Coarse Aggregates

Size of Coarse Aggregate	40	30	25	20	15	10	5	2.5
Amounts finer than each standard sieve percentage by weight	100	-	-	90-100	-	30-69	0-10	-

c) Other requirements for aggregates are as follows:

i. Fine Aggregates

Fitness Modulus, AASHTO M-6	: 2.3 – 3.1
Sodium Sulphate Soundness, AASHTO T104	: Max. 10% loss
Content of Friable Particles AASHTO 112	: Max 1% by weight
Sand Equivalent, AASHTO T176	: Min. 75

ii. Coarse Aggregate

Abrasion, AASGTO T96	: Max. 405 loss
Soft Fragment and shale, AASHTO M80	: Max. 5% by weight
Thin and elongated Pieces, AASHTO M80	: Max. 15%

3. Water

All sources of water to be used with cement shall be approved by the Engineer. Water shall be free from injurious quantities of oil, alkali, vegetable matter and salt as determined by the Engineer.

4. Admixture

Only admixture, which have been tested and approved in the site laboratory through trial mixing for design proportion shall be used.

Before selection of admixture, the Contractor shall submit to the Engineer the specific information or guarantees prepared by the admixture supplier.

The Contractor shall not exclude the admixture from concrete proportions.

b) Proportioning Concrete

The Contractor shall consult with the Engineer as to mix proportions at least thirty (30) days prior to beginning the concrete work. The actual mix

proportions of cement, aggregates, water and admixture shall be determined by the Contractor under supervision of the Engineer in the site laboratory.

The Contractor shall prepare the design proportions which has 120% of the strength requirement specified for the designated class of concrete.

No class of concrete shall be prepared or placed until its job-mix proportions have been approved by the Engineer.

c) Concrete Work

(i) Batching shall be done by weight with accuracy of:

Cement	: ½ percent
Aggregate	: ½ percent
Water and Admixture	: 1 percent.

(ii) Equipment should be capable of measuring quantities within these tolerances for the smartest batch regularly used, as well as for larger batches.

The accuracy of batching equipment should be checked every month in the presence of the Engineer and adjusted when necessary.

(iii) Mixing and delivery

Slump of mixed concrete shall be checked and approved at an accuracy of +25mm against designated slump in these specifications.

(iv) Concrete in hot weather

No concrete shall be placed when the ambient air temperature is expected to exceed thirty three degrees celsius (33⁰c) during placement operations.

(v) Concreting at night

No concrete shall be mixed, placed or finished when natural light is insufficient, unless an adequate approved artificial lighting system is operated, such night work is subject to approval by the engineer.

(vi) Placing

In preparation of the placing of concrete, the interior space of forms shall be cleaned and approved by the Engineer prior to placing concrete. All temporary members except tie bars to support forms shall be removed entirely from the forms and not buried in the concrete. The use

of open and vertical chute shall not be permitted unless otherwise directed by the engineer.

The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms.

d) Measurement and Payment

Measurements for the Concrete Works Class 25/20 of culvert walls and slabs shall be made in cubic metres for the walls and slabs actually constructed, measured from their dimensions shown on the Drawings. Payment for the Concrete Works (Class 25/20) of culvert walls and slabs shall be the full compensation for furnishing all materials of the concrete mixing, delivering, placing and curing the concrete, equipment and tools, labour and other incidental necessary for the completion of the work in accordance with the Drawings and these Specifications and as directed by the Engineer.

SECTION 20 - ROAD FURNITURE

2001 ROAD RESERVE BOUNDARY POSTS

Road reserve boundary posts shall be provided as directed by the Engineer and in compliance with Standard Specification clause 2001. They shall be placed at 50m intervals along the boundary of the road reserve.

2003 EDGE MARKER POSTS

Edge marker posts shall be provided as directed by the Engineer and in compliance with the requirements of Standard Specification clause 2003

2004 PERMANENT ROAD SIGNS

Permanent Road Signs shall be provided as directed by the Engineer and in compliance with the requirements of the "Manual for Traffic Signs in Kenya" Part II and standard Specification clause 2004.

2004B EXISTING ROAD SIGNS

Where directed by the Engineer, the Contractor shall take down road signs including all posts, nuts, bolts and fittings, and remove and dispose of the concrete foundation and backfill the post holes. The signs shall be stored as directed by the Engineer.

Measurement and payment for taking down road signs shall be made by the number of signs of any type and size taken down, cleaned and stored as directed.

2005 ROAD MARKING

Paint for road marking shall be internally reflectorised hot applied thermoplastic material in accordance with Clause 219 of the Standard Specification.

The rates inserted in the Bills of Quantities for road marking shall include for prior application of approved tack coat.

2006 GUARDRAILS

Contrary to the Standard Specification, guardrail posts shall be concrete 200 mm diameter set vertically at least 1.2m into the shoulder as directed by the Engineer. Spacer blocks shall also be made of concrete.

Beams for guardrails shall be "Armco Flex-beam" or similar obtained from a manufacturer approved by the Engineer.

2007 **KERBS**

(a) Vertical Joints

Vertical joints between adjacent kerbs shall not be greater than 5 mm in width and shall have mortar consisting of 1:3 cement: sand by volume.

b) Transition between flush and raised kerbs

The transition between flush and raised kerbs (e.g. at bus bays) shall be termed as ramped kerbs and shall occur within a length of 2.0m

2008 **KILOMETRE MARKER POSTS**

Kilometre marker posts shall be provided as directed by the Engineer and in compliance with Standard Specification Clause 2008.

2009 **RUMBLE STRIPS**

Where directed by the Engineer, the Contractor shall provide, place, trim, shape and compact to line and level asphaltic concrete rumble strips on the finished shoulders. This shall be done to the satisfaction of the Engineer.

2009B **BOLLARDS**

Where directed by the Engineer, the Contractor shall provide and install class 20/20 200mm diameter reinforced concrete bollards concreted 300mm into the ground.

SECTION 22-DAY-WORKS

2202 MEASUREMENTS AND PAYMENT

(a) Plant

Where items of major plant listed in the schedule of Day-works are specified by type (e.g. Concrete mixer etc.) the power rating of such items of plant provided by the Contractor shall not be lower than the power ratings of such plant manufactured within the last two years prior to the date of BID. Any item of major plant employed upon Day-works that has a power rating lower than specified above shall be paid for at rates lower than those in the schedule of Day-works. The reduction in the rate payable shall be in proportion to the reduction in power rating below that specified above.

SECTION 25 - HIV/AIDS, GENDER ISSUES, SOCIAL ISSUES AND LOCAL PARTICIPATION

2501 SCOPE

This specification sets out the Contractor's obligations with regard to on-site HIV/AIDS awareness campaign and preventive measures, which are to be instituted. The Contractor shall institute an HIV/AIDS awareness campaign amongst his workers for the duration of the Contract.

- **Scope of Activities**

Activities for HIV/AIDS awareness campaigns and prevention will be broad-based, targeting both individuals and groups. They may consist of:-

- (i) Information posters in public places, both on and offsite (eating houses, bars, guest houses, etc.) and on contractor's vehicles.
- (ii) Availability of socially marketed condoms
- (iii) Peer educators (reference people) drawn from the local labour and educated in HIV/AIDS issues for discussions with colleagues (estimate 1 per 100 employees).
- (iv) Small focus group discussions to disseminate information covering key issues.
- (v) Theatre groups and video presentations.
- (vi) Promotional events (such as football matches) to encourage openness and discussion of HIV/AIDS issues.
- (vii) Promotional billboards to raise awareness of the integration of construction and HIV/AIDS activities.
- (viii) Inclusion of HIV/AIDS activities at site meetings with District Aids Committee and other approved representatives.
- (ix) Availability of promotional materials such as T-shirts, caps, bumper stickers, key rings etc.

- **Objective**

The Objective of the HIV/AIDS training programme is to reduce the risk of exposure to and spread of the HIV virus in the area influenced by the construction. The target group will be local labourers and their supervisors employed by the works contractors. The

wider community will benefit indirectly through their normal day-to-day interaction with the target group.

2502 GENERAL REQUIREMENTS

(a) Publicity

(i) Posters

As part of the campaign the Contractor will be required to display AIDS awareness posters in all buildings frequented by workers employed on the Contract where such buildings fall under the control of the Contractor. In addition, at least ten (10) of The Contractor's vehicles, regularly used on site shall display HIV/AIDS awareness posters. The posters shall be printed on gloss paper and shall be at least A1 size on buildings and A3 size, or other approved size on vehicles. The message on the posters to be proposed by the contractor shall be approved by the Engineer before the posters are printed.

The contractor shall be responsible for the maintenance and replacement of such posters during the contract period.

(ii) T-shirts and Caps

Contractor shall provide to be used by selected staff members continually during the contract period T-shirts and caps bearing messages approved by the Engineer.

(iii) Videos Shows

Contractor shall make arrangements for educative video shows at least every two (2) months during the contract implementation. The videos shall be those approved by the Ministry of Health for use in public awareness.

(iv) HIV/AIDS Awareness Road Signs

Contractor shall provide and erect HIV/AIDS awareness permanent road signs of surface area not less than 4m² and not more than 5m².

The specifications and payments for such signs shall be in accordance with Section 20 of both Standard and Special Specifications.

(b) Condoms

As part of the campaign the Contractor will be required to make condoms available to workers. The condoms shall be from those approved by the Ministry of Health (Kenya). The Contractor shall make available at least 2,000 male and 200 female condoms every month, through dispensing machines or other approved method of distribution. The Contractor shall at all times keep the site adequately supplied with such condoms during the contract period.

(c) Training

HIV/AIDS activities are co-ordinated nationally by the National Aids Control Council (NACC). The Contractor, in consultation with NACC and the Ministry of Health (MOH), will co-ordinate with the provincial, district and local representatives. In carrying out training of all staff involved in the construction activities. The trainers consisting of persons of different disciplines and being experts in AIDS and HIV issues shall include of at least 1 counsellor.

Activities on the construction site will be linked as far as possible with on-going HIV/AIDS awareness and prevention in the area. This will ensure complementarity of approaches, reinforcing education and minimizing duplication. In addition, these links will ensure that the target group will have access to continued information after the end of the construction period.

Activities on the construction site will be linked as far as possible with on-going HIV/AIDS awareness and prevention in the area. This will ensure complementarity of approaches, reinforcing education and minimizing duplication. In addition, these links will ensure that the target group will have access to continued information after the end of the construction period.

The training sessions shall cover among others the following:

- (i) Preventive behaviours including partner reduction, condom use, awareness and appreciation of the importance of treatment of sexually transmitted incidences (STIs);
- (ii) Skills including negotiating safer sex, correct condom use, purchase of condoms without embarrassment; and referral to local health centres and available services.
- (iii) Establishing the status and focus of all current and planned HIV/AIDS activities in the area to ensure complementarity and determining potential involvement in project activities.
- (iv) Carrying out a brief review of regional activities combining road construction with

HIV/AIDS campaigns to determine options, best practice key issues, constraints etc.

- (v) Reviewing of Information, Education and Communication (IEC) materials available and their relevance to road construction, making recommendations for future development of IEC materials.
- (vi) Providing education and training for site personnel, supervisors and peer educators for the scope of activities as above.
- (vii) Providing supervision for peer educators to ensure sustained quality of education. Incentives for their continual work may be small promotional items such as T – shirts, Caps etc.
- (viii) Providing mechanism for the social marketing of condoms and distribution of materials.
- (ix) Monitoring activities regularly to assess effectiveness and impact. This should include an initial, interim and final assessment of basic knowledge, attitude and practices (KAP) taking account of existing data sources and recognizing the limitations due to the short time frame to show behaviour change. The KAP will be supported by qualitative information from focus group discussions.

The training sessions shall be conducted once every two months during the contract implementation.

(d) Timing

Activities shall commence at the start of the construction period and continue throughout the contract period to ensure a sustained impact.

2503 MEASUREMENT AND PAYMENTS

(i) Posters

Unit: Number (No.)

Payment: Payment rate for posters shall be by the Number (No.) placed or replaced upon the instructions of the Engineer.

(ii) T-Shirts and Caps

Unit: A complete Set of T-Shirt and Caps (Set)

Payment: Payment rate for T-shirts and Caps shall be by the set of T-Shirts and Caps instructed by the Engineer.

(iii) Video Shows

Unit Number (No.)

Payment: Payment rate for video shows shall be the number (No.) of shows carried out. The rates shall include all the arrangements necessary to achieve the same.

(iv) Condoms

Unit: Number (No.)

Payment: Payment rates shall by the number of condoms provided by the Contractor. The rate shall include the provisions and maintenance of appropriate and approved dispensers.

(v) Training

Unit: Session

Payment: Payment rate shall be by the number of sessions conducted. The rate shall include allowance payable, lunches, transport, tent hires, any public address system etc necessary for conducting an effective public training

In order to minimise the negative effects on the environment during construction phase, the following issues and the corresponding mitigation measures have been recommended:

A Borrow pits and Quarries

Possible sources of materials will be identified and the sites investigated for material extraction. Materials sites (borrow bit areas) if not reinstated and rehabilitated after project completion, cause landscape scarring, dangers of overhanging cliffs and falling rocks which creates environmental, health and safety hazards, stagnant water pits where children and animals drown.

Land will be acquired for obtaining construction materials i.e. borrow pits and quarries.

Mitigation Measures

The Contractor is required carry out the following:

1. Ensure that appropriate authorisation to use the proposed borrows pits has been obtained before commencing activities by seeking approval from the National Environmental Management Authority before use of any active quarry site;
2. Carry out inspection of each of the site's soil stability before excavation;
3. All borrow pits sites shall be clearly indicated on a plan and approved by the Resident Engineer;
4. Borrow pits and quarries shall be located more than 20 meters from watercourses in a position that will facilitate the prevention of storm water runoff from the site from entering the watercourse;
5. The Contractor shall give 14 days' notice to nearby communities of his intention to begin excavation in the borrow pits or quarries;
6. Prepare health and safety plan before any work on the quarries is commenced;
7. Cordon off the quarry and borrow areas to keep livestock and children off;
8. Maintain fences and "make good" of the sites afterwards.
9. The Contractor shall prepare and implement borrow pit plans and borrow pit rehabilitation plans, which would minimise the risk of erosion.

10. Topsoil shall be stripped prior to removal of borrow and stockpiled on site. This soil shall be replaced on the disturbed once the operation of the borrow site or quarry is complete;
11. The use of borrow pits or quarries for material spoil sites may be approved by the Engineer (and/or with the appropriate consent of the “landowner”). Where this occurs, the materials spoiled in the borrow pit shall be profiled to fit into the surrounding landscape and covered with topsoil;
12. Decommission the borrow pits and quarries upon completion of the Contract and reinstate the land to its natural condition by grading excavations and planting suitable saplings.

B Air pollution

During construction there is going to be dust generated in these areas. Other possible sources of air pollution will arise from exhaust and engine emissions and construction machinery.

Air emissions including dust, is regarded as a nuisance when it reduces visibility, soils private property, is aesthetically displeasing or affects palatability of grazing. Dust generated by construction related activities must be minimised.

Mitigation Measures

- a) Workers shall be trained on management of air pollution from vehicles and machinery. All construction machinery shall be maintained and serviced in accordance with the contractor’s specifications;
- b) Workers shall be trained on dust minimisation techniques;
- c) The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilised as soon as practically possible;
- d) Do not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds. The Engineer shall suspend earthworks operations wherever visible dust is affecting properties adjoining the road;
- e) Water sprays shall be used on all earthworks areas within 200 metres of human settlement. Water shall be applied whenever dust emissions (from vehicle movements or wind) are visible at the site in the opinion of the Engineer;
- f) Vehicles delivering soil materials shall be covered to reduce spills and windblown dust;
- g) Vehicle speeds shall be limited to minimise the generation of dust on site and on diversion and access roads;

- h) Any complaints received by the Contractor regarding dust will be recorded and communicated to the Engineer;
- i) Plants and all construction works should be undertaken strictly during business hours;
- j) NEMA and the Ministry of Transport has published regulatory measures related to vehicle air pollution. It is anticipated that these measures will be adhered to and the law enforcers will take control;
- k) Project-specific design improvements to limit motor vehicle air pollution impacts include:
 - i) The carriage way provides sufficient capacity to avoid traffic congestion, with projected increases in traffic flow;
 - ii) Avoiding steep grades and sharp curves which would promote deceleration, acceleration and shifting wherever possible;
 - iii) Planting tall, leafy, and dense vegetation along the road to filter pollutants.

C Noise pollution

Road constructions generally require the use of machinery, and although these activities may be intermittent and localized, they nevertheless contribute tremendous amounts of sustained noise during equipment operation. These can degrade the human welfare and by disrupting noise sensitive areas like schools and hospitals.

Mitigation Measures

1. The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours in the residential areas;
2. Schools, hospitals and other noise sensitive areas shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity. Any excessively noisy activity shall be conducted outside of school hours, where approved by the Resident Engineer;
3. Construction workers will be required to wear ear muffs in areas exposed to excessive noise levels;
4. Equipment should be maintained regularly to reduce noise resulting from friction;
5. No unnecessary hooting by project and resident vehicles;
6. Any complaints received by the Contractor regarding noise will be recorded and communicated to the Engineer.

D Vegetation Loss

The proposed project roads will follow the old roads alignment during construction, only vegetation which, has encroached into the road reserve will be cleared to give way for the proposed road.

Mitigation Measures

1. Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed nor should any unauthorised planting of vegetation take place;
2. The clearance of the site for construction purposes shall be kept to a minimum.
3. Areas to be cleared should be agreed and demarcated before the start of the clearing operations;
4. Clearing and removal of vegetation, especially at borrow sites must be carried out in such a way that damage to adjacent areas is prevented or minimised;
5. All vegetation encroaching into the road reserve must be cleared to give room for visibility;
6. Areas with dense indigenous vegetation are not to be disturbed unless required for construction purposes.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

E Impacts on soils and drainage

a. Storm water and Soil Erosion

It is expected on a properly improved road, there should be no problems of erosion or sedimentation because side drains, mitre drains, culverts and drifts are installed to effectively drain away any water.

Soil erosion is attributed to:

1. Run-off from unprotected steep slopes in the hilly areas;

2. Run-off from blockage of culverts or lack of drainage facilities;
3. Lack of scour checks on the side drains;
4. Poor drains in feeder roads.

Construction activities such as excavation and hauling of material from borrow pits and cuts for construction of embankments may also result in soil erosion.

Environmental protection measures on road works has two main benefits:

- It protects the road, thereby cutting maintenance costs, and
- It prevents off-road damage.

In terms of roadwork implementation, the contractor is responsible for ensuring that the protection measures as stipulated in the contract are carried out and that the required quality of work is provided.

Particular care is required where slopes have to be cut, fills made and drainage systems constructed. It is the contractor's obligation to protect slopes from erosion and to ensure that drainage outlets do not cause erosion

Mitigation Measures

1. Earthworks should be controlled so that land that is not required for the road works is not disturbed;
2. Wherever possible, earthworks should be carried out during the dry season to prevent soil from being washed away by the rain;
3. Excavated materials and excess earth should be kept at appropriate sites approved by the Supervising Engineer;
4. The earth dumping sites should be designed in such a manner as to facilitate natural water discharge;
5. The contractor should adhere to specified cut and fill gradients and planting embankments with shrubs and grass to reduce erosion and take care of stability problems of road embankments. Areas cleared for improving sight distance should be planted with grass to reduce erosion
6. The Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking measures to prevent the surface water from being concentrated in drainage channels or streams

and from scouring slopes, use of check dams, soak pits and gabions;

7. Areas affected by construction related activities and/or susceptible to erosion must be monitored regularly for evidence of erosion.
8. On any areas where the risk of erosion is evident, special measures may be necessary to stabilise the areas and prevent erosion. These may include, but not be limited to:
 - i. Confining construction activities;
 - ii. Using cut off drains;
 - iii. Using mechanical cover or packing structures such as geofabric to stabilise steep slopes or hessian, gabions and mattress and retaining walls;
 - iv. Mulch or chip cover;
 - v. Constructing anti-erosion berms;
 - vi. Where erosion does occur on any completed work/working areas, the Contractor shall reinstate such areas and areas damaged by the erosion at his own cost and to the satisfaction of the Engineer

b. Drainage

Bridges (Reinforced Concrete, Composite) and pipe culverts are the only drainage structures existing on the project road.

The project design has catered for the following to mitigate against drainage problems:

1. Cross drains will be used to replace some broken or damaged cross pipe culverts that by visual inspection appeared to overtop during floods.
2. Depending on the structural integrity some bridges/box culverts may be retained but extended.

Mitigation Measures

1. Where new culverts are to be installed, consultation with people settled there will be required to avoid possible conflicts that may arise due to channelling of water;
2. The Contractor shall ensure that provision is made to facilitate continuity of base water flow at all times during construction of these features across streams, rivers, lagoons and flood plains;

3. Reduction of baseline water quality through construction actions / activities shall be prevented (for example coffer dams, silt traps);
4. The Contractor shall not divert a dam or modify any watercourse without the approval of the Engineer and relevant authorities as required by the law.

Measurement and Payments

The Engineer will instruct the permanent works related to this clause such as soil erosion measures and pay under the relevant bill items. No separate payment shall be made for the other items as the Contractor shall include their costs in the rates for other measured items

F Impacts on water resources

a. Reduced water supply to local community

While the water sources within the project area are sufficient for the construction works, livestock and community domestic use, the concern is the water quality due to abstraction by the project works and its associated waste water management.

Mitigation Measures

1. The contractor should consult the community on partitioning of access to this resource for construction purposes;
2. The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006.
3. Abstractions shall be approved by the Water Resources Management Authority.

b. Water contamination

This impact will only apply where the contractor will supplement labour based methods with substantial machinery for construction and where the contractor is to set up camp. Construction equipment generates large amounts of waste oil and its proper handling is critical. Haphazard storage and leakage can result in the contamination of soils, surface and ground waters.

Pollution of water resources by oil-based pollutants from lorries and construction machinery during construction works could cause health problems for the population. Moreover it is a common practice for vehicles to be washed along the rivers and streams.

Mitigation Measures

1. The contractor should construct machinery and vehicle maintenance areas as well as sealed areas for the storage of pollutants so as to avoid any accidental discharge that would pollute water resources
2. Measures should be taken to ensure proper storage of fuel, oil and bitumen. Oil-water interceptors or sumps should be constructed to capture discharge of oils, fats and other polluting liquids from maintenance workshops, vehicle and equipment washing bays.
3. A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up.

c. Water Sources and Springs

Riparian areas and other water sources along the rivers and streams along the road may be contaminated during construction of the roads.

Mitigation measures

1. Rehabilitation of the existing water points, use of soak pits, stone pitching and check dams as velocity and siltation reducing measures of this water sources and springs
2. No construction materials shall be stockpiled within areas that are at risk of flooding;
3. The Contractor shall ensure that all construction activities at the seasonal river crossings are commenced and completed during the dry seasons (as far as possible);
4. All temporary and permanent fill used adjacent to, or within, the perennial river bed shall be of clean and or larger particles. Silts and clays shall not be permitted in the fill;
5. Plastic sheeting, sandbags or geofabric approved by the RE shall be used to prevent the migration of fines through the edges of the fill into the river;
6. The Contractor shall not modify the banks or bed of a watercourse other than necessary to complete the specified works. If such unapproved modification occurs, the Contractor shall restore the affected areas to their original profile;
7. The Contractor shall preserve all riparian vegetation;
8. The Contractor shall not pollute the watercourse or sources through any construction activities.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

25-50-002-7 Contractor's camp site

The construction contractor will need to establish camps including site offices, workshops, stores, vehicle parking.

Mitigation Measures

The mitigation measures have been divided according to the different components of the contractor's camp.

General

1. The site for the Contractor's Camp shall be determined in collaboration with the RE taking into consideration the following:
 - i. The security situation in the area.
 - ii. The local administration shall be involved in the site location to avoid destruction of any cultural sites or any other conflict;
 - iii. The Contractor's Camp layout shall take into account availability of access for deliveries and services and any future works;
 - iv. The Contractor's Camp should also be of sufficient size to accommodate the needs of all sub-contractors that may work on the project.
 - v. Decommission the camps and reinstate the land to its natural condition by filling excavations and planting suitable saplings.

Sanitation

1. The Contractor shall comply with all laws and any by-laws relating to public health and sanitation;

Workshops

1. Where practical, all maintenance of equipment and vehicles on site shall be performed in the workshop.

2. If it is necessary to do maintenance on site, but outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities;
3. The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water in his workshop and other plant or emergency maintenance facilities.
4. The workshop shall be kept tidy at all times and shall have the following as a minimum:
 - i. A smooth impermeable floor either constructed of concrete or suitable plastic covered with sufficient gravel to protect the plastic from damage;
 - ii. the floor shall be bounded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil);
 - iii. Drip trays shall be used to collect the waste oil and lubricants during servicing and shall also be provided in construction areas for stationary plant (such as compressors);
 - iv. The drip trays shall be inspected and emptied daily;
 - v. Drip trays shall be closely monitored during wet weather to ensure that they do not overflow.

General Materials Handling and Storage

1. All materials shall be stored within the Contractor's camp unless otherwise approved by the Engineer;
2. All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants. Sources of imported materials shall be listed and approved by the Engineer
3. The Contractor shall ensure that delivery drivers are informed of all procedures and restrictions (including 'No go' areas) required;
4. Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product;
5. Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure contamination from any leaks is reduced;
6. Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is identified and replaced in timely manner;

7. Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

25-50-002-8 Solid Waste

Construction will result in the creation of various solid wastes, principally surplus earth (spoil) and rock (soil debris), office wastes including.

Mitigation Measures

1. The contractor should develop a waste management plan;
2. All personnel shall be instructed to dispose of all waste in a proper manner;
3. At all places of work the contractor shall provide litter collection facilities;
4. The final disposal of the site waste shall be done at the location that shall be approved by the Engineer, after consultation with local administration and local leaders;
5. The provision of sufficient bins (preferably vermin and weatherproof) at the camp and work sites to store the solid waste produced on a daily basis;
6. Wherever possible, materials used or generated by construction shall be recycled;
7. Provision for responsible management of any hazardous waste generated during the construction works;
8. Dispose of surplus material ("spoil") only at designated sites and by approved methods.
9. The spoil area should preferably be located on land already cleared wherever possible. Communities shall be involved in the site location to avoid destruction of any ritual site or any other conflict;
10. The development and rehabilitation of spoil areas.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

G Liquid wastes

a. Wastewater and Contaminated Water Management

During the construction phase, various liquid wastes including grey and black water (respectively washing water and sewage), concrete washings, runoff from camp and workshop areas, and various liquid waste streams from washing construction vehicle and equipment washing will be generated.

Mitigation Measures

1. No grey water runoff or uncontrolled discharges from the site/working areas
2. Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site.
3. The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas
4. Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered;
5. Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;
6. The Contractor shall notify the Engineer of any pollution incidents on site.

b. Fuels, Oils, Hazardous Substances and other Liquid Pollutants

The construction phase will involve the use of stationary and mobile plant and equipment requiring refuelling and the construction of permanent and temporary fuel storage facilities.

Mitigation Measures

1. Hazardous materials shall not be stored within 2 kilometres of the top water level of public water supply reservoirs;
2. Hazardous materials shall be stored above flood level and at least 20 metres from any watercourse;
3. Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations;
4. Chemicals and fuel shall be stored in storage tanks within a secure compound.

5. Storage areas or secondary containment shall be constructed of waterproof reinforced concrete or approved equivalent
6. The minimum volume for secondary containment shall be 110% of the capacity of the largest tank system, plus 10% of the total capacity of all other separate tanks and containers within the bund wall with closed valves for controlled draining during rains;
7. Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment;
8. Fence of the tank compound with locks or other adequate security controls at the site;
9. Locks on unattended dispensing hoses;
10. Appropriate training for the handling and use of fuels and hazardous material
11. Extreme care will be taken when transferring chemicals and fuels from storage vessels to equipment and machinery on an impervious sealed area which is kerbed and graded to prevent run-off
12. All chemicals stored within the bunded areas shall be clearly labelled detailing the nature and quantity of chemicals within individual containers;
13. Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal;
14. Stormwater shall be diverted away from the fuel handling and storage areas. An oil water interceptor shall be provided to treat any rainwater from fuel storage and handling areas.

c. Concrete Batching (Where applicable)

This is principally a labour based gravel surfaced works and concreting works may be required, e.g. for drainage structures

Mitigation Measures

1. Concrete batching plant shall be located more than 20 m from the nearest stream/river channel;
2. Topsoil shall be removed from the batching plant site and stockpiled;
3. Concrete shall not be mixed directly on the ground;
4. The concrete batching works shall be kept neat and clean at all times;

5. Contaminated stormwater and wastewater runoff from the batching area and aggregate stockpiles shall not be permitted to enter streams but shall be led to a pit where the water can soak away;
6. Unused cement bags are to be stored so as not to be effected by rain or runoff events;
7. Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via wind blown dust);
8. Concrete transportation shall not result in spillage;
9. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment;
10. Suitable screening and containment shall be in place to prevent wind blown contamination associated with any bulk cement silos, loading and batching;
11. Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site;
12. All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete and disposed at an approved disposal site. Washing the remains into the ground is not acceptable;
13. All excess aggregate and sand shall be removed

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

25-50-002-10 Disruption of Access to Property

The road construction may lead to disruption of access to property.

Mitigation Measures

Disruption of access to property must be kept to a minimum at all times. Where such disruption is unavoidable, the Contractor shall advise the affected parties and the Engineer at least seven working days in advance of such disruption.

H Relocation of public utilities

Road construction could lead to disruption of existing utilities. This includes water pipes and electricity lines. However, this will be temporary as the contractor will relocate the services to the edge of the road reserve. These interruptions will be of a short time but may lead to disturbances and inconveniences.

Mitigation Measures

1. Notice should be given to the utility users prior to any interruption in supply;
2. Liaise with relevant parties which include water service institutions and KPLC.

25-50-002-12 Delays in transportation

During construction phase, the road traffic will be controlled and in some cases complete road closure will be necessary. This will entail disruption to traffic flows resulting in delay to transport of people and goods.

Mitigation Measures

1. To avoid delays to road users, the contractor will be required to plan itineraries for site traffic on a daily basis. Traffic management and control is mandatory throughout the project;
2. Temporary road signs that are visible both during the day and at night indicating road works and restrictions will be required, as detailed in section 9 of the specifications;
3. The contractor should also set aside footpaths, cycle lanes and parking bays for heavy goods vehicles and public transport vehicles;
4. Areas where construction is taking place should have clearly marked speed reduction signage.

Measurement and Payments

Traffic Control will be paid under item 09-50- 004, No separate payment shall be made for the other items. The Contractor shall include the costs in the rates for other measured items.

J Disruption of Community

All construction activities may cause disturbance to the community around the area. Managing the welfare of a significant number of workers is inevitably a major challenge, and the co-existence of multiple contractor crews of workers from diverse ethnic and geographic backgrounds can be problematic.

Mitigation Measures

1. The Engineer is to establish a formal grievance and redress mechanisms.
2. The Contractor will be required to minimise the risk of grievances with the local communities.
3. Where grievances occur, the Contractor will be required to assist in the process to investigate and resolve the grievance as effectively and quickly as reasonable;
4. The Contractors shall keep a 'Complaints register' on Site. The register shall contain:
 - i. All contact details of the person who made the complaint and information regarding the complaint itself;
 - ii. The investigations undertaken and response provided;
 - iii. Actions taken and by whom;
 - iv. Any follow-up actions taken.
5. Copies of complaints received are to be copied to the Engineer, and where pertinent.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

K Site Security

It is expected that the Contractor will make arrangements for security of its properties, equipment and worker's

Mitigation Measures

1. The Supervising Engineer and Contractor in liaison with the security organs must create awareness to the security situation on the ground all the times;
2. Appropriate fencing, security gates, shelter and security guards are to be provided at the Construction
3. The Contractor must ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft;
4. Site staff that are found to be involved in incidences of theft or pose other security risks to the local community are to be dismissed and reported to the authorities.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

25-50-002-15 Fire Incidences

Fire is an inherent risk in any construction which might lead to loss of property and sometimes loss of life.

Mitigation Measures

1. The Contractor shall ensure there is control of potential fire ignition points;
2. The Contractor shall ensure that there is basic fire-fighting equipment available on site;
3. Flammable materials should be stored in approved conditions
4. Smoking shall not be permitted in those areas where there is a fire hazard.
5. The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur.

Measurement and Payments

No separate payment shall be made for this item. The Contractor shall include the costs in the rates for other measured items

2505 HEALTH AND SAFETY MEASURES ON SITE

The Contractor shall ensure that all possible means of protection are given to the labour force at all times. Such protection shall include provision of high visibility clothing or vests, goggles and masks for workers in potentially dangerous locations or dealing with potentially harmful materials.

The following Safety Measures should be adhered to:

- First aid kits must be available on site, a qualified first aider should be on site during the working time and the Site Supervisor should also be conversant with first aid procedures. The Contractor shall maintain first aid kits with a minimum of the following items:-
 - Non Stick wound dressing
 - Selection of plaster/band aids
 - Crepe bandages

- Gauze and cotton wool
 - Antiseptic solution (washing wounds)
 - Antiseptic cream – Betadine, Burnol
 - Pain killers Panadol, Disprin
 - Anti diarrhoea – Immodium, Diadis, Charcoal, diastop or approved brand
 - Anti histamine – Piriton, Triludan
 - Anti nausea – Stemetil
 - Eye ointment
 - Oral re-hydration sachets
 - Surgical gloves
- Protective goggles for stone cutting, chiselling, grinding, and welding.
 - Face masks when working in dust and smouldering waste.
 - Helmets when working on sites where there is a danger of falling objects, e.g. in deep drains, digging pit latrines, work in quarries, etc.
 - The Site Supervisor should also know where the nearest hospital / clinic is and where an ambulance or quick transport can be found.
 - Special safety measures are required when deep trenches have to be dug, for example for culverts or structures. Depending on the material (natural soil slope) and the depth of the trench, strutting will be required to avoid collapsing trench sides. The construction of strutting has to be done carefully and requires an experienced builder.
 - No alcoholic drinks or drugs during work.

Quality Control

No worker will be assigned works without protective clothing; a percentage of the payment will be deducted whenever the Engineer or his representative finds a worker without protective gear.

Payment

50% of the Lump Sum payment for this item will be made when the contractor mobilises and provides all items as required by this clause, 25% will be paid when the works are 50% complete and the remaining 25% upon final completion.

2506 GENDER EQUALITY

According to constitutional law of the Government of Kenya, women and men have the same rights and responsibilities which are to be ensured at all levels and in all aspects of daily life.

It is therefore the obligation of Contractor to ensure that gender equalisation is achieved in all aspects of contract works. That means women should get equal opportunities with men and the recruitment process must clearly demonstrate this. Opportunities for employment should also be offered to disabled people. Special activities that they can carry out have to be identified and allocated to them.

Measurement & Payments

No separate payment shall be made for this item but the Contractor will be expected to comply fully with the requirements of this clause.

2507 LABOUR STANDARDS

It is an obligatory duty of the construction sector to maintain the international labour standards, as Kenya is one of the signatories of the International Labour Conventions of the International Labour Organisation (ILO). The contractor should observe the following requirements:

Equality:

- Men and women should receive equal pay for work of equal value.
- Persons should be given equal opportunity and treatment in employment;

There should be no discrimination against persons in their employment and occupation on the basis of their race, colour, sex, religion, political opinion, national extraction or social origin, or on any other basis set out in new constitution.

Freedom from forced labour:

- Work or service should not be exacted from any person under the menace of penalty or under circumstances where the person has not offered himself or herself voluntarily.
- Work or service should not be exacted from any person:
 - As a means of political coercion;
 - As a method of mobilising and using labour for purposes of economic development;
 - As a means of labour discipline;

- As a punishment for having participated in strikes
- As a means of racial origin,
- Social, national or religious discrimination.

Freedom of association:

All steps to be taken to protect, respect and promote workers and community's rights of association

Minimum age:

No person under the age of 18 years should be employed or work

Minimum wages:

Minimum wages should be established for groups of wage earner, in consultation with employers and Labour Department and workers organizations;

Protection of wages:

Wages should be paid in cash money. Workers should be informed of any deduction made from wages, and national regulations should set down condition for deductions from wages. Wages should be paid regularly at or near the place of work.

Before recruitment, adequate notice should be given and the notices posted in public places such as schools, chief's office and churches in order to reach as many people as possible.

During recruitment, the information on the number of jobs available and terms of employment (pay rates, timing and arrangements for payment including first payment date), should be disclosed openly. The recruitment process should be conducted in transparent manner without biases or any discrimination.

The unskilled labour is supposed to be sourced from the project area apart from specialised personnel like craftsmen and technicians who may be hired from elsewhere if they cannot be found in the project area.

Measurement & Payment

No separate payment shall be made for this item; the Contractor will be expected to comply fully with the requirements of this clause.

SECTION 26: PERFORMANCE BASED ROUTINE MAINTENANCE WORKS

2601 NOTICE TO BIDDERS

This section deals with the Procurement of Works under the Performance Based Routine Maintenance type of Contract. The maintenance will be carried out for a period of three years after improvement works are completed. During the second and the third year after completion of improvement works, the contractor will be required to carry out instructed works.

This type of contract differs substantially from the traditional contracts for road maintenance works in that most of the payments to be made to the contractor are not based on quantities of works measured by unit prices for works inputs, but on measured ‘outputs’ reflecting the target conditions of the roads under contract (in other words: ‘what the roads are supposed to look like’), expressed through ‘**Service Levels**’. Another major difference is that the Contractor is responsible for designing (deciding on) the works necessary to reach the required Service Levels, and the durability and performance of the roads over a longer period.

For example, the contractor is not paid for removing 2 cubic metres of silt from a culvert (his actual work input) in a certain month, but for keeping the culvert clean and free of silt at all times (the output of his efforts). This means that in some months he will be paid the agreed standard monthly lumpsum amount even though he has not had to do much work. In other months he might have to do a lot of work but he will still only be paid the agreed standard amount. However, if he fails to meet the Service Levels by, for example, allowing a culvert to become silted up, he will have a reduction made from his monthly lump sum.

The Service Levels are defined in the Contract and so is the method of calculating the payment reductions for non-compliance. It is intended that the contractor is motivated to do good quality work so that he reduces his maintenance burden, and therefore his costs, over the duration of the contract. If he does shoddy work he will have to repeat it and this will increase his maintenance inputs and costs. *He* must decide how best to plan and execute the works in order to make his operations cost effective.

In this particular contract this method of payment, based on Service Levels, applies mainly to the ‘**off-carriageway**’ Routine Maintenance.

There is provision in the contract for repairs and maintenance works ‘on-carriageway’ and for emergency works that may have to be carried out from time to time, but these activities are paid for using the traditional method of measuring quantities of input items, and rates, given in the Bills of Quantities.

Another important aspect in the Performance type of contract is for the contractor and employer to enter into a long term relationship whereby the contractor takes over more responsibility for managing the condition of the road and is rewarded by a longer term contract than is traditional; sometimes several years.

2602 DESCRIPTION OF PROJECT ROAD

The project roads are located in Nyeri County and are approximately 32 km long. Comprising of loops listed in the table below;

S/NO.	Link Name	Length (Km)
1	Ihwa - Ihururu	9
2	Ndugamano – Gura/ Ndugamano - Gachatha	10
3	Gachatha – Kangaita – Ithekahuno - Gatiki Roads	13
Total		32

The roads traverse flat and rolling terrain with Coffee, tea, and horticulture being the main cash crops. Maize, beans, bananas and sweet potatoes are also grown for substance consumption. Dairy farming is also practised in the area.

2603 SCOPE OF WORKS

- (a) Designing and carrying out ‘off-carriageway’ routine maintenance of the drainage system, including drainage and erosion control structures, and the control of vegetation, in order to achieve the Service Levels defined in the Specifications.
- (b) Carrying out activities ‘on-carriageway’ in order to achieve the Service Levels for cleanliness and safety as defined in the Specifications.
- (c) Repairs and routine maintenance of the paved surface, as directed by the Engineer.
- (d) Repairs and routine maintenance of the roads signs, safety barriers and other road furniture, as directed by the Engineer.
- (e) Carrying out emergency works, as directed by the Engineer.

2603 (a) Specifications- Performance Based Works

The services to be provided by the Contractor include all activities, physical and others, which the Contractor needs to carry out in order to comply with the Service Levels and other output and performance criteria indicated in the contract, or with any other requirements of the contract. In particular, they include management tasks and physical works associated with the following road-related assets and items:

- Inspect road, identify and remove all obstructions

- Clear side drains, mitre drains, cut-off drains
- Repair and replace scour checks
- Repair eroded ditches
- Clean cross culverts, access culverts, outlets and inlets
- Headwall repairs
- Clear stream channels
- Vegetation control: grass slashing, bush clearing, tree pruning
- De-silt drifts
- Maintenance and minor repairs to bridges.

Performance based routine maintenance services will be paid for as a fixed **lump sum per km per month, with payment reductions made for non-compliance**, if appropriate.

i. Timetable for Compliance with Service Level Requirements

In order to respect the Contractor’s initial mobilization period, compliance with the service levels will be introduced gradually as shown in Table 26.1.

Table 26.1 Timetable for Compliance with Service Level Requirements		
Contract Month	Road Safety Compliance required on % of contract road	Durability Compliance required on % of contract road
1	50	50
2	100	75
3	100	100
4 until end of Contract	100	100

ii. Specification for Service Levels for Road Safety

The road user must be able to travel at a certain level of safety, unobstructed by objects, wash-out material and other debris on the gravel wearing course and shoulders. The criteria for determining the service levels for safety are given in Table 26.2. The enforcement of these criteria is expected to be an immediate priority of the contractor due to the critical importance of road safety, and 100% compliance is expected from Month 2, as shown in the Timetable in Table 26.1. Compliance will be determined by Visual Inspection.

Item	Service Level	Time Allowed
Cleanliness of the road gravel surfacing and shoulders	<p>The road must always be clean and free of soil, debris, trash and other objects, which must be removed within the time given if they pose:</p> <ul style="list-style-type: none"> • A high danger to traffic: such as rocks, fallen trees, dead animals, abandoned vehicles, fly tipping and other large obstacles etc: • A lesser (medium) danger to traffic: such as material washed on to the road after storms etc: 	<p>6 hours</p> <p>4 days</p>

iii. Specification for Service Levels for Road Durability

iv. Drainage

In general terms the contractor must ensure that all drainage elements and structures are without obstructions which may reduce their normal cross-section and impede the free flow of water.

The Service Level requirements for drainage systems and drainage structures are shown in Table 26.3. Compliance will be determined by Visual Inspection.

Item	Service Level	Time Allowed for Repairs and Tolerances Permitted
Side drains, ditches, mitre drains and unlined vertical drains	Must be clean and free of obstacles	<p>Tolerance permitted:</p> <p>Siltation/Obstructions must less than 50mm in depth.</p> <p>Siltation/Obstructions must be cleared within 7 days after detection.</p> <p>Damages must be repaired within 3 weeks after detection.</p>
Culverts and access drifts	Must be clean and free of obstacles and without structural damage. Must be firmly contained by	As above

	surrounding soil or material.	
Scour checks and other erosion protection structures	Must be de-silted, structurally sound and firmly contained in surrounding soil or material.	As above

v. Vegetation

This section specifies the Service Levels to be complied with in the case of vegetation growing within the right-of-way/ road reserve.

Vegetation is to be controlled to the heights, at the locations and with the restrictions as set out in Table 26.4. Compliance will be measured with a tape measure.

Type	Height (mm)	Features applied to:
1. Vegetation Free Zone.	0	Carriageway, shoulders and structures.
2. Inner vegetation zone: from edge of shoulders to back of side drain/ditch or 2m away from edge of shoulder on straights and outside of curves, and 5m on the inside of curves. Also control of vegetation around street furniture and other features.	25 (min) to 150 (max)	Road verges and large vegetated areas, including surface water channels with longitudinal gradients $\geq 3\%$. Also vegetation control around: <ul style="list-style-type: none"> • Marker posts • Signposts • Bridge and culvert markers • Guardrails • Bridge abutments • Cross culvert ends and headwalls • Inner side drains
3. Outer vegetation zone, excluding zone 2.	50 (min) to 300 (max)	Bush clearing and vegetation control around: <ul style="list-style-type: none"> • Marker posts • Access culvert ends and headwalls • Outer side drains • Channels with gradients $\leq 3\%$.
4. Growth encroaching into Vegetation Free Zone from the side or top.	Must be removed if within 5m above the road surface.	Applies to vegetation control including trees, scrub or branches hanging over the zone.

vi. Structures

The Contractor is responsible for the routine maintenance of all bridges, retaining walls and similar structures along the contract road.

The Service Levels for bridges, retaining walls and similar structures are given in Table 2.6.3 below. Compliance will be determined by Visual Inspection.

Table 26.5 -Service Levels for Structures		
Item	Service Level	Time allowed for repairs or Tolerance permitted
Steel or other metal structures	<i>Guardrails must be present and not deformed. All metal parts of overall structure shall be painted or otherwise protected and free of corrosion. Drainage system (e.g. weep holes) to be kept in good condition and fully functional.</i>	Contractor must immediately notify Engineer in case of any condition which threatens structural integrity of the structure. Damage and defects must be repaired within seven (7) days.
Concrete structures	<i>Guardrails must be present and painted. Beams and all other structural parts must be in good conditions and fully functional. Drainage system (e.g. weep holes) in good condition and fully functional.</i>	Contractor must immediately notify Engineer in case of any condition which threatens structural integrity of the structure. Damage and defects must be repaired within seven (7) days.
Expansion joints	Clean and in good condition	<i>Damages and defects must be repaired within seven (7) days.</i>
Retention walls	Contractor must control presence and adequate condition of retention walls and their drainage.	<i>Damage and defects must be repaired within seven (7) days.</i>
Riverbeds	Contractor must ensure free flow of water under bridge and up to 50 metres upstream and downstream. Contractor must maintain design clearance under bridge. The Contractor shall take all reasonable measures to control erosion around bridge abutments and piers.	<i>Causes for non-compliance must be eliminated within fourteen (14) days after water has sufficiently receded to allow minimum working conditions.</i>

2603(b): Repairs and Maintenance Works

Repairs and Maintenance works will be carried out by the Contractor when specifically instructed by the project manager. Activities include:

- Fill potholes and minor gullies in the gravel wearing course and shoulders
- Repair carriageway edges
- Reinstate road camber
- Road furniture maintenance and repair
- Repairs to culverts, replacing rings etc

Repairs and maintenance works will be paid for as measured items in accordance with the unit rates in the Bill of Quantities.

2603 (c): Emergency Works

Emergency works, by definition, are unforeseen at the time of preparing the contract. Severe weather conditions such as unusually high rainfall can lead to flash floods which may cause wash-outs and other damage to the carriageway and other features of the road and its corridor. While specific items of work are not known at the start of the Contract it is prudent to include some general items which are indicative of the type of works that may be required. These have been included in the Bill of Quantities for Repairs, Maintenance and Emergency Works as they will probably be the same items, e.g. repairs and maintenance under an emergency situation. The quantities are nominal as they cannot be defined in advance.

In the event of an emergency the Contractor should draw to the attention of the Engineer that certain works need to be carried out to repair the carriageway and other road features to restore the safe passage of traffic along the road and ensure the integrity of the road and its corridor. The Contractor shall give the Engineer an estimate of the extent of the required activities and an estimate of the costs based on the Bill of Quantities. The Engineer will consider the information and instruct the Contractor to carry out such works as are necessary.

Emergency works will be paid for as measured items in accordance with the unit rates in the Bill of Quantities. The instructed works will be done in accordance with the following specifications:

- The General Specification for Roadworks is the Standard Specification for Road and Bridge Construction, Ministry of Transport and Communications, 1986.
- The Special Specification in the Standard Tender Documents for Procurement of Small Works -KeRRA/ Ministry of Roads, November 2009.

2604: SELF-CONTROL UNIT OF CONTRACTOR

The Contractor is obliged to assign a technically qualified and trained person, or persons, to verify continuously the degree of their compliance with the Service Levels.

The Self-control Unit is responsible for gathering the information needed by the Contractor to prepare the Monthly Statement. The unit should have a complete knowledge of the road condition, both on and off carriageway, at all times. The unit will also be responsible for carrying out, in close cooperation with the Engineer, the formal and scheduled inspections of Service Levels which will take place regularly.

The compliance (or non-compliance) of the Contractor with the service level requirements will be reported by the Self-Control Unit to the Engineer in the form of Table 26.3, given below.

2605: Site Regulations, Health and Safety Measures and Work Procedures

The Contractor shall prepare and submit to the Engineer, for approval, his proposed site regulations, health and safety measures (including HIV/AIDS mitigation measures) and work procedures.

2606: Functions of Key Personnel

The Contractor will provide as a minimum the following permanent key personnel:

- Project director – the owner, director or senior manager of the company to oversee all contractual and operational functions of the contract.
- Site Supervisor-to head the self-control unit and direct and oversee the day-to-day planning and site operations of the contract including staff and public safety issues, the free flow of traffic, liaising with the public and reporting to the Engineer. He will also decide what works have to be carried out and supervise the labour force to ensure quality and adherence to the service levels, as well as the duties described in **26-50-005**.

The roles could be done by the same person, depending on the size of the firm.

2607: Method of Formal Inspections

Formal inspections will be carried out jointly by the Engineer and the Road Manager at the end of each month. The main purpose of the formal inspections is to enable the Engineer to verify the information presented in the Contractor's Monthly Statement with the actual observed and

measured conditions on the site. The Engineer will prepare a brief Memorandum describing the following:

- i. The general circumstances of the site visit, including date, road sections visited, persons present, etc.;
- ii. Any non-compliance which may have been detected;
- iii. The time granted by the Engineer to the Contractor to remedy the detected defects.

Based on the outcome of the formal inspection, the Engineer will correct any possible errors or misrepresentations in the Contractor's statement, countersign it and present it to the Employer for payment, and to the Contractor for information.

Formal inspections will also be scheduled for the follow-up site visits, whose purpose is to verify if the Contractor has remedied the causes of earlier non-compliance, within the time frame granted by the Engineer and specified in the Memorandum.

2608: Informal Inspections of Service Levels

The Engineer may carry out informal inspections of Service Levels as part of his general mandate given to him by the Employer. He may do so on his own initiative, at any time and anywhere on the roads included in the contract. If he detects any road sections where the Service Level criteria are not met, he is obliged to inform the Contractor within 24 hours in writing, in order to enable the Contractor to take remedial action as soon as possible. The results of informal inspections may not be used by the Engineer for purposes of correcting the Contractor's monthly statements or applying penalties, except for cases in which the traffic flow on the road has been completely interrupted.

2609: Monthly Statement

The Monthly Statement to be submitted by the Contractor shall have the format shown in Table 26.6, which gives an example of how the statement is filled out. The compliance or non-compliance is reported in the table and is used to determine the degree of compliance and the payment reduction to be made in a particular month.

Table 26.6 Monthly Statement for Contract

(Sample Only)

Road Section: From km: 5.00 To km: 25.00 Length of contract road: 20.00 km

District: Nyandarua Region: Central

Contract Month: 2, October 2010

Service Level	Required Compliance		Actual Compliance			Non-compliance		Payment
Criteria	Target	km	Compliance criteria		Total Length (km)	Length	% Reduction	Reduction
					Compliant			km
1. Road Safety	100%	20.00	Cleanliness of carriageway		18.00	2.00	20%	0.40
2. Durability	75%	15.00	Drainage		13.00	2.00	30%	0.60
	75%	15.00	Vegetation height		13.00	2.00	20%	0.40
	75%	15.00	Vegetation clearance		13.00	2.00	10%	0.20
	75%	15.00	Structures and river beds		13.00	2.00	20%	0.40
							Total	2.00

Length of road for payment this month = 'Length of contract road' minus 'Payment reduction length'
 = 20.00 - 2.00 = 18.00 km

Less reductions for non-rectified previous non-compliance (Tab = 18.00 - 1.00 = 17.00

2.8)

Total payment due this month	=	'Rate per km per month'			
	=	multiplied by		'Length of road for payment this month'	
	=	? Ksh/km	x	17.00	km
	=	??	Ksh		

2610: Procedures for Inspection

The visual inspection will be undertaken as part of the Formal and Informal inspections. The criteria for Service Levels will be checked at sections selected by the Engineer based on visual appearance. The Engineer shall be the sole judge of compliance. If a specified criterion is not met, the one-kilometre section in which the deficit occurs will be judged non-compliant.

2611: Payment Reductions and Liquidated Damages

In accordance with the relevant clauses of the Conditions of Contract, Payment Reductions are applied in case of non-compliance with Service Level requirements, while Liquidated Damages are applied in the case of non-compliance with required Repair, Maintenance and Emergency Works.

The results of each formal inspection of the Service Levels and other performance criteria will be recorded by the Engineer in the form of a Memorandum. The Memorandum will state the type and location of any non-compliance detected, in particular those non-compliances already shown in the standard tables provided by the Contractor as part of the monthly statement. For each individual case of non-compliance, the Engineer will determine a date by which the Contractor must have completed the necessary measures in order to remedy the cause of the non-compliance. A follow-up site visit is therefore necessary at the date fixed by the Engineer, or soon thereafter, in order to verify that the Contractor has indeed remedied the cause of non-compliance.

If at the date indicated in the Memorandum, the Contractor has not remedied the cause for non-compliance, independent of the reason given for their failure to do so, the Contractor is subject to Payment Reductions in accordance with the relevant clauses of the Conditions of Contract.

Payment Reductions are variable over time. If the Contractor fails to remedy a cause of non-compliance for which a payment reduction has already been applied, the amount of the payment reduction increases month by month for that particular cause of non-compliance, without a ceiling being applied, until compliance is established. The calculation of the initial (first month) amounts of payment reductions, and the formula for their adjustment over time, is to be based on the following rules given in Table 26.7.

TABLE 26.7			
CRITERIA	CONDITIONS FOR APPLICATION OF PAYMENT REDUCTIONS	UNIT RATES FOR NON-COMPLIANCE	REFERENCE TO TECHNICAL SPECIFICATIONS (PARAGRAPH NO.)
Road Safety	<i>Cleanliness of road: observed anywhere in a one km section does not comply with the service levels</i>	20% of the monthly lump sum for one km applied to each one-km section which does not comply	26-50-004(a)
Drainage	<i>Cleanliness and condition of drainage structures (lateral ditches):</i> For a one-km section, to be determined for subsections of 50 m each. If unacceptable obstructions exist in more than one subsection, the one-km section does not comply	30% of the monthly lump sum for one km, applied to each one-km section which does not comply	26-50-004(a) iv
Vegetation	<i>Vegetation height (maximum):</i> The maximum height measured anywhere in a one-km section is above the threshold value	20% of the monthly lump sum for one km, applied to each one-km section which does not comply.	26-50-004(a) v
	<i>Vegetation (clearance above road):</i> The vertical clearance between the road surface and the lowest point of tree or other plant is less than the threshold value	10% of the monthly lump sum for one km, applied to each one-km section which does not comply.	26-50-004(a)
Structures and River Beds	<i>Steel, concrete, expansion joints, retention walls, river beds:</i> For a one km of section, to be determined for each structure. If non-compliant on more than one structure, the one km does not comply	20% of the monthly lump sum for one km, applied to each one-km section which does not comply	26-50-004(a) vi

Note: (i) The Unit Rates of payment reductions (“PR_u”) shown in the above table are applicable during the first 30 days of non-compliance.

(ii) If the non-compliance has not been remedied within thirty days, liquidated damages for periods beyond 30 days are calculated based on the following formula:

$$PR = 2^n PR_u \quad \text{considering:}$$

J = number of days of non-compliance, and n = $\left\{ \frac{J-1}{30} \right\}$ rounded up to full number (without decimals)

2612: Determination of Liquidated Damages- instructed Works

The liquidated damages are **0.05%** for the particular item delayed, per calendar day of delay up to a limit of 10% of the contract price.

SECTION 12:
BILLS OF QUANTITIES

PREAMBLE TO BILL OF QUANTITIES

1. The Bills of Quantities forms part of the Contract Documents and are to be read in conjunction with the Instructions to Bidders, Conditions of Contract Parts I and II, Specifications and Drawings.
2. The brief description of the items in the Bills of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed descriptions given in the conditions of Contract and Specifications for the full direction and description of work and materials.
3. The Quantities set forth in the Bills of Quantities are estimated , representing substantially the work to be carried out, and are given to provide a common basis for bidding and comparing of Bids. There is no guarantee to the Contractor that he will be required to carry out all the quantities of work indicated under any one particular item or group of items in the Bill of Quantities. The basis of payment shall be the Contractor's rates and the quantities of work actually done in fulfilment of his obligation under the Contract.
4. Payments will be made on agreed milestones in accordance with Clause 60.1 of the Conditions of Contract part II.
5. Payments for emergency and/or instructed works will be paid as and when they occur using submitted rates and/or day works and shall require prior approval of the Employer.
6. The prices and rates inserted in the Bills of Quantities will be used for valuing the work executed, and the Engineer will only measure the whole of the works executed in accordance with this Contract.
7. A price or rate shall be entered in ink against every item in the Bills of Quantities with the exception of items that already have Provisional sums affixed thereto. The bidders are reminded that no “nil” or “included” rates or “lump-sum” discounts will be accepted. The rates for various items should include discounts if any. Bidders who fail to comply will be disqualified.
8. Provisional sums (including Day-works) in the Bills of Quantities shall be expended in whole or in part at the discretion of the Engineer.
9. The price and rates entered in the Bills of Quantities shall, except in-so-far as it is otherwise provided under the Contract, include all Constructional plant to be used, labour, insurance, supervision, compliance testing, materials, erection, maintenance of works, overheads and profits, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract, transport, electricity and telephones, water, use and replenishment of all consumables, including those required under the contract by the Engineer and his staff.
10. Errors in the pricing of the Bills of Quantities will be corrected in accordance with Clause (28) of instructions to bidders.

SECTION 13: DRAWINGS
(See the Book of Drawings)

LOCATION MAP

APPENDIX A

APPENDIX TO BILL ITEM 1.05:

PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY

ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
	1. FURNITURE				
A104/1.01	Desk 2.2x0.9 m with chair and lockup drawers	No	2		
A104/1.02	Desk chair (standard)	No	15		
A104/1.03	Stationery cupboard, 1.2 m ³ , lockable	No	2		
A104/1.04	Steel filing cabinet, 4 drawers, lockable	No	2		
A104/1.05	Steel filing cabinet, 2 drawers, lockable	No	2		
A104/1.06	Bookshelf, 3 shelves 1.2 m long (to hold box files)	No	2		
A104/1.07	Table - 6 m ²	No	2		
A104/1.08	Two Plate electric heater	No	1		
A104/1.09	Fire extinguisher, 10 litre capacity, CO ₂ type	No	4		
A104/1.10	Complete first aid kit	No	2		
	EQUIPMENT				
	<i>(The following equipment shall be purpose made for use in the Engineer's laboratories and shall comply with the relevant British (BS) or American (AASHTO) Standard)</i>				
	2. General Equipment				
A104/2.02	2.49kg. Compaction hammer, drop regulated to 304.8mm	No	2		
A104/2.03	4.535kg compaction hammer drop regulated to 457.2mm	No	2		
A104/2.04	Electric vibrating Kango Hammer fitted with steel tamper(BS 1377) with support frame	No	1		
A104/2.05	Straight edge 300 mm long with handles	No	4		
A104/2.06	Steel Tamper (BS1377) compatible with Kango hammer	No	3		
A104/2.07	Compaction mould 152.4 mm. dia x 116.43 mm complete with base plate and extension collar, 101.6 mm	No	2		
A104/2.08	Galvanized metal tray 1m x 0.5m x 75 mm deep	No	4		
A104/2.09	75mm brush	No	2		
A104/2.10	Semi-automatic balance, 25kg Capacity accurate to 1g, including weights	No	1		
A104/2.11	20mm BS Sieve, 300mm diameter	No	1		
A104/2.12	Stop Clock	No	2		
A104/2.13	Thermostatically controlled electric oven 105-110 ⁰ C, capacity 0.225 m ³	No	2		
A104/2.14	As above but gas heated	No	1		
A104/2.15	Moisture content tins, 75 mm dia, Cadmium or aluminium plated	No	60		
A104/2.16	Cone penetrometer with gauge and automatically controlled test cup	No	2		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
	3. Density (Sand replacement method BS 1377)				
A104/3.01	Metal containers 450mm diameter	No	2		
A104/3.02	Stainless steel tray 305mm diameter	No	2		
A104/3.03	Metal tray with 150 mm diameter hole in the centre, 300mmx300 mm square or equivalent area, 40mm deep	No	2		
A104/3.04	Metal tray with 200mm diameter hole in the centre, 500mm x 500 mm square , 50 mm deep	No	2		
A104/3.05	Steel pegs for fixing tray in position	No	15		
A104/3.06	Sand pouring cylinder, 150 mm diameter	No	2		
A104/3.07	Sand pouring cylinder, 215 mm diameter	No	2		
A104/3.08	Cold steel chisel 20mm x 300mmm	No	4		
A104/3.09	Cold steel chisel 10mm x 250mmm	No	4		
A104/3.10	1.5kg, 3.5kg hammers and 1kg rubber mallet	Set	1		
A104/3.11	Scoop for removing excavated material from hole, 250 mm long handle	No	6		
A104/3.12	100mm brush, soft	No	3		
A104/3.13	50mm brush, soft	No	3		
A104/3.14	Primus gas stove	No	1		
A104/3.15	Calibrating can 150 mm diameter x 150 mm deep	No	3		
A104/3.16	Ditto but 200 mm diameter x 250 mm deep	No	3		
	4. Density (Nuclear Density method AASHTO T238)				
A104/4.01	Nuclear density gauge (Troxler 3411B or similar approved) complete with 3 no. hole forming device and 3 no. guide	No	1		
	5. CBR (AASHTO T193)				
A104/5.01	CBR mould, 152.4 mm dia x 178 mm high, complete with perforated base plate and extension collar 50.8 mm high that can be fitted to either side of mould	No	50		
A104/5.02	Perforated swell plate 150 mm dia with an adjustable centre post of rust proof metal provided with a lock-nut	No	40		
A104/5.03	2.25 kg split surcharge weight	No	2		
A104/5.04	Set of annular surcharge weights	No	1		
A104/5.05	Solid base plate for CBR mould	No	2		
A104/5.06	Static compaction displacer discs 1 Nox 61.4 mm, 1 No x 50.8 mm and 2 Nox 38.8 mm thick with handles	set	1		
A104/5.07	Disk lifting handle	No	2		
A104/5.08	Central extruder, complete with 20kN hydraulic jack and accessories	No	1		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
A104/5.09	Automatic CBR Proctor Compaction press, 50 tonnes capacity with an adjustable distance between platens of 530mm-250mm, rammer weights and automatic count selector	No	1		
A104/5.10	Set of guards for above press.	No	1		
A104/5.11	50 kN CBR Load frame complete with stabilising bar (electric and hand operated) including proving rings for 10KN, 28KN and 50KN, piston and bracket	No	1		
A104/5.12	Penetration gauge range 0 - 25mm	No	2		
A104/5.13	CBR piston including bracket	No	2		
A104/5.14	Swell measurement tripod complete with guage calibrated in 0.01 mm divisions	No	2		
A104/5.15	Soaking tank for CBR mould sufficient for 50 moulds	No	1		
6. Relative Density of Aggregates (BS 812)					
A104/6.01	Wire mesh basket with apertures not greater than 6.5 mm large enough to contain 2.5 kg of aggregate	No	2		
A104/6.02	A stout watertight container in which the basket can be freely suspended	No	2		
A104/6.03	Soft absorbent cloth (tea towel)	No	10		
A104/6.04	Shallow tray of area not less than 0.065 m ²	No	2		
A104/6.05	An airtight container of similar capacity to the basket	No	2		
A104/6.06	Pycnometer of 1 litre capacity	No	4		
A104/6.07	Semi automatic 5 kg balance accurate to 0.1g to be of size and type to permit the basket containing the sample to be suspended in water(to be supplied with weights)	No	1		
A104/6.08	Hot air drier (electric)	No	2		
7. Flakiness (BS 812)					
A104/7.01	Thickness gauge (various sizes)	No	2		
8. Sieve Analysis (BS 1377)					
A104/8.01	BS Sieve 300mm diameter in sizes 75, 63, 50, 37.5, 28, 20, 14, 10, 6.3, 5 and 4 mm, plus lid and receiver	Set	2		
A104/8.02	BS Sieve 200mm diameter in sizes 2, 1, 0.6, 0.5, 0.425, 0.300,0.150 and 0.075 mm, plus lid and receiver	Set	2		
A104/8.03	Electric sieve shaker	No	1		
A104/8.04	BS sieve 200mm diameter 0.425 and 0.075 mm	set	1		
A104/8.05	1 m x 1 m x 75mm deep galvanized metal tray	No	10		
A104/8.06	Riffle box with 50mm slots (BS 1377)	No	1		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
	9. Miscellaneous Equipment				
A104/9.01	Wheel barrow	No	3		
A104/9.02	Dustpan and brush	No	3		
A104/9.03	Shovel	No	4		
A104/9.04	Pick axe with handle	No	4		
A104/9.05	Metal scoop, large (150mm wide)	No	3		
A104/9.06	Metal scoop, medium (100mm wide)	No	4		
A104/9.07	Garden trowel	No	2		
A104/9.08	Steel tray 0.3m x 0.3m x 0.01m deep	No	15		
A104/9.09	Palette knife 200mm long blade	No	3		
A104/9.10	Palette knife 100mm long blade	No	4		
A104/9.11	BS sieve 450mm diameter, 37.5mm	No	1		
A104/9.12	BS sieve 450mm diameter, 20mm	No	1		
A104/9.13	BS sieve 450mm diameter, 5mm	No	1		
A104/9.14	BS sieve 450mm diameter, 0.425mm	No	1		
A104/9.15	BS sieve 450mm diameter, 0.3mm	No	1		
A104/9.16	BS sieve 450mm diameter, 0.075mm	No	1		
A104/9.17	Set of lid and receiver for metal scoop and steel trays	No	2		
A104/9.18	BS Sieve brush	No	2		
A104/9.19	Measuring cylinder set, 25 ml, 100 ml, 500 ml, 1000 ml, 2000 ml	set	2		
A104/9.20	Glass jar capacity 5 litres with lid	No	10		
A104/9.21	200mm x 200mm x 20mm cadmium plated or aluminium tin	No	20		
A104/9.22	Electronic balance capacity 1000 g, accurate to 0.01gm.	No	1		
A104/9.23	Balance 2000 g capacity accuracy to 0.1g (manual), including weights	No	1		
A104/9.24	Balance 50kg capacity accurate to 10gm including weights	No	1		
A104/9.25	Still for producing distilled water	No	1		
A104/9.26	Polythene or glass 20 litres storage vessel with tap at bottom	No	2		
A104/9.27	Stiff broom	No	2		
A104/9.28	Vernier calipers, 150mm	No	2		
A104/9.29	Vernier calipers, 250mm	No	2		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
A104/9.30	Pestle and mortar	No	2		
A104/9.31	Linear shrinkage mould (BS 1377)	No	6		
A104/9.32	Liquid Limit Device	No	2		
A104/9.33	Average least dimension gauge	No	2		
A104/9.34	Lockable tool box containing: 1 pr"Molegrips", 2 x 150mm screwdriver, 2 x 200 mm screwdriver, 2 x 300 mm screwdriver,(1 standard and 1 Phillips head of each) adjustable spanners 200 mm and 300 mm, 1 pair round nosed pliers, 1 pair general purpose pliers.	No	1		
A104/9.35	Plastic or metal bucket including lid,10 litres capacity	No	6		
A104/9.36	Polythene wash bottle (500 ml)	No	5		
A104/9.37	A4 size clipboard	No	4		
A104/9.38	Thermometer, range -10°C to150°C, glass (BS 593)	No	2		
A104/9.39	Laboratory thermometer, range + 0°C to + 250°C (BS 593)	No	2		
A104/9.40	Maximum and minimum thermometer (BS692)	No	2		
A104/9.41	Rain gauge	No	1		
A104/9.42	Portable dial thermometer + 50°C to +250°C accurate to ± 3%	No	1		
A104/9.43	Ditto with 0.75m long stem	No	1		
A104/9.44	Pocket thermometer + 50°C to +250°C accurate to ± 3% with 0.1 m stem	No	2		
A104/9.45	5 litre capacity steel storage containers with leak and dust proof lids for storage of bitumen samples	No	50		
A104/9.46	Hotplate 200mm diameter with Simmerstat heat control unit.	No	2		
A104/9.47	450mm diameter x 150mm deep metal mason's basin	No	6		
	10. Standard Specifications (<i>Copies of each of the latest editions of the following Standards</i>)				
A104/10.01	BS 598	No	1		
A104/10.02	BS 812	No	1		
A104/10.03	BS 882	No	1		
A104/10.04	BS 1377	No	1		
A104/10.05	BS 1881	No	1		
A104/10.06	BS 1924	No	1		
A104/10.07	Standard Specifications for Transportation Material and Methods of Sampling and Testing (AASHTO) Parts I and II, 14th Edition	Set	1		
A104/10.08	ASTM D1559	No	1		
A104/10.09	Asphalt Institute, Superpave Manual Series No.2(SP-2)	No	1		
A104/10.10	Overseas Road Note 19	No	1		
A104/10.11	BS 5911 Part 1 &3	No	1		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
	11. Concrete: Slump and Cube Manufacture (BS 1881)				
A104/10.12	BS 4449	No	1		
A104/11.01	Slump cone, tamping rod and base	set	2		
A104/11.02	Concrete cube mould, 150mm cube	No	30		
A104/11.03	Soaking tank for cubes (capacity 50 No.)	No	1		
A104/11.04	Cube tamping bars	No	10		
	12. Concrete: Cube Compression Testing				
A104/12.01	Concrete compression machine to BS1610 Grade A with 300 mm gauge, rectangular platens, capacity 1560 kN with load spacer	No	1		
A104/12.02	Safety guard for above				
A104/12.03	50mm distance piece				
A104/12.04	70mm distance piece				
A104/12.05	Electro-mechanical load pacer, 100 mm or equivalent distance piece				
	13. Aggregate and Chippings				
A104/13.01	Sand equivalent to AASHTO T176 including graduated plastic cylinder, rubber stopper, irrigation tube weighted foot assembly, siphon assembly, 85ml tin box (57mm dia.), 100 mm dia wide mouth funnel, stop clock, mechanical shaker and 10 litre jar	Set	1		
A104/13.02	Beaker 250ml	No	2		
A104/13.03	Aggregate Crushing Value Apparatus, 150 mm nominal diameter , including plunger and base plate	No	2		
A104/13.04	Tamping rod and metal measure for above	Set	4		
A104/13.05	Los Angeles Abrasion to ASTM standards	No	1		
A104/13.06	Set of 12 abrasive charges	No	2		
A104/13.07	Thermometer, 0°C to +50°C	No	2		
A104/13.08	Thermometer, 0°C to +250°C	No	2		
A104/13.09	Reagent grade Silica gel, 500g container	No	50		
	14. Bitumen Spray Test (BS 1707)				
A104/14.1	Transverse distribution of spray test bitumen distributor (depot tray test to BS 1707) or equivalent.	Set	1		
A104/14.02	Steel tray 20 mm deep x0.1m ² (for measuring bitumen spray rates) with purpose made detachable handle 1.5m long.	No.	4		
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
	16. Bitumen Extraction Test				
	A) Extractor Bottle Method BS 598 Part 2				
A104/16.01	Electronic top pan balance 4kg capacity, sensitive to 0.1gm	No	1		
A104/16.02	Flat bottomed scoop	No	3		
A104/16.03	Steel garden trowel	No	2		
A104/16.04	Large steel spoon	No	2		
A104/16.05	Heat resistant gloves	pair	10		
A104/16.06	Foot pump for pressurising air water assemblies up to a maximum of 700KN/m ² and fitted with flexible hose approximately 1.2m long and connector	No	2		
A104/16.07	Steel bottle 600ml capacity with 49mm rubber stopper	No	2		
A104/16.08	Steel bottle 2500ml capacity with 71mm rubber stopper	No	2		
A104/16.09	Steel bottle 7000ml capacity with 71mm rubber stopper	No	2		
A104/16.10	Flask funnel for fitting to the 700ml steel bottle with rim of funnel retaining sieve 200mm nominal diameter	No	2		
A104/16.11	Bottle roller compact bench mounted unit designed to rotate 2 bottles simultaneously about longitudinal axis	No	1		
A104/16.12	Pressure filter complete with cutting tool for making hole in the filter paper	No	1		
A104/16.13	Filter funnel to take 200mm nominal diameter sieves	No	2		
A104/16.14	Centrifuge complying with BS 598	No	1		
A104/16.15	Binder recovery	No	1		
A104/16.16	Volumetric flask 250ml, 500ml, 1000ml and 2000ml capacity	set	2		
A104/16.17	Recovery still for Dichloromethane	No	1		
	B) Hot Extractor Method BS 598 Part 2				
A104/16.18	Hot extractor complete with wire gauze container gasket, cork lid and support assembly	No	2		
A104/16.19	Dean and Stark receiver with condenser to suite Trichloroethylene				
A104/16.20	Gyratory compactor ELE Servo Pac or equivalent with 1 x 100mm and 1 x 150mm moulds	No	1		
A104/16.21	PRD Vibrating hammer compactor complete with 6 moulds, 7 base plates from ELE	No	1		
A104/16.22	Two (2) sets of Tamping foot 102mm diameter and 146mm diameter and shanks to fit the supplied vibratory hammer				
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APPENDIX A					
APPENDIX TO BILL ITEM 1.05:					
PROVIDE AND MAINTAIN FURNITURE AND EQUIPMENT FOR THE ENGINEER'S LABORATORY					
ITEM	DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page					
	17. Consumables				
A104/17.01	Paraffin wax	Kg	50		
A104/17.02	Gas	Kg	1600		
A104/17.03	Gunny sack	No	500		
A104/17.04	Plastic bag 900x450x1000 gauge	No	500		
A104/17.05	Plastic bag 450x300x1000 gauge	No	500		
A104/17.06	Filter paper 150mm diameter Whatman No. 5 (Boxes of 100)	No	20		
A104/17.07	Filter paper 400mm diameter Whatman No. 5 (Boxes of 100)	No	20		
A104/17.08	Filter paper 100mm diameter Whatman No. 5 (Boxes of 100)	No	20		
A104/17.09	Filter paper 400mm diameter Whatman No. 54 (Boxes of 100)	No	10		
A104/17.10	Filter paper 270mm diameter with 33 diameter hole at centre Whatman No. 5 (Boxes of 100)	No	15		
A104/17.11	Trichloroethylene (205 Litre Drum)	No	2		
A104/17.12	Dichloromethane	kg	0		
A104/17.13	Cotton waste	kg	50		
A104/17.14	Gas cylinders compatible with supplied stoves	No	10		
A104/17.15	Sodium sulphate	kg	45		
A104/17.16	Sand for density test	kg	250		
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APPENDIX B

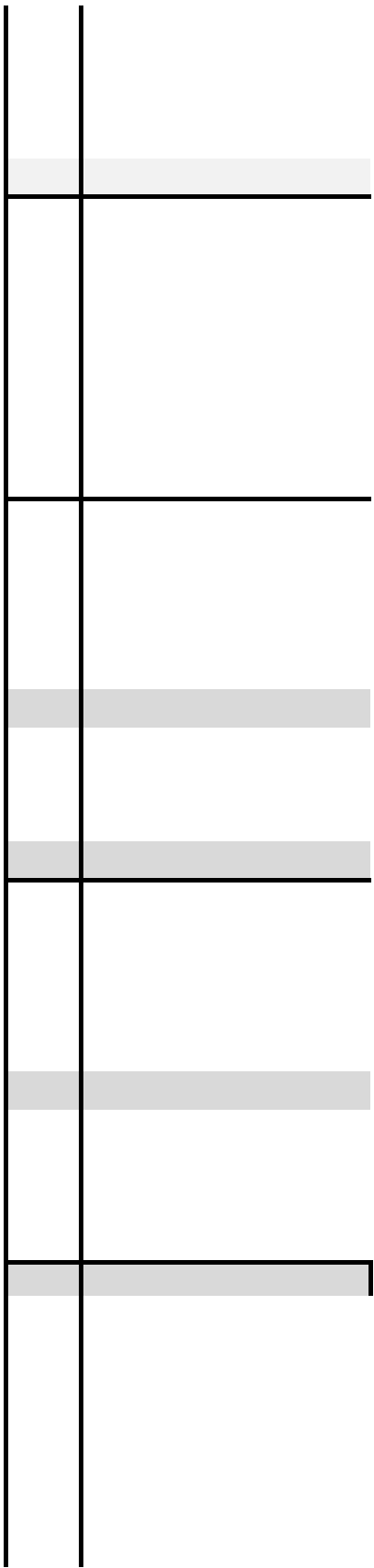
APPENDIX TO BILL ITEM 1.06A: PROVIDE, FURNISH AND MAINTAIN THE R.E.'S OFFICE

DESCRIPTION		UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
	1. ENGINEER'S MAIN OFFICE AND FURNITURE				
1	Executive desk 2.2x0.9 m with six lockup drawers	No	2		
2	Desk 2.2x0.9 m with chair and three lockup drawers	No	4		
3	Office tables	No	3		
4	Executive Swivel orthopedic chair adjustable height	No	2		
5	Standard office chairs	No	8		
6	Bench 3m long with cushioned backrest (located as directed)	No	1		
7	Typist's desk	No	1		
8	Typist's chair	No	3		
9	Lockable steel stationery cupboard, 1.2 m ³ , lockable	No	4		
10	Medium size steel filing cabinet, 4 drawers lockable	No	4		
11	Medium size steel filing cabinet, 2 lockable drawers lockable	No	3		
12	Bookshelf, 1.5 m wide 3 shelves (for box files) sliding glass door	No	3		
13	Conference table with 12 chairs	No	1		
14	Waste paper basket	No.	5		
15	Curtains for office and laboratory -for all windows and doors	Set	2		
16	Ordinary 2 hole paper punch	No	2		
17	Heavy duty 2 hole paper punch	No	2		
18	Set of full divided scale (metric 1/1000, 1/2500, 1/500, 1/2000, 1/1250, 1/1500)	No	1		
19	Computer meeting the following specifications or equivalent: Personal computer with 20" screen full multimedia, 1000GB hard disk, 12.0GB RAM, Core i7 processor, complete with all accessories preloaded with latest versions of windows OS, MS Office, Professional and MS Project	No	2		
20	Autocad Civil 3D 2012 and Licences for above computers	No	2		
21	As A103/2.11 but with 15" screen	No	4		
22	Laptop PC with Intel Core i7-350M Processor 15.4" screen, 12GB DDR3 RAM 1000GB 8xDVD+/-RW or simillar approved with Microsoft Windows professional	No	1		
23	Latest HP (A4) Laser Printer with accessories	No	3		
24	Latest HP (A3) Laser Printer with accessories	No	1		
25	UPS 600 VA	No	6		
26	wall clocks, battery powered min size 350mm x 350mm	No	2		
27	Safe for cash and valuables min.size approx. 0.8mx0.5mx0.4m to be concreted in place (wall/floor mounted) complete with lock and keys	No	1		
28	First Aid Kit	No	4		
C/Forward to next page					

APPENDIX B**APPENDIX TO BILL ITEM 1.06A: PROVIDE, FURNISH AND MAINTAIN THE R.E.'S OFFICE**

DESCRIPTION	UNIT	QTY	RATE (KSHS)	AMOUNT (KSHS)
B/Forward From previous page				
29	Fire Extinguisher	No	4	
30	Filing Tray - set of 3no.	set	10	
31	Refrigerator minimum capacity 0.2 m ³	No	1	
32	Drinking water dispenser, hot/cold	No	1	
33	Table - 0.8 m ² surface area	No	1	
34	Cupboard, 0.15 m ³ , lockable	No	1	
35	Cooker 4 plate electric cooker with oven and grill	No	1	
36	A3 Photocopier (approved make), with feeder sorting trays, scanner and print capability	No	1	
37	Reams of A4 photocopying paper	No	100	
38	Reams of A3 photocopying paper	No	20	
39	Electronic scientific calculator, Casio fx 992s or equivalent approved	No	6	
40	Stapling machine Ofrex size 50 or similar with 5000 staples	No	6	
41	Heavy duty punch and spiral binder, IBICO AG or similar approved	No	2	
42	Inkjet Plain Paper Fax Machine with 4MB of memory	No	1	
43	Pencil sharpener (desk mounted type)	No	6	
44	Digital Camera, 20.1 Megapixel(min), 1920x1080 full HD movie recording, optical steadyShot, sweep panorama, 2.7" LCD screen, minimum 15x digital zoom, multimedia card/SD 8GB memory, 12 scene selection modes, all inclusive.	No	1	
45	PABX Telephone system including intercom connecting all offices and laboratory. rate includes headsets, wiring and operational costs. including High Speed Internet Access using optic fibre or HDSL (High Data Digital Subscriber Line) broadband connection networked to all computers, with annual subscription paid during the entire contract period.	item	1	
Total carried to Bill Item 1.06A				

S/No.	Item Description
1	Geodetic GNSS Receivers



APPENDIX D

GEODETIC GLOBAL NAVIGATION SATELLITE SYSTEM SPECIFICATIONS (GNSS)

General Characteristics

accessories

Specific Specifications

1. Channels: At least 120 enabled for simultaneous signal tracking

2. Reception

Must be enabled for Multi - Constellation / Frequency i.e current systems e.g. GPS (L1, L2, L2C, L5)

GLONASS (L1C/A, L1P, L2C/A); SBAS (EGNOS, WAAS, MSAS, GAGAN, QZSS)

Galileo ready: E1, E5A, E5B

BeiDou ready (Compass) : B1, B2

Must have some multipath mitigation technology embedded

Note: Should be configured to receive new and upcoming constellations (if any)

2. Accuracy :

Real Time Kinematics (RTK)

- Horizontal: 8 mm + 1 ppm RMS
- Vertical: 15 mm + 1 ppm RMS
- Initialization time: typically < 5 s
- Initialisation reliability >99.9%

Post Processing Static

- Horizontal: 3 mm + 0.5 ppm RMS
- Vertical: 5 mm + 0.5 ppm RMS
- Baseline Length: ≤ 80 km

3. Special functionalities

Extended RTK range - base setup

simultaneously

- the base to provide WiFi hotspot functionality for better control/setup of the receiver
- the base to provide web interface functionality via any smart phone, tablet or computer
- the base to provide NTRIP caster and dyndns functions

Increased reliability - rover setup

- the rover to provide a mode for better performance under difficult conditions (close to buildings, trees and urban areas)
- the rover to be able to connect to any CORS GNSS networks or Single stations via internet

4. Communications

a) I/O

- 2x TNC connector (1 for UMTS antenna and 1 for UHF antenna)
- 2x LEMO
- 1x high speed USB
- Integrated GSM/GPRS modem
- Integrated Bluetooth class 2
- Optional radio modem (2):
 - Internal Rx/Tx: 403-473 MHz
 - External Radio: 1W - 35W adjustable (at least 12Km range)
- Should be configured to log into any upcoming CORS protocol
- Should be enabled to use SIM card

b) Radio Transmission Protocols (RTK)

- RTCM2.1, RTCM2.3, RTCM3.0, CMR, CMR+ input and output
- NMEA0183 output

5. Data Storage:

- Must be able to store raw data
- Must have at least 4 GB internal storage
- Optional external microSD storage
- Device should mount as a USB external hard drive

6. Power Supply

- Battery life: at least 5 hours in RTK mode
- Must have External power input option
- Each set should be supplied with two internal battery packs

7. Software

Two types of software

a) for Static

- Permanent licence to be included (protected by USB dongle)
- Must be able to process raw data (GPS L1&L2, Glonass L1&L2) from leading brands
- Must be able to define datums and compute various transformations

. Must be able to do 3D adjustment

· Must be able to export/import raw data to RINEX format and process the same. This feature must be inclusive of the total cost

b) for RTK

Supplier should provide licence free field data collection software that has the following key survey operational features:-

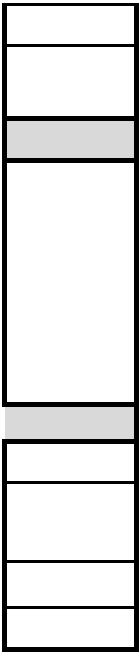
- must provide functions for topo survey
- must provide functions for stakeout
- Operating platform - Windows Mobile 6.5 or equivalent

8. Sourcing

The equipment must be sourced from manufacturer's authorized dealers in Kenya who must be capable of training users and commissioning the equipment for full use.

9. Warranty

Minimum of One year



APPENDIX C

APPENDIX TO BILL ITEM 1.06B ENGINEERS'S SURVEY EQUIPMENT

ITEM	Description	UNIT	QTY	RATE	AMOUNT (KSHS)
1.01	Digital Total Station reading to 1"accuracy (one second) with the following facilities <ul style="list-style-type: none"> · Inbuilt data logger · Uploading/downloading software · Data transfer cable · Battery (2No) · Battery charger · Tool kit · Two face keyboard · User manual It must have the following inbuilt survey programs as a minimum <ul style="list-style-type: none"> · Survey · Staking out · Resection/intersection · Traverse · Cogo 	No.	1		
1.02	The following mandatory total station accessories must be included per Total station instrument				
a	1No. Heavy duty telescopic tripod(preferably wooden)	No.	1		
b	Telescopic plumbing prism pole complete with a prism and prism holder with target and plumbing bubble (length not less than 2.15m)	No.	3		
c	· Triple prism holder set, in a casing, comprising triple prisms, prisms holder with target, tribrach and a tribrach adaptor	No.	1		
d	· Survey umbrella	No.	1		
e	· 1No.Telescopic Tripod	No.	1		
1.03	Engineer's Automatic Level Wild NAK 2 or similar with a tripod and the following specifications <ul style="list-style-type: none"> · Accuracy of 0.7 mm per 1 km double run · Standard magnification of: 32x · Shortest focusing distance of 1.6m · Compensator setting accuracy of 0.3" 	No.	2		
	Total carried forward to next page				

APPENDIX C

APPENDIX TO BILL ITEM 1.06B ENGINEERS'S SURVEY EQUIPMENT

ITEM	Description	UNIT	QTY	RATE	AMOUNT (KSHS)
	Brought Forward				-
1.04	Hand held GPS with accuracy of 1 Metre	No.	1		
1.05	Set of two way radio communication with a range of 1 kilometer	set.	1		
1.06	5 M Leveling staff with leveling bubble	No.	4		
1.07	3 M Ranging Rods	No.	10		
1.08	Scientific Calculators FX 912ms or equivalent	No.	3		
1.09	50m. Linen Measuring Tape	No.	6		
1.10	1 M stainless steel straight edge	No.	1		
1.11	3 m tape measure	No.	6		
1.12	Sledge hammer 2kg weight	No.	2		
1.13	Mattock	No.	2		
1.14	Pangas (16")	No.	10		
1.15	Marker Pens	No.	20		
1.16	Levelling Survey books	No.	100		
1.17	Reflector Jackets	No.	30		
1.18	Provision of Geodetic GNSS receivers comprising of one base and two rovers as per the specifications in Appendix D	No.	1		
	Total carried to Bill Item 1.06B				

SUMMARY OF BILL OF QUANTITIES		
BILL ITEM	DESCRIPTION	AMOUNT (KSHS)
1	Preliminaries and General Items	
4	Site Clearance and Top Soil Stripping	
5	Earth Works	
7	Excavation and Filling of Structures	
8	Culverts and Drainage Works	
9	Passage to Traffic	
12	Natural Gravel Base and Subbase	
14	Lime/Cement Improved gravel Subbase and Base	
15	Bituminous Surface Treatment and Surface Dressing	
16	Bituminous Mixes	
17	Concrete Works	
20	Road Furniture	
21	Miscellaneous Bridge works	
22	Schedule of Dayworks.	
25	HIV/AIDS, Gender & Social Issues, Local Participation	
(A)	SUB-TOTAL (1)	
(B)	Add 15% VARIATION OF PRICE of sub total (1)	
(C)	Add 10% CONTIGENCIES of sub total (1)	
(D)	SUB-TOTAL (2) = (A + B + C)	
(E)	Add ...16% VAT of sub-total (2)	
TOTAL CARRIED FORWARD TO FORM OF BID AS BID SUM 1		

SECTION 1: PERFORMANCE BASED ROUTINE MAINTENANCE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	Road safety				
1.01	1)Removal of trees, falling rocks,logs or any other obstruction on the carriageway	Km.Month	1,152		
	2) Bush clearing including grass cutting for visibility and safety Durability	Km.Month	1,152		
1.02	Clean side drains, mitre drains, cross and access culverts to free flow conditions	Km.Month	1,152		
(A)	SUB-TOTAL 1: CARRIED FORWARD TO GRAND SUMMARY OF PERFORMANCE BASED ROUTINE MAINTENANCE				

SECTION 2: INSTRUCTED WORKS FOR PERFORMANCE BASED ROUTINE MAINTENANCE					
BILL NO. 5 : EARTHWORKS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No separate payments shall be made for gravel for blinding on hard material fill areas or hauling to spoil unsuitable excavation materials and the cost of such shall be included in the rates and prices</i>				
5.01	Fill in soft material including benching of shoulders for repairs to embankments, shoulders and compaction to 95% MDD (AASHTO T99) in layers not exceeding 150mm	m ³	4,500		
5.02	Ditto item 5.01 but in hard material	m ³	500		
5.03	Cut to spoil in soft material	m ³	172		
5.04	Ditto item 5.03 but in hard material	m ³	10		
Bill No. 5 Total Carried Forward to Summary					

BILL NO. 7 : EXCAVATION AND FILLING OF STRUCTURES					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No separate payments shall be made for gravel for blinding or hauling to spoil unsuitable excavation materials and the cost of such shall be included in the rates and prices</i>				
7.01	Provide and place 150mm thick stone pitching as directed by the Engineer including cement grouting	m ²	750		
7.02	Excavate for gabions in soft material.	m ³	60		
7.03	Provide and place gabion boxes and mattresses where directed by the Engineer.	m ²	300		
7.04	Rockfill to gabions.	m ³	130		
7.05	Filter fabric behind gabion boxes.	m ²	40		
Bill No. 7 Total Carried Forward to Summary					

BILL NO. 8. CULVERTS AND DRAINAGE WORKS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No separate payments shall be made for gravel for blinding or hauling to spoil unsuitable excavation materials and the cost of such shall be included in the rates and prices</i>				
8.01	Excavate for inlet,outfall,mitre and catch water drains in soft material	m ³	700		
8.02	As per item 8.01, but for hard material	m ³	55		
8.03	Excavation in soft material for pipe culverts,headwalls, wingwalls, apron, toewalls,and drop inlets and compact as directed by the engineer	m ³	675		
8.04	As per item 8.03, but for hard material	m ³	50		
8.05	Provide,lay and joint 600mm dia. concrete pipes (precast to BS 5911 Parts 1 & 3) for access roads	m	360		
8.06	Provide,lay and joint 900mm dia. concrete pipes (precast to BS 5911 Parts 1 & 3) for access roads	m	200		
8.07	Provide and place class 15/20 concrete to beds, surround and haunches	m ³	280		
8.08	Provide, place and compact class 25(20) concrete for headwalls, wingwalls, aprons,and toewalls to access and cross pipe culverts including all form work and the provision and placing of reinforcement as shown in the drawings	m ³	230		
8.09	Provide and place invert block drains 300mm radius with two course side slabs	m	100		
8.10	Construct in concrete class 15(20) side drains scour checks as instructed	m ³	35		
8.11	Provide and place reinforced with Y10 BARS spaced 200x200 c/c precast concrete slabs 1000mm x 600mm x 150mm with recessed lift hooks and water ingress notches as instructed and place over open lined drains where instructed	No.	120		
Bill No. 8 Total Carried Forward to Summary					

BILL NO. 11 : SHOULDERS TO CARRIAGEWAY PAVEMENT AND PEDESTRIAN WALKWAYS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
11.01	Grade, shape, water and compact existing shoulders, access and busbays where directed by the Engineer	m ²	32,000		
11.02	Cut benches on shoulders , widening and busbays where directed by the Engineer	m ²	32,000		
11.03	Provide , lay and compact 150mm thick gravel to shoulders in accordance with specifications and as directed by the Engineer	m ³	2,300		
Bill No. 11 Total Carried Forward to Summary					

BILL NO. 12 : NATURAL MATERIAL FOR SUBBASE AND BASE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No overhaul will be paid for separately under these items as it shall be deemed to have been included in the Contractor's rates</i>				
12.01	Provide gravel of base quality material, haul, spread, compact to at least 100% M.D.D (AASHTO T-180) and shape to level and tolerance for repairs to pavement layers as instructed	m ³	1,200		
Bill No. 12 Total Carried Forward to Summary					

BILL NO. 14 : CEMENT OR LIME TREATED SUBBASE AND BASE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No overhaul will be paid for separately under these items as it shall be deemed to have been included in the Contractor's rates</i>				
14.01	Provide and spread Lime as an improvement agent for sub-base and base	Tonne	100		
14.02	Provide and spread Cement as an improvement agent for sub-base and base	Tonne	120		
14.03	Mix and process natural material with improvement agent for pavement layers as instructed by the Engineer or as specified	m ³	500		
14.04	Curing of cement / lime treated base and sub-base layers	m ²	2,500		
Bill No. 14 Total Carried Forward to Summary					

BILL NO. 15: BITUMINOUS SURFACE TREATMENT & SURFACE DRESSING TO SHOULDERS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
15.01	Prepare surface of road base and shoulders, provide, heat and spray MC 30 cutback bitumen prime coat at 0.8-1.2 Litres/m ² .	Litres	260,000		
15.02	Prepare surface of road and shoulders, Provide, heat and spray 80/100 cut-back bitumen as first seal on the shoulders at a rate of 1.0-1.2 Litres/m ² .	Litres	260,000		
15.03	Prepare surface of road base and shoulders, Provide, transport, lay and roll 10/14 mm Class 2 pre-coated with MC 30, chippings class 1 at a rate of 90-110m ² /m ³	m ³	2,500		
15.04	Prepare surface of road base and shoulders, Provide & spray K1-60 as tack coat on carriageway, rate of 0.5-0.8 l/m ²	Litre	100		
Bill No. 15 Total Carried Forward to Summary					

BILL NO. 16: BITUMINOUS MIXES					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
16.01	Provide, lay and compact cold Asphalt Concrete(AC) for repair of carriageway as directed by the Engineer. The rate to include preparing the ground including compaction to receive AC.	m ³	1,000		
16.02	Provide and erect Asphalt Concrete Type I bumps and rumble strips as directed by the Engineer at Bitumen Content of 5.5 - 7.0% by weight of total mix.	m ³	50		
Bill No. 16 Total Carried Forward to Summary					

BILL NO. 20: ROAD FURNITURE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
20.01	Provide and replace permanent road signs				
	a) warning signs	No.	3		
	b) Priority prohibitory and mandatory signs	No.	5		
	c) Standard informatory signs	No.	3		
	d) Non standard informantor signs area		1		
	i) Less than 1.0m ²	No.	5		
	ii) More than 1.0m ² but less than 5m ²	No.	3		
20.02	Provide and replace guard rails	m	11		
20.03	Provide and replace handrail	m	11		
20.04	Provide, deliver, paint and mark the road as specified or as directed by the Engineer, with white reflectionized thermoplastic paint from an approved supplier.	m ²	6,400		
20.05	As item 20.04 but for yellow reflectionized thermoplastic paint	m ²	3,200		
Bill No. 20 Total Carried Forward to Summary					

SUMMARY OF INSTRUCTED WORKS FOR PERFORMANCE BASED ROUTINE MAINTENANCE		
BILL ITEM	DESCRIPTION	AMOUNT (KSHS)
5	Earth Works	
7	Excavation and Filling of Structures	
8	Culverts and Drainage Works	
11	Shoulders to Carriageway pavement and pedestrian walkway	
12	Natural Gravel Base and Subbase	
14	Lime/Cement Improved gravel Subbase and Base	
15	Bituminous Surface Treatment and Surface Dressing	
16	Bituminous Mixes	
20	Road furniture	
(B)	SUB-TOTAL (2) - INSTRUCTED WORKS FOR PERFORMANCE BASED ROUTINE MAINTENANCE CARRIED FORWARD TO GRAND SUMMARY	

GRAND SUMMARY OF BILL OF QUANTITIES FOR MAINTENANCE WORKS		
BILL ITEM	DESCRIPTION	AMOUNT (KSHS)
(C)	Total for Performance based routine maintenance works (PBRM) = SUB-TOTAL (1)	
(D)	Total for instructed maintenance works = SUB-TOTAL (2)	
(E)	SUB-TOTAL (3) = (C) + (D)	
(F)	Add 5% CONTIGENCIES of sub total (3)	
(G)	Add 15% VARIATION OF PRICE of sub total (3)	
(H)	SUB-TOTAL (4) = (E) + (F) +(G)	
(I)	Add ...16% VAT of sub-total (4)	
GRAND TOTAL (H) + (I)-CARRIED FORWARD TO FORM OF BID AS BID SUM 2		

GRAND SUMMARY

ITEM NO.	DESCRIPTION	AMOUNT (KSH.)
1	TOTAL CARRIED FORWARD TO FORM OF BID AS BID SUM 1	
2	TOTAL BROUGHT FORWARD TO FORM OF BID AS BID SUM 2	
TOTAL CARRIED FORWARD TO FORM OF BID		

BILL NO. 1. PRELIMINARIES AND GENERAL ITEMS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
1.01	Provide or rent accomodation for Engineer's senior and junior staff				
	(i) Type I -1 No.	Month	30	65,000	1,950,000.00
	(i) Type II - 3 No.	Month	90	55,000	4,950,000.00
	(iii) Type III -5 No.	Month	150	40,000	6,000,000.00
	(iv) Type IV -10 No.	Month	300	30,000	9,000,000.00
	(v) Type V- 10 No.	Month	300	21,000	6,300,000.00
	Total	Total Item 1.01			28,200,000.00
1.02	E.O item 1.01 for contractor's overhead and profit	%			
1.03	Provide or rent and maintain Engineer's Representative's office as shown on the drawings or as instructed by the Engineer for use during the duration of the Contract, ownership to revert to the Employer at the end of the Contract	LUMP SUM	1		
1.04	Provide or rent and maintain Engineer's Site Laboratory for the duration of the Contract, ownership to revert to the Employer at the end of the Contract	LUMP SUM	1		
1.05	Provide and maintain Laboratory equipment, reagents and other items as priced in Appendix 'A' to the Bill of Quantities for use by the Engineer's representative for the duration of the contract.	LUMP SUM	1		
1.06A	Provide and maintain furniture , tools and other items for the Engineers office and Engineer's representative houses as priced in Appendix B for the duration of the contract	LUMP SUM	1		
1.06B	Provide and maintain survey equipment as priced in Appendix C for the duration of the contract	LUMP SUM	1		
1.07	Provide with drivers, fuel and maintain one (1) new 4WD fully loaded station wagon of minimum diesel engine capacity 3000cc approved by the Engineer for his exclusive use, inclusive of the first 5000km per vehicle month. Vehicle to revert to the Contractor at the end of the project.	veh Month	30		
1.08	EO item 1.07 for total aggregated mileage in excess of 5000km per vehicle month.	km	150,000		
1.09	Ditto item 1.07, but one (1) new 4WD fully loaded double cabin pick-up of minimum diesel engine capacity 3000cc approved for the exclusive use of the Engineer inclusive of the first 5000km per vehicle month. Vehicles to revert to the Contractor at the end of the project.	veh Month	36		
1.10	E.O item 1.09 for total aggregated mileage in excess of 5000 km per vehicle per month.	km	150,000		
1.11	Ditto item 1.07, but two (2) new 4WD standard double cabin pick-ups of minimum diesel engine capacity 3000cc approved for the exclusive use of the Engineer inclusive of the first 5000km per vehicle month. Vehicles to revert to the Contractor at the end of the project.	veh Month	72		
1.12	E.O item 1.11 for total aggregated mileage in excess of 5000 km per vehicle per month.	km	300,000		
1.13	Ditto item 1.07, but two (2) new 4WD Single cabin pick-up with fibre glass body of minimum diesel engine capacity 3000cc approved for the exclusive use of the Engineer inclusive of the first 5000km per vehicle month. Vehicle to revert to the Contractor at the end of the project.	veh Month	72		
1.14	E.O item 1.13 for total aggregated mileage in excess of 5000 km per vehicle per month.	km	300,000		
1.15	Allow a Prime Cost Sum of Kshs. 9,000,000 for the RE's miscellaneous account to be spent in whole or part as directed by the RE against receipts.	PC Sum		9,000,000.00	9,000,000.00
1.16	E.O. item 1.15 for Contractor's overheads and profits.	% of item			
1.17	Allow a Prime Cost Sum of Kshs21,000,000.00 for attendance upon the Resident Engineer' staff.	PC Sum		21,000,000.00	21,000,000.00
1.18	E.O. item 1.17 for Contractor's overheads and profits.	% of item			
1.19	Allow a Prime Cost Sum of Kshs 10,000,000.00 for relocation of services	PC Sum		10,000,000.00	10,000,000.00
1.20	E.O. item 1.19 for Contractor's overheads and profits.	% of item			
1.21	Provide Mobile Weigh Bridge as per specifications in appendix E (attached as PDF)	No	1		
1.22	Provide, erect and maintain publicity signs as directed by the Engineer.	No	6		
1.23	Allow a Prime Cost Sum of Kshs 7,500,000.00 for training of Engineer's personnel.	PC Sum		7,500,000.00	7,500,000.00
1.24	E.O. item 1.23 for Contractor's overheads and profits.	% of item			
Bill No. 1 Total Carried Forward to Grand Summary					

BILL NO. 4 : SITE CLEARANCE AND TOP SOIL STRIPPING					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
4.01	Clear site on road reserve including removal of all growths, bushes, hedges, trees, stumps, grub up roots, and other deleterious materials and back-fill and compact to 100% MDD(AASHTO T99) with approved material as directed by the Engineer.	Ha.	36		
4.02	Strip top soil upto 0.2m in thickness along alignment or material sites including removal of all grass and other vegetation,transport to spoil and spread or stock pile for re-use as directed by the Engineer.	m ³	75,000		
4.03	Provide KShs 2,000,000 for the removal of structures and obstructions to be paid on dayworks basis	Prov Sum	1	2,000,000.00	2,000,000.00
Bill No. 4 Total Carried Forward to Grand Summary					

BILL NO. 5 : EARTHWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	NOTE: No separate payment shall be made for the overhaul of material and the cost of such haulage shall be included in the rates and/or prices inserted				
5.01	Fill in soft material including benching of shoulders and embankments and compaction to 95% MDD (AASHTO T99) in layers not exceeding 150mm	m ³	200,000		
5.02	Ditto item 5.01 but in hard material	m ³	20,000		
5.03	Cut to spoil in soft material	m ³	300,000		
5.04	Ditto item 5.03 but in hard material	m ³	35,000		
5.05	Provide improved sub grade material to as shown on the drawings and compaction to 100% MDD (AASHTO T99)	m ³	110,000		
5.06	Compaction of top 300mm below formation level in cuts and fills to 100% MDD (AASHTO T99)	m ³	150,000		
5.07	Compaction of original ground below fills to 95% MDD.(AASHTO T99)	m ³	120,000		
5.08	Top-soiling prior to planting grass as directed by the Engineer	m ²	150,000		
5.09	Grassing as directed by the Engineer	m ²	150,000		
Bill No. 5 Total Carried Forward to Grand Summary					

BILL NO. 7 : EXCAVATION AND FILLING OF STRUCTURES

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	These work items covers all excavations and filling operations to bridges, box culverts, retaining walls and other major structures.				
7.01	Excavate to spoil in soft materials.	m ³	6,500		
7.02	As item 7.01 but in hard material.	m ³	2,000		
7.03	Provide,place and compact rockfill below strucures.	m ³	2,000		
7.04	Provide and place 150mm thick stone pitching including grouting as directed by the Engineer.	m ²	12,000		
7.05	Excavate for gabions in soft material.	m ³	2,000		
7.06	Provide and place gabion boxes and mattresses where directed by the Engineer.	m ²	3,300		
7.07	Rockfill to gabions.	m ³	1,500		
7.08	Filter fabric behind gabion boxes.	m ²	1,000		
7.09	Provide and backfill approved material around new box culverts, compact to 100% MDD (AASHTO T99) in layers not exceeding 150mm.	m ³	2,000		
7.11	Allow for protection of structures pusuant to section 707 of the specifications	LS	1		
7.11	River training in soft material	m ³	500		
Bill No. 7 Total Carried Forward to Grand Summary					

BILL NO. 8. CULVERTS AND DRAINAGE WORKS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No separate payments shall be made for gravel for blinding or hauling to spoil unsuitable excavation materials and the cost of such shall be included</i>				
8.01	Excavate for inlet,outfall,mitre and catch water drains in soft material	m ³	6,725		
8.02	As per item 8.01, but for hard material	m ³	1,500		
8.03	Excavation in soft material for pipe culverts,headwalls, wingwalls, apron, toewalls,and drop inlets and compact as directed by the engineer	m ³	3,500		
8.04	As per item 8.03, but for hard material	m ³	1,200		
8.05	Provide,lay and joint 600mm dia. concrete pipes (precast to BS 5911 Parts 1 & 3) for access roads	m	1,980		
8.06	As for item 8.05 but 900mm dia concrete pipes (precast to BS 5911 parts 1 & 3) for cross culverts	m	1,584		
8.07	As for item 8.05 but 1200mm dia concrete pipes (precast to BS 5911 parts 1 & 3) for cross culverts	m	250		
8.08	Provide and place class 15/20 concrete to beds, surround and haunches	m ³	2,000		
8.09	Provide, place and compact class 25(20) concrete for headwalls, wingwalls, aprons, and toewalls to access and cross pipe culverts including all form work and the provision and placing of reinforcement as shown in the drawings	m ³	1,560		
8.10	Provide and place invert block drains with two course side slabs (Provisional)	m	2,500		
8.11	Construct in concrete class 15(20) side drains scour checks as instructed	m ³	1,000		
8.12	Excavate and remove broken pipe culverts including inlet and outlet structures	m	1,000		
8.13	Provide and place precast concrete slabs 1000mm x 600mm x 50mm and place over open lined drains in trade centres and markets	No.	1,000		
Bill No. 8 Total Carried Forward to Grand Summary					

BILL NO. 9: PASSAGE OF TRAFFIC					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	NOTE: Notwithstanding the provision of Section 9 of the Standard Specification, no extra payments shall be due as all costs shall be deemed to be included in the rates inserted herein				
9.01	Construct and maintain diversions in maximum lengths of 5km sections as directed by the Engineer, including including 150mm wearing course gravel all signage, lighting and barriers	km	32		
9.02	Provide, spread, water and compact gravel of minimum CBR 30% as directed by the Engineer for maintenance works.	m ³	15,000		
9.03	Allow for the passage of traffic through and around the works	LS	1		
9.04	Grade, water and compact existing road ahead of works	km	32		
Bill No. 9 Total Carried Forward to Grand Summary					

BILL NO. 12 : NATURAL MATERIAL FOR SUBBASE AND BASE

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No overhaul will be paid for separately under these items as it shall be deemed to have been included in the Contractor's rates</i>				
12.01	Provide gravel sub-base material, haul, spread, compact to at least 100% M.D.D (AASHTO T-180) and shape to level and tolerance.	m ³	50,000		
12.02	Ditto item 12.01 but for base	m ³	35,000		
Bill No. 12 Total Carried Forward to Grand Summary					

BILL NO. 14 : CEMENT OR LIME TREATED SUBBASE AND BASE

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<i>Note: No overhaul will be paid for separately under these items as it shall be deemed to have been included in the Contractor's rates</i>				
14.01	Provide and spread Lime as an improvement agent for sub-base and base	Tonne	3,000		
14.02	Provide and spread Cement as an improvement agent for base	Tonne	2,000		
14.03	Mix and process natural material with improvement agent for pavement layers as instructed by the Engineer or as specified as instructed by the Engineer or as specified.	m ³	85,000		
14.04	Curing of cement / lime treated base and sub-base layers	m ²	520,000		
Bill No. 14 Total Carried Forward to Grand Summary					

BILL NO. 15: BITUMINOUS SURFACE TREATMENT & SURFACE DRESSING TO SHOULDERS

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
15.01	Prepare surface of road base and shoulders, provide, heat and spray MC 30 cutback bitumen prime coat at 0.8-1.2 Litres/m ² .	Litres	300,000		
15.02	Provide & spray K1-60 as tack coat on carriageway, rate of 0.5-0.8 l/m ²	litre	200,000		
Bill No. 15 Total Carried Forward to Grand Summary					

BILL NO. 16: BITUMINOUS MIXES					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
16.01	Provide, lay and compact 35mm Asphalt Concrete Type II wearing course as directed by the Engineer at Bitumen Content of 5.5 - 7.0% by weight of total mix.	m ³	8,500		
16.02	Provide and erect Asphalt Concrete Type II bumps and rumble strips as directed by the Engineer at Bitumen Content of 5.5 - 7.0% by weight of total mix.	m ³	500		
Bill No. 16 Total Carried Forward to Grand Summary					

BILL NO. 17. CONCRETE WORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	BRIDGES AND BOX CULVERTS				
	<u>Concrete</u>				
17.01	Provide, place and compact Class 15(20) concrete blinding as instructed by the Engineer	m ³	350		
17.02	Provide, place and compact concrete class 25(20) to base of wingwall, abutments, main beams, cross-beams ,deck and approach slabs as shown in drawings.	m ³	1,500		
	<u>Reinforcement: Provide, cut, bend & fix into position steel reinforcement as shown in the drawings or as instructed by the Engineer</u>				
17.03	High yield reinforcement steel bars to BS 4461 equal to or less than 16mm diameter bar size	Tonne	70		
17.04	High yield bond strength reinforcement steel to BS 4461 greater than 16mm diameter bar size	Tonne	50		
	<u>Formwork : Provide, erect and afterwards dismantle and remove all the formwork as specified by the Engineer</u>				
17.05	Provide & fix in place vertical formwork to achieve class F1 finish	m ²	2,000		
17.06	As item 17.05 but horizontal	m ²	2,200		
17.07	As item 17.05 but sloped.	m ²	2,150		
17.08	Vertical formwork to achieve class F3 finish	m ²	2,500		
Bill No. 17 Total Carried Forward to Grand Summary					

BILL NO. 20: ROAD FURNITURE					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
20.01	Provide Road Reserve Boundary posts	No.	128		
20.02	Excavate for, provide & place 250 x 125mm precast concrete raised or ramped kerbs haunched in 100mm thick class 15/20 concrete base bedding and mortar joined in support to carriageway, busbays and junctions as directed by the Engineer.				
	a) Straight kerbs	m	300		
	b) Kerbs radius 12m - 6m	m	300		
	c) Ditto but radius 5m - 1m	m	150		
20.03	As 20.02 but for flush kerbs 100 x 125mm	m	150		
20.04	Provide and erect permanent road signs where instructed by the Resident Engineer and in accordance with Special Specifications Clause 2004 as follows:				
	a) warning signs	No.	45		
	b) Priority prohibitory and mandatory signs	No.	45		
	c) Standard informatory signs	No.	30		
	d) Non standard informator signs area				
	i) Less than 1.0m ²	No.	38		
	ii) More than 1.0m ² but less than 5m ²	No.	30		
20.05	Provide, deliver, paint and mark the road as specified or as directed by the Engineer, with white reflectionized thermoplastic paint from an approved supplier.	m ²	6,400		
20.06	As item 20.05 but for yellow reflectionized thermoplastic paint	m ²	3,520		
20.07	Provide and erect concrete posts for guardrails complete with spacers (size and interval) as per specifications or as directed by the Engineer	No.	650		
20.08	Provide and erect flex-beam guardrails complete with connections as shown on the drawings or as directed by the Engineer	m	2,000		
20.09	Provide Edge marker posts	No.	75		
20.10	Provide kilometre marker posts as directed by the Engineer	No.	64		
Bill No. 20 Total Carried Forward to Grand Summary					

BILL NO. 21: MISCELLANEOUS BRIDGE WORKS					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
21.01	Provide and place into position handrails to kerbs of bridge deck & ramps as shown on the drawing and as directed by the Engineer.	m	200		
21.02	Provide and place into position handrails along the edge of the carriageway as per drawings and as instructed by the Engineer.	m	100		
21.03	Provide and place into position galvanised flexi-beam guardrails including end pieces,nuts and bolts along the approaches to the bridges as per drawings and as instructed by the Engineer. including end pieces,nuts and bolts along the	m	120		
21.04	Provide and place into position galvanised flexi-beam guardrails including end pieces,nuts and bolts along the approaches to culverts as per drawings and as instructed by the Engineer.	m	500		
21.05	Provide and place a 0.5m wide drainage layer of class 14/20 mm to structural concrete in contact with fill material.	m ³	300		
21.06	Provide and place as directed by the Engineer PVC pipes of diameter 75mm and length 600 mm to form weep holes to bridge abutments and wingwalls	No.	10		
21.07	Provide and place as directed by the Engineer PVC pipes of diameter 75 mm and length 300 mm to form storm drain pipes of the bridge deck	No.	150		
Bill No. 21 Total Carried Forward to Grand Summary					

BILL NO. 22: SCHEDULE OF DAYWORKS

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
	<u>PLANT</u>				
	<i>The rates inserted herein are to include all operational and Maintenance costs, fuel, oil, grease, drivers/operators wages, supervision, overheads and profit. Only time actually employed upon the work will be paid for and the rates should include for idle time, travelling time and overtime, In accordance with clause 2202 (a) of the specifications. Note: All items of plant must be priced.</i>				
22.01	Crawler dozers with hydraulic attachmentsto include ripper				
	a) Up to 135 kw rated flywheel power	hrs	20		
	b) Over 136 kw rated flywheel power	hrs	8		
22.02	Motor Grader				
	a) Up to 110kw rated flywheel power	hrs	10		
	b) Over 100kw rated flywheel power	hrs	8		
22.03	Vibratory Roller				
	a) 6.5 - 8.81 tonne un-ballasted weight	hr	20		
	b) Over 8.91 tonne un-ballasted weight	hr	10		
22.04	Hand propelled vibrating roller 650 - 1300kg	hrs	8		
22.05	Cat 950G wheel loader or equivalent	hrs	20		
22.06	10 Tonne tipper lorry	hrs	20		
22.07	Small dumpers, 750-1000kg rated payload	hrs	8		
22.08	Dual purpose hydraulic excavator with backhoe/loader and a rated bucket capacity of upto 1m ³ .	hrs	8		
22.09	Articulated wheel loader with 1.5-2.0m ³ SAE rated bucket capacity	hrs	8		
22.10	50mm delivery water pump and motor	hrs	8		
22.11	Self propelled water tanker 4,500ls min. capacity with pick-up pump	hrs	8		
22.12	Concrete Mixer of 100 - 150litres	hrs	8		
22.13	Concrete poker vibrator	hrs	8		
	<u>LABOUR</u>				
	<i>The rates inserted herein are to include all costs of labour such as insurance, accomodation, travelling time, over-time, use and maintenance of small tools of trade, supervision, overheads and Profit. Only the actual time engaged upon the work will be paid for.</i>				
22.14	Unskilled Labour	hrs	24		
22.15	Artisans	hrs	24		
22.16	Office attendants and chainmen	hrs	24		
22.17	Watchmen (all round surveillance)	hrs	24		
Bill No. 22 Total Carried Forward to next page					

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
Brought forward from previous page					
	<u>MATERIALS</u>				
	<i>All materials are to comply with the Specification. The rates inserted herein are to include for delivery to the site, storage, handling, overheads and profit</i>				
22.18	Ordinary Portland Cement	Ton	1		
22.19	Hydrated Lime	Ton	1		
22.20	Mild Steel(any diametre)	Ton	1		
22.21	High Yield Steel (any diametre)	Ton	1		
22.22	Fine Aggregate for Concrete	m ³	10		
22.23	Coarse Aggregate for Concrete	m ³	10		
22.24	Wrot Shuttering Timber	m ²	10		
22.25	Rough shuttering timber.	m ²	10		
22.26	Bitumen Emulsion KI-60.	Litre	10		
22.27	Straight run bitumen Grade 80/100.	Litre	10		
22.28	Kerosene	Litre	10		
22.29	14/20 mm nominal size surface chips.	m ³	10		
22.30	6/10mm nominal size surface chips	m ³	10		
22.31	AC Type II Ex-plant	m ³	10		
Bill No. 22 Total Carried Forward to Grand Summary					

BILL NO. 25: ENVIRONMENTAL MITIGATION MEASURES & HIV AIDS CAMPAIGN

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (KSHS)
25.01	All for a prime cost sum of KShs 5000,000 (five Million) for ESIA study and report, Compliance Audits and environmental monitoring.	PC sum	1	5,000,000.00	5,000,000.00
25.02	E.O for Item 25.01 for Contractor's Oveheads and Profit	%			
25.03	Allow for engagement of a HIV/AIDS specialist subcontractor to deal with prevention, awareness activities as per programme to be approved by the Engineer	Months	30		
25.04	Allow for the availability of male and female condoms to workers and staff strategically and socially presented for the duration of the contract	No.	3,000		
25.05	Allow for preparation and submmision of monthly reports on HIV/AIDS awareness and prevention activities. Report to be tabled at site meetings.,	Months	30		
25.06	Provide, Instal and maintain HIV/AIDS awareness bill boards with approved message and graphics with maximum area 4m ² fabricated as per specifications of permanent inforamatory sign boards	No.	9		
25.07	Allow for vedio shows on HIV/AIDS related awareness and prevention matters every 3months	No.	14		
25.08	Allow for production and distribution of HIV/AIDS awareness material as follows:				
	a) T-Shirt printed with approved message and graphics	No.	200		
	b) Ditto (a) above but caps	No.	200		
	c) A1 size weather proved posters	No.	20		
	d) A3 size weather proved posters	No.	200		
	e) 200x150mm stickers with HIV/AIDS awareness/prevention slogan	No.	200		
	f) Key rings with HIV/AIDS awareness/prevention slogan	No.	200		
	g) Ball point pens with HIV/AIDS awareness / prevention slogan.	No.	500		
Bill No. 25 Total Carried Forward to Grand Summary					

Detailed Specifications			
Weighing Capability	Wheel Weight ≤ 40 TON	Temperature Compensation Range	-10~+50°C
	Axle Weight ≤ 80 TON	Sensitive Influence by Temperature	0.1%/10°C
	Whole Truck Weight ≤ 1000 TON (Maximum 7 axles per truck)	Zero Temperature Influence	0.1%/10°C
Static Accuracy	±0.07%	In-Motion Accuracy	Within ±3.5%
Sensitivity	1±0.2 MV/V	Nonlinearity	≤0.20%
Repeatability	≤0.01%FS	Zero Output	4~10%
Input Impedance	3120±40Ω	Output Impedance	2800±10Ω
Operating System Platform	Android with SMS Capability		
Software	Web enabled (communicate with a remote database IP)	Ability to transfer data from indicator to HQ	
Battery	40 hours fully charged		
Communication	Wireless & a minimum of 20 meters Cable	From Pads -indicator (Wireless up ≥30 m)	
Displays Remote	7 Segment LED indicator		
Charging Battery	AC Adapter & Car charger		
Power supply	Battery & 220/240 VAC		
Warranty	≥2 yrs free service with a clearly defined scope; The Warranty Must be in writing; Maintenance SLA With scope of Frequency of Maintenance.		
		Excitation Voltage	20V (DC)
		Insulation Resistance	≥5000 MΩ(100VDC)
		Working Temperature	-40~+80°C
		Overload Protection	300%