

REPUBLIC OF KENYA



EMBU COUNTY GOVERNMENT

PROJECT NAME:

PROPOSED CONSTRUCTION OF MURURIRI DRIFT

TENDER NO: EBU/CNT/Q/185/2018-2019

NTHAWA WARD

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**SECTION I
INVITATION FOR TENDERS
REPUBLIC OF KENYA**



EMBU COUNTY GOVERNMENT

Tender reference no. : **EBU/CNT/Q/185/2018-2019**

- 1.1 The *County Government of Embu* invites sealed tenders for **PROPOSED CONSTRUCTION OF MURURIRI DRIFT**
- 1.2 **Interested eligible candidates may obtain further information and inspect Tender documents at our website: www.embu.go.ke.** For more information/clarification interested applicants can visit the office of the **Director of Supply Chain Management Office**, during normal working hours.
- 1.4 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for the contract period.
- 1.4 Original and a copy of tender documents are to be enclosed in plain sealed envelopes marked with Tender name and reference number and deposited in the Quotation Box at the front of Procurement offices or to be addressed to
**The County Secretary,
County Government of Embu
P.O. Box 36
EMBU**
- so as to be received on or before **25TH APRIL 2019 at 11.00am**
- 1.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at a location as will be designated.
- 1.7 This Project is funded by the World Bank

Director Supply Chain Management

For COUNTY SECRETARY

SECTION II

INSTRUCTIONS TO TENDERERS

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INSTRUCTIONSTOTENDERERS.**A. GENERAL****1 SCOPE OF BID**

- 1.1 The Employer, as defined in the Conditions of Contract Part II hereinafter “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 Form of Bid from the date of commencement of the Works.
- 1.3 Throughout these bidding documents, the terms bid and tender and their derivatives (bidder/tenderer, bid/tendered, bidding/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 World Bank through grants.

3 CORRUPT PRACTICES

- 3.1 The government requires that the bidders, suppliers, sub-contractors and supervisors observe the highest standards of ethics during the execution of such contracts. In this pursuit of this policy, the government;

Defines for the purpose 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 the 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 the benefits of free and open competition

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

Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a government contract if it at any time it is determined 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 road works contractor is mandatory.
- 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 eligibility 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:
 - (a) Submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and
 - (b) Update 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 update the following information:
 - (a) evidence of access to lines of credit from a bank and availability of other financial resources
 - (b) financial predictions for the current year and the two subsequent years, including the effect of known commitments
 - (c) work commitments
 - (d) current litigation information; and
 - (e) availability of critical equipment
- 5.3 Bidders shall also submit proposals of work methods and schedule in sufficient detail to demonstrate the adequacy of the bidders' proposals to meet the technical specifications and the completion time referred to in Clause 1.2 above.

6 ONE BID PER BIDDER

- 6.1 Each bidder shall submit only one bid. A bidder who submits or participates in more than one bid will be disqualified.

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 tenderer is advised to visit and examine the site and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the site shall be the tenderer's own responsibility.
- 7.2 The tenderer and any of his personnel or agents will be granted permission by the Employer to enter upon premises and lands for the purpose of such inspection, but only upon the express condition that the tenderer, his personnel or agents, will release and indemnify the Employer from and against all liability in respect of, and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission, would not have arisen.
- 7.3 A Mandatory pre-tender site meeting shall be held as specified in the tender notice. A representative of the Employer will be available to meet the intending tenderers at the venue.
- 7.4 The Employer will conduct a Site Visit concurrently with the pre-bid meeting referred to in Clause 18, attendance for which is necessary for all bidders. Attendance by the tenderers shall be as specified in the tender notice.
- 7.5 Tenderers must provide their own transport. The representative will not be available at any other time for site inspection visits.
- 7.6 Each tenderer shall complete the Certificate of Tenderer's Visit to the Site, whether he in fact visits the Site at the time of the organized site visit or by himself at some other time.

B. BIDDING DOCUMENTS

8 CONTENTS OF BIDDING DOCUMENTS

- 8.1 The set of documents comprising the tender includes the following together with any addenda issued in accordance with Clause 10:
- (a) Invitation to Bid
 - (b) Instructions to Bidders and Conditions of Tender
 - (c) Appendix to Instruction to Tenderers
 - (d) Conditions of Contract - Part I
 - (e) Conditions of Contract - Part II
 - (f) Road Maintenance Manual (May 2010 Edition)
 - (g) Standard Specifications
 - (h) Special Specifications
 - (i) Form of Bid, Appendix to Form of Bid and Bid Security
 - (j) Bills of Quantities

- (k) Schedules of Supplementary information
- (l) Form of Contract Agreement
- (m) Form of Performance Security
- (n) Drawings
- (o) BID Addenda (BID Notices)
- (p) Declaration Form

- 8.2 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.
- 8.3 All recipients of the documents for the proposed Contract for the purpose of submitting a tender (whether they submit a tender or not) shall treat the details of the documents as "private and confidential".

9 CLARIFICATION OF BIDDING DOCUMENTS

- 9.1 The prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing, cable or by e-mail (hereinafter the term cable is deemed to include telex and facsimile) at the Employer's mailing address indicated in the Bidding Data or visit our procurement office at Embu County Headquarters.
- 9.2 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.

10 AMENDMENT OF BIDDING DOCUMENTS

- 10.1 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.
- 10.2 The Addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause 9.1 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.
- 10.3 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 16.2.

C. PREPARATION OF BIDS

11 LANGUAGE OF BID

- 11.1 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.

12 DOCUMENTS COMPRISING THE BID

- 12.1 The bid to be prepared by the bidder shall comprise:
- (a) Duly filled-in Form of Bid and Appendix to form of bid;
 - (b) Bid security;
 - (c) Priced Bills of Quantities;
 - (d) Schedules of information
 - (e) Qualification criteria
 - (f) Any other materials required to be completed and submitted in accordance with the Instructions to Bidders embodied in these bidding documents.
- 12.2 These Forms, Bills of Quantities and Schedules provided in these bidding documents shall be used without exception (subject to extensions of the Schedules in the same format).

13 BID PRICES

- 13.1 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.
- 13.2 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.
- 13.3 All duties, taxes (including VAT) and other levies payable by the Contractor under the Contract, or for any other cause as of the date 7 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.
- 13.4 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.

14 CURRENCIES OF BID AND PAYMENT

- 14.1 Bids shall be priced in Kenya Shillings.

15 BID VALIDITY

- 15.1 The bid shall remain valid and open for acceptance for a period of 90 calendar days from the specified date of bid opening specified in Clause 22.

- 15.2 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 16 in all respects.

16 BID SECURITY

- 16.1 Provide Tender Security of a minimum amount equivalent to 2% of the tender sum per bid (document) in either of the following forms: A Banker's cheque; Bank Guarantee; Guarantee from a PPOA approved Insurance Company; Letter of credit
- 16.2 Any bid not accompanied by an acceptable bid security will be rejected by the Employer as non-responsive.
- 16.3 The bid securities of unsuccessful bidders will be discharged/ returned as promptly as possible as but not later than 30 days after the expiration of the period of bid security validity.
- 16.4 The bid security of the successful bidder will be discharged upon the bidder signing the Contract Agreement and furnishing the required performance security.
- 16.5 The bid security may be forfeited:
- (a) if a bidder withdraws his bid, except as provided in Sub-Clause 23.2.
 - (b) if the bidder does not accept the correction of any errors, pursuant to Sub-Clause 28.2 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

17 NO ALTERNATIVE OFFERS

- 17.1 The bidder shall submit one offer, which complies fully with the requirements of the bidding documents.
- 17.2 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.
- 17.3 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. 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.

18 PRE-BID MEETING

- 18.1 The bidder's designated representative is invited to attend a mandatory pre-bid meeting, which will take place as specified in the Tender notice. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 18.2 The bidder is requested as far as possible to submit any questions in writing or by cable, to reach the Employer not later than one week before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted in accordance with the Minutes of the meeting, including the text of the questions raised and the responses given together with any responses prepared after the meeting, will be transmitted without delay to all purchasers of the bidding documents. Any modification of the bidding documents listed in Sub-Clause 9.1, which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 or through the minutes of the pre-bid meeting.

19 FORMAT AND SIGNING OF BIDS

- 19.1 The bidder shall prepare one original of the documents comprising the bid as described in Clause 12 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 another copy of the bid clearly marked "COPY OF ORIGINAL". In the event of discrepancy between them, the original shall prevail.
- 19.2 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 5.1(a) OR 4.3 (c) as the case may be. The person or persons signing the bid shall initial all pages of the bid where entries or amendments have been made.
- 19.3 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

20 SEALING AND MARKING OF BIDS

- 20.1 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.
- 20.2 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 20.2, 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 22.1, and for matching purposes under Clause 23.

20.3 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.

21 DEADLINE FOR SUBMISSION OF BIDS

21.1 Bids must be received by the Employer at the address specified in Sub Clause 20.2 not later than **the date indicated in the tender notice.**

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

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

21.2 The Employer may, at his discretion, extend the deadline for the submission of bids through the issue of an Addendum in accordance with Clause 10 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.

22 LATE BIDS

22.1 Any bid received by the Employer after the deadline for submission of bids prescribed in Clause 21 will be returned unopened to the bidder.

23 MODIFICATION, SUBSTITUTION AND WITHDRAWAL OF BIDS

23.1 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.

23.2 The bidder’s modification, substitution or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause 20, with the outer and inner envelopes additionally marked “MODIFICATION” or “WITHDRAWAL” as appropriate.

23.3 No bid may be modified subsequent to the deadline for submission of bids, except in accordance with Sub-Clause 29.2.

23.4 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 16 may result in the forfeiture of the bid security pursuant to Sub-Clause 16.5.

E. BID OPENING AND EVALUATION

24 BID OPENING

- 24.1 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 stipulated in the letter of invitation. The bidders' representatives who are present shall sign a register evidencing their attendance.
- 24.2 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 23 shall not be opened.
- 24.3 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 22.
- 24.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with Sub-Clause 24.3.
- 24.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

25 PROCESS TO BE CONFIDENTIAL

- 25.1 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.

26 CLARIFICATION OF BIDS AND CONTACTING OF THE EMPLOYER

- 26.1 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.
- 26.2 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, should do so in writing.

- 26.3 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.

27 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

- 27.1 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.
- 27.2 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 tender 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.
- 27.3 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.

28 ARITHMETIC CHECK

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

- (a) Where there is a discrepancy between the amount in figures and the amount in words, the amount in words will govern.
- (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case adjustment will be made to the entry containing that error.
- (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bills of Quantities, the amount as stated in the Form of Tender shall prevail.
- (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected work items (i.e. corrected tender sum less Prime Cost and Provisional Sums).

- (e) The Error Correction Factor shall be applied to all work items (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuations of variations.
- (f) The Bidder shall within three (3) days after issuance of the written notice by the Employer, or such further time as the Employer may allow, correct his tender in such a manner as may be agreed or directed by the Employer failing which the tender may be absolutely rejected and the Bid Security forfeited in accordance with Sub-Clause 17.6 .

29 EVALUATION AND COMPARISON OF BIDS

- 29.1 The Employer will carry out evaluation of details and information provided in post-Qualification Questionnaire and any bidder who does not qualify shall not have his/her bid evaluated further.
- 29.2 The Employer will then evaluate and compare only the bids determined to be substantially responsive in accordance with Clauses 27 and 28.
- 29.3 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.
- 29.4 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

30 QUALIFICATION AND EVALUATION CRITERIA

- 31.1 Post-qualification will be based on meeting all of the following minimum point scale criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities as well as financial position. The Employer reserves the right to waive minor deviations, if they do not materially affect the capacity of an applicant to perform the contract. Subcontractor's experience and resources shall not be taken into account in determining the Applicant's compliance with qualifying criteria.

31.2 *General Experience.*

The Applicant shall meet the following minimum criteria: -

- (a) Average annual turnover for the last 2 years – **KShs.10,000,000.00/-**.
 - (b) Successful completion as a prime contractor or sub-contractor in the execution of at least three roads rehabilitation/new construction projects of a similar nature and comparable in complexity to the proposed contract within the last three years, for which at least one was located in an urban environment in Kenya.
- 31.3 *Personnel Capabilities.* The Applicant should list down personnel of minimum qualification of Diploma in Civil Engineering for Site Agent, Diploma for the surveyor and other supervisory staff.
 - 31.4 *Equipment Capabilities.* The Applicant should list down, the plants and equipment that are in his ownership and the ones proposed for hire which should be suitable for executing contract works. – Applicants must attaché evidence of ownership or hiring arrangements.
 - 31.5 *Cash flow statement.* The Applicant should demonstrate that the firm has access to or has available, liquid assets, unencumbered real assets, lines or credit, and other financial means sufficient to meet the construction cash flow for a period of 2 months, estimated at 20% of the estimated tender sum.

31.6 Balance Sheets. Signed and stamped Audited balance sheets for the last two years should be submitted and must demonstrate the soundness of the Applicant's financial position, availability of working capital and net worth.

31.7 Financial position/Ratios. The applicant's financial information will be assessed in terms of ROCE, current ratio and return on equity, and the point scale criteria on their financial position given on this basis. Where necessary, the Employer may make inquiries with the Applicant's bankers.

31.8 **Litigation History.** The Applicant should provide accurate information on any litigation or arbitration resulting from contracts complete or under execution by him over the last five years. A consistent history of litigation against the Applicant may result in failure of the application.

31.9 Post-qualification criteria are as provided in the Appendix to instruction to tenderers. The bidders who pass the technical criteria will be subjected to financial evaluation.

F. FINANCIAL EVALUATION

30.8 Comparison of major rates of items of construction & credibility of tenderers rates

The Employer will compare the tenderers' rates with the Engineer's estimates for major items of construction. If some bids are seriously unbalanced or front loaded in relation to the Engineer's estimates for the major items of work to be performed under the contract, the Employer may 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.

G. 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 29, provided that such bidder has been determined to be (a) eligible in accordance with the provisions of Sub-Clause 3.1, and (b) qualified in accordance with the provisions of Clause 4.

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 security will be returned as promptly as possible, in accordance with sub clause 17.4.

34 SIGNING OF AGREEMENT

- 34.1 Within 21 days of receipt of the Notification of Award, 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 14 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 9 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 successful bidder to lodge the required performance Guarantee within 14 days of the receipt of the letter of Acceptance shall constitute sufficient grounds for 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.

Appendix to Instructions to Tenderers

Notes on the Appendix to the Instruction to Tenderers

1. The Appendix to instructions to tenderers is intended to assist the procuring entity in providing specific information in relation to the corresponding clause in the instructions to Tenderers and has to be prepared for each specific procurement.
2. The procuring entity should specify in the appendix information and requirements specific to the circumstances of the procuring entity, the goods to be procured and the tender evaluation criteria that will apply to the tenders.
3. In preparing the Appendix the following aspects should be taken into consideration;
 - (a) The information that specifies and complements provisions of Instruction to tenderers to be incorporated
 - (b) Amendments and/or supplements if any, to provisions of Section 2.0 as necessitated by the circumstances of the goods to be procured to be also incorporated
4. Section II should remain unchanged and can only be amended through the Appendix.
5. Clauses to be included in this part must be consistent with the public procurement law and the regulations.

Appendix to Instructions to Tenderers/General information

The following information regarding the particulars of the tender shall complement supplement or amend the provisions of the instructions to tenderers. Wherever there is a conflict between the provision of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers.

INSTRUCTIONS TO TENDERERS REFERENCE	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
	<p><i>The Bidder shall submit original and a copy of the tender document, clearly marking each “ORIGINAL TENDER” and “COPY OF TENDER” on or before 25TH APRIL 2019 at 11.00AM and have them deposited in the tender box at the reception of the Governor’s office.</i></p> <p><i>Both documents (Original & Copy) shall bear all the attachments required.</i></p>

PRELIMINARY REQUIREMENTS

1. All entries must be typed or written in ink. Mistakes must not be erased but should be crossed out and corrections made and initialed by the persons signing the tender.
2. The form of bid **shall** be duly filled, signed and stamped by an individual entrusted with the powers of attorney.
3. Each bid should be submitted in a plain sealed envelope with the Tender Number and Name endorsed on the outside.
4. The bidder shall attach a duly filled, signed and stamped confidential business questionnaire by an individual entrusted with the powers of attorney.
5. The form of power of attorney shall be duly filled, signed and stamped (Schedule 3).
6. **The tender document shall be submitted complete, intact with no page alterations.**
7. Tenderers shall ensure that the submitted bid (documents) is (are) **serialized**. i.e (each page in the submitted bid shall have serial identification).
8. All submitted forms and documents shall be duly filled, signed (where applicable) and stamped.

Bidders shall attach copies of the under listed documents endorsed (signed and stamped) by commissioner of oaths/advocate registered in Kenya.

9. Copy of a valid current year business permit.
10. Copy of a Valid current year tax compliance certificate.
11. Copy of a Certificate of incorporation.
12. Copy of a PIN/VAT certificate from KRA.
13. Copy of NCA registration certificate of roadworks category 7 and above.
14. Copy of valid NCA practicing license.
15. Financial audited accounts for the previous three years endorsed, signed and stamped by a registered external auditor in order to confirm the following:
 - a. the current soundness of the applicant’s financial position and its prospective long term profitability(Schedule 8).
 - b. capacity to have a cash flow amount of minimum KShs 4 Million equivalent working capital

- c. Minimum average annual construction turnover of KShs. 5 Million [Ten million] for the last two years.]

ALL DOCUMENTS SHOULD BE CERTIFIED BY A COMMISSIONAL OF OATH

Bidders that will not comply with the above criteria shall be considered non-responsive

Qualification Criteria		Compliance Requirement	Documentation
No.	Subject	Requirement	Bidder
1. Eligibility			
1.1	Eligibility	Nationality in accordance with Sub-Clause 4.1.	Must meet requirement
1.2	Conflict of Interest	No conflicts of interest in Sub-Clause 4.2.	Must meet requirement
1.3	Debarment	Not having been declared ineligible by the Employer, as described in Sub-Clause 4.3.	Must meet requirement
1.4	Incorporation & Registration	Pursuant to sub-clause 4.1 the following shall be provided; - Copy of Certificate of incorporation certified by a Commissioner of Oaths or issuing authority to show that the applicant is a registered company and legally authorised to do business in Kenya - Proof of registration with the National Construction Authority (NCA) in the categories indicated in the tender notice.	Must meet requirement
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

Qualification Criteria		Compliance Requirement	Documentation
No.	Subject	Requirement	Bidder
2.2	Pending Litigation	All pending litigation shall in total not represent more than fifty percent (50%) of the Applicant's net worth and shall be treated as resolved against the Applicant.	Must meet requirement
Section XI, Schedule 11			
3. Financial Situation			
3.1	Financial Performance	(a) Submission of audited balance sheets or other financial statements acceptable to the Employer, for the last three [3] years or authenticated bank statement for the last six (6) months to demonstrate: (b) capacity to have a cash flow equivalent to 20% of the tender sum	(a) Must meet requirement (b)) Must meet requirement
Section XI, Schedule 9			
3.2	Average Annual Construction Turnover	(c) Average annual construction turnover of KShs.10 Million [Ten Million], calculated as total certified payments received for contracts in progress or completed, within the last two [(2)] years	(c) Must meet requirement
Section XI, Schedule 9			
4. Experience			
4.1(a)	General Construction Experience	Experience under construction contracts in the role as a main contractor or subcontractor for at least the last five [5] years prior to the applications submission deadline	Must meet requirement
Section XI, Schedule 7			

Qualification Criteria		Compliance Requirement	Documentation	
No.	Subject	Requirement	Bidder	
4.2(b)	Specific Construction Experience	Participation as a roads contractor, management contractor or subcontractor, in at least two (2) each with a value of at least KShs. 5 Million (five million), successfully and substantially completed. One (1) of the contracts should be in a Town and that are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods/technology or other characteristics as described in Section 2.	Must meet requirement	Section XI, Schedule 7
5. Current Commitments				
5.1	On-going contracts	The total value of outstanding works on the on-going contracts should not exceed the average annual turnover for the last two years.	Must meet requirement	Section XI, Schedule 8
6. Site Staff				
	Site Agent Foreman Site Surveyor	The site staff shall possess minimum levels of qualifications set below; Qualification = Diploma in Civil Engineering/Building construction General Experience = 2 years Specific Experience = 1 year Qualification = Dip. Civil Engineering General Experience = 2 yrs Specific Experience = 1 Yrs Qualification = Diploma in Survey General Experience = 3 yrs Specific Experience = 2 Yrs	Must meet requirement	Section XI, Schedule 6

Qualification Criteria		Compliance Requirement	Documentation	
No.	Subject	Requirement	Bidder	Submission Requirements
5. PLANT AND EQUIPMENT				
	See description below in Schedule 7		Must meet requirement	
6.	Work Methodology	Submission of a brief work methodology in accordance with sub-clause 5.3	Must meet requirement	Section II
7.	County Based	Should have the physical address within Counties in the Region and Current Work Permit	Must meet requirement	Section II
8.	Litigation History	The applicant to provide Sworn affidavit	Must meet requirement	

7. Schedule of the Major Items of Plant/Equipment Available for 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 Contract Execution	Compliance Requirement	No of Equipment Owned by the Bidder	No. of equipment to be hired/purchased by the Bidder	No. of equipment to be made available for the Contract by the Bidder
A	General Plant Paving blocks making machine	optional				
B	Kerbstone/channel Machine	optional				
C	Kerbstone/road channel making Machine					
	Bituminous Plants	optional				
	Bitumen Pressure distributor	optional				
D	Asphalt concrete paver					
	Compactors	optional				
	Vibrating compaction plate 300 mm wide	optional				
E	Vibrating compaction plate 600 mm wide					
	Pot hole repair machines	1				
	Colas Sprayer	1				
	Pavement Cutter Machine	optional				
	Paver Braker Machine	1				
F	Pedestrian Roller					
	Concrete Equipment	1	Must have at least one			
	Mobile concrete mixers	1				

Item No.	Equipment Details	*Minimum Number Required for the Contract Execution	Compliance Requirement	No of Equipment Owned by the Bidder	No. of equipment to be hired/ purchased by the Bidder	No. of equipment to be made available for the Contract by the Bidder
G	Concrete vibrators					
	Transport (Tippers, dumpers, water tankers)	2				
	4X2 tippers payload 7 – 12 tonnes	2	Must have at least two			
	6X4 tippers payload 16 – 20 tonnes	2				
	8X4 tippers payload 16 – 20 tonnes	2				
	Flat bed lorries	2				
	Subtotal for G – tippers & dumpers	1	Must have at least one			
	Water tankers (18,000 – 20,000 litres capacity)					
H	Earth – Moving Equipment					
	Wheeled loaders	1	Must have at least one			
	Motor graders (93 - 205kW)					
	Trench excavator	1				
	Subtotal for H – Earth moving equipment					
I	Excavators					
	Hydraulic crawler mounted (7 – 10 tonnes) – 0.25 – 0.4 m ³ SAE bucket.					

Item No.	Equipment Details	*Minimum Number Required for the Contract Execution	Compliance Requirement	No of Equipment Owned by the Bidder	No. of equipment to be hired/ purchased by the Bidder	No. of equipment to be made available for the Contract by the Bidder
J	Hydraulic crawler mounted (10 – 16 tonnes) – 0.40 – 0.60 m ³ SAE bucket.					
	Hydraulic wheel mounted (7 – 10 tonnes) – 0.25 – 0.4 m ³ SAE bucket.					
	Hydraulic wheel mounted (10 – 16 tonnes) – 0.40 – 0.6 m ³ SAE bucket.					
	Hydraulic wheel mounted backloader (7 – 10 tonnes) – 0.25 – 0.4 m ³ SAE bucket.					
	Subtotal for I (Excavators)					
	Rollers		1	Must have at least one		
	Self-propelled single drum vibrating (various types)		0			
Pneumatic rubber tyre (1-2 tonnes/wheel)		Optional				
Double drum vibrating pedestrian roller						

Bidders who shall not meet the above TECHNICAL requirement will be considered non-responsive.

Appendix to Instruction to Tenderers

Table 1: Pre- Qualification Checklist For Completeness And Responsiveness.

S/No.	Completeness and Responsiveness Criteria	References	Requirement
1.	Form of Bid	Section X Clause 20.2	- Amount must be indicated - Properly fill and signed by authorised by the company
2.	Appendix to Form of Bid	Clause 20.2 Section X	- Form properly sign
3.	Bid Security	Section X Clause 16/17	- A Banker's cheque; Bank Guarantee; Guarantee from a PPOA approved Insurance Company; Letter of credit -In the format provided with all conditions - must be valid for 120 days
4.	Confidential Business Questionnaire	Section XI; Schedule 1	- Properly fill and sign - Provide all required information
5.	Form of Power of Attorney	Section XI; Schedule 2 Clause 5.1(a)	- Properly fill and sign
6.	Tax Compliance Certificate	Employer's notice	- Copy of certificate - valid
7.	Registration with National Construction Authority (NCA)	Employer's notice Item 1.4 of QC	- Copy of certificate - Copy of valid license
8.	Certificate of Incorporation	Employer's notice Item 1.4 of QC	- Copy of certificate Certified by Commissioner for Oaths
9.	Priced Bill of Quantities	Clause 14.1 Section IX	- Fill all rates, prices and amounts and counter sign any alteration(s)
10.	Eligibility	Section XI; Schedule 1 Clause 4.1/4.2	- Copies of National ID or passport for all directors - Certified copy of Form CR12
11.	Conflict of interest	Section XI; Schedule 1 Clause 4.2	- to state explicitly
12.	Debarment	Item 1.3 of QC	- Properly fill and sign
13.	Pending Litigation	Item 2.2 of QC	- Provide Sworn affidavit
14.	Litigation History	Section XI;	- Fill in information and sign

SECTION III–

CONDITIONS OF CONTRACT

1. Definitions

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

“Bills of Quantities” means the priced and completed Bill of Quantities forming part of the tender [where applicable].

“Schedule of Rates” means the priced Schedule of Rates forming part of the tender [where applicable].

“The Completion Date” means the date of completion of the Works as certified by the Employer’s Representative.

“The Contract” means the agreement entered into by the Employer and the Contractor as recorded in the Agreement Form and signed by the parties.

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

“The Contractor’s Tender” is the completed tendering document submitted by the Contractor to the Employer.

“The Contract Price” is the price stated in the Letter of Acceptance.

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

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

“The Defects Liability Certificate” is the certificate issued by Employer’s Representative upon correction of defects by the Contractor.

“The Defects Liability Period” is the period named in the Appendix to Conditions of Contract and calculated from the Completion Date.

“Drawings” include calculations and other information provided or approved by the Employer’s Representative for the execution of the Contract.

“Employer” Includes Central or Local Government administration, Universities, Public Institutions and Corporations and is the party who employs the Contractor to carry out the Works.

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

“Site” means the place or places where the permanent Works are to be carried out

including workshops where the same is being prepared.

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

“Employer’s Representative” is the person appointed by the Employer and notified to the Contractor for the purpose of supervision of the Works.

“Specification” means the Specification of the Works included in the Contract.

“Start Date” is the date when the Contractor shall commence execution of the Works.

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

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

“ A Variation” is an instruction given by the Employer’s Representative which varies the Works.

“The Works” are what the Contract requires the Contractor to construct, install, and turnover to the Employer.

2. Contract Documents

2.1 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;

- (1) Agreement,
- (2) Letter of Acceptance,
- (3) Contractor’s Tender,
- (4) Conditions of Contract,
- (5) Specifications,
- (6) Drawings,
- (7) Bills of Quantities or Schedule of Rates [whichever is applicable)

3. Employer’s Representative’s Decisions

3.1 Except where otherwise specifically stated, the Employer’s Representative will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

4. Works, Language and Law of Contract

4.1 The Contractor shall construct and install the Works in accordance with the Contract documents. The Works may commence on the Start Date and shall be carried out in accordance with the Program submitted by the Contractor, as

updated with the approval of the Employer's Representative, and complete them by the Intended Completion Date.

4.2 The ruling language of the Contract shall be English language and the law governing the Contract shall be the law of the Republic of Kenya.

5. Safety, Temporary works and Discoveries

5.1 The Contractor shall be responsible for design of temporary works and shall obtain approval of third parties to the design of the temporary works where required.

5.2 The Contractor shall be responsible for the safety of all activities on the Site.

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

6 Work Program and Sub-contracting

6.1 Within seven days after Site possession date, the Contractor shall submit to the Employer's Representative for approval a program showing the general methods, arrangements, order and timing for all the activities in the Works.

6.2 The Contractor may sub-contract the Works (but only to a maximum of 25 percent of the Contract Price) with the approval of the Employer's Representative. However, he shall not assign the Contract without the approval of the Employer in writing. Sub-contracting shall not alter the Contractor's obligations.

7 The site

7.1 The Employer shall give possession of all parts of the Site to the Contractor. The Contractor shall allow the Employer's Representative and any other person authorized by the Employer's Representative ,access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

8 Instructions

8.1 The Contractor shall carry out all instructions of the Employer's Representative which are in accordance with the Contract.

9 Extension of Completion Date

9.1 The Employer's Representative shall extend the Completion Date if an occurrence arises which makes it impossible for completion to be achieved by the Intended Completion Date. The Employer's Representative shall decide whether and by how much to extend the Completion Date.

9.2 For the purposes of this clause, the following occurrences shall be valid for consideration;

Delay by:-

- (a) force majeure, or
- (b) reason of any exceptionally adverse weather conditions, or
- (c) reason of civil commotion, strike or lockout affecting any of the trades employed upon the Works or any of the trades engaged in the preparation, manufacture or transportation of any of the goods or materials required for the Works, or
- (d) reason of the Employer's Representative's instructions issued under these Conditions, or
- (e) reason of the contractor not having received in due time necessary instructions, drawings, details or levels from the Employer's Representative for which he specifically applied in writing on a date which having regard to the date for Completion stated in the appendix to these Conditions or to any extension of time then fixed under this clause was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same, or
- (f) delay on the part of artists, tradesmen or others engaged by the Employer in executing work not forming part of this Contract, or
- (g) reason of delay by statutory or other services providers or similar bodies engaged directly by the Employer, or
- (h) reason of opening up for inspection of any Work covered up or of the testing or any of the Work, materials or goods in accordance with these conditions unless the inspection or test showed that the Work, materials or goods were not in accordance with this Contract, or
- (i) reason of delay in appointing a replacement Employer's Representative, or
- (j) reason of delay caused by the late supply of goods or materials or in executing Work for which the Employer or his agents are contractually obliged to supply or to execute as the case may be, or
- (k) delay in receiving possession of or access to the Site.

10 Management Meetings

10.1 A Contract management meeting shall be held regularly and attended by the Employer's Representative and the Contractor. Its business shall be to review the plans for the remaining Work. The Employer's Representative shall record the business of management meetings and provide copies of the record to those

attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Employer's Representative either at the management meeting or after the management meeting and stated in writing to all who attend the meeting.

10.2 Communication between parties shall be effective only when in writing.

11 Defects

11.1 The Employer's Representative shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Employer's Representative may instruct the Contractor to search for a defect and to uncover and test any Work that the Employer's Representative considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.

11.2 The Employer's Representative shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Appendix to Conditions of Contract.

11.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Employer's Representative's notice. If the Contractor has not corrected a defect within the time specified in the Employer's Representative's notice, the Employer's Representative will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

12 Bills of Quantities/Schedule of Rates

12.1 The Bills of Quantities/Schedule of Rates shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rates in the Bills of Quantities/Schedule of Rates for each item. Items against which no rate is entered by the Tenderer will not be paid for when executed and shall be deemed covered by the rates for other items in the Bills of Quantities/Schedule of Rates.

12.2 Where Bills of Quantities do not form part of the Contract, the Contract Price shall be a lump sum (which shall be deemed to have been based on the rates in the Schedule of Rates forming part of the tender) and shall be subject to re-measurement after each stage.

13 Variations

13.1 The Contractor shall provide the Employer's Representative with a quotation for carrying out the variations when requested to do so. The Employer's Representative shall assess the quotation and shall obtain the necessary authority

from the Employer before the variation is ordered.

- 13.2 If the Work in the variation corresponds with an item description in the Bill of Quantities/Schedule of Rates, the rate in the Bill of Quantities/Schedule of Rates shall be used to calculate the value of the variation. If the nature of the Work in the variation does not correspond with items in the Bill of Quantities/Schedule of Rates, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
- 13.3 If the Contractor's quotation is unreasonable, the Employer's Representative may order the variation and make a change to the Contract Price, which shall be based on the Employer's Representative's own forecast of the effects of the variation on the Contractor's costs.

14 Payment Certificates and Final Account

- 14.1 The Contractor shall be paid after each of the following stages of Work listed herebelow (subject to re-measurement by the Employer's Representative of the Work done in each stage before payment is made). In case of lump-sum Contracts, the valuation for each stage shall be based on the quantities so obtained in the re-measurement and the rates in the Schedule of Rates.
- (i) Advance payment_
 (percent of Contract Price,
 [after Contract execution]to be inserted by the Employer).
 - (ii) First stage (*define stage*) _
 - (iii) Second stage (*define stage*)_
 - (iv) Third stage (*define stage*) _
 - (v) After defects liability period .
- 14.2 Upon deciding that Works included in a particular stage are complete, the Contractor shall submit to the Employer's Representative his application for payment. The Employer's Representative shall check, adjust if necessary and certify the amount to be paid to the Contractor within 21 days of receipt of the Contractor's application .The Employer shall pay the Contractor the amounts so certified within 30 days of the date of issue of each Interim Certificate.
- 14.3 The Contractor shall supply the Employer's Representative with a detailed final account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer's Representative shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer's Representative shall issue within 21 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has

been resubmitted, the Employer's Representative shall decide on the amount payable to the Contractor and issue a Final Payment Certificate. The Employer shall pay the Contractor the amount so certified within 60 days of the issue of the Final Payment Certificate.

- 14.4 If the period laid down for payment to the Contractor upon each of the Employer's Representative's Certificate by the Employer has been exceeded, the Contractor shall be entitled to claim simple interest calculated pro-rata on the basis of the number of days delayed at the Central Bank of Kenya's average base lending rate prevailing on the first day the payment becomes overdue. The Contractor will be required to notify the Employer within 15 days of receipt of delayed payments of his intentions to claim interest.

15. Insurance

- 15.1 The Contractor shall be responsible for and shall take out appropriate cover against, among other risks, personal injury; loss of or damage to the Works, materials and plant; and loss of or damage to property.

16. Liquidated Damages

- 16.1 The Contractor shall pay liquidated damages to the Employer at the rate 0.001 per cent of the Contract price per day for each day that the actual Completion Date is later than the Intended Completion Date except in the case of any of the occurrences listed under clause 9.2. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

17. Completion and Taking Over

- 17.1 Upon deciding that the Work is complete the Contractor shall request the Employer's Representative to issue a Certificate of Completion of the Works, upon deciding that the Work is completed.

The Employer shall take over the Site and the Works within seven days of the Employer's Representative issuing a Certificate of Completion.

18. Termination

- 18.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;
- (a) the Contractor stops Work for 30 days continuously without reasonable cause or authority from the Employer's Representative;
 - (b) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

- (c) a payment certified by the Employer's Representative is not paid by the Employer to the Contractor within 30 days after the expiry of the payment periods stated in sub clauses 14.2 and 14.3 hereinabove.
- (d) the Employer's Representative gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time.

18.2 If the Contract is terminated, the Contractor shall stop Work immediately, and leave the Site as soon as reasonably possible. The Employer's Representative shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

19. Payment Upon Termination

19.1 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on Site, plant, equipment and temporary works.

19.2 The Contractor shall, during the execution or after the completion of the Works under this clause, remove from the Site as and when required within such reasonable time as the Employer's Representative may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to him, and in default thereof, the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

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

20. Corrupt Gifts and Payments of Commission

20.1 The Contractor shall not;

- (a) Offer or give or agree to give to any person in the service of the Employer any gifts or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract with the Employer or for showing or forbearing to show favour or disfavour to any person in relation to

this or any other contract with the Employer.

- (b) Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the Laws of Kenya.

21. Settlement of Disputes

- 21.1 Any dispute arising out of the Contract which cannot be amicably settled between the parties shall be referred by either party to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the chairman of the Chartered Institute of Arbitrators, Kenya branch, on the request of the applying party.

SECTION IV – APPENDIX TO CONDITIONS OF CONTRACT

THE EMPLOYER IS

Name: COUNTY GOVERNMENT OF EMBU

Address: P.O BOX 36-60100 EMBU

The Project Manager is

Name: DIRECTOR-INFRASTRUCTURE, TRANSPORT AND PUBLIC WORKS.

Address: P.O BOX 36-60100 EMBU

SECTION V– STANDARD FORM

- (i) Form of Invitation for Tenders
- (ii) Form of Tender
- (iii) Letter of Acceptance
- (iv) Form of Agreement
- (v) Form of Tender Security
- (vi) Performance Bank Guarantee
- (vii) Bank Guarantee for Advance Payment
- (viii) Qualification Information
- (ix) Tender Questionnaire
- (xi) Confidential Business Questionnaire
- (x) Statement of Foreign Currency Requirement
- (xi) Details of Sub-Contractors
- (x) Request for Review Form

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)

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

Dear Sir,

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

Dated this _____ day of _____ 20_____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of

_____ [Name of Employer]
 of _____ [Address of Employer]

Witness; Name _____

Address _____

Signature _____

Date _____

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

APPENDIX CONDITIONS OF CONTRACT	CLAUSE	AMOUNT
Bid Security		Kshs. NIL
Program to be submitted	14.1	Not later than 14 (Fourteen) days after issuance of Order to Commence
Period for commencement, from Engineer's order to commence	41.1	14 days
Time for completion	43.1	6 (six) months
Amount of liquidated damages	47.1	Ksh.10,000 per day
Limit of liquidated damages	47.1	10% of Contract Value
Defects Liability Period	49.1	3 (three) months
Percentage of Retention	60.3	10% of Interim Payment Certificate
Minimum amount of Third Party Insurance	23.2	Kshs. NIL
Minimum amount of interim certificates	60.2	Kshs.500,000
Time within which payment to be made after Interim Payment Certificate signed by Engineer	60.10	90 days
Time within which payment to be made after Final Payment Certificate signed by Engineer	60.10	90 days
Appointer of Arbitrator	67(3)	Chairman, Chartered Institute of Arbitrators-Kenya Chapter
Notice to Employer and Engineer	68.2	The Employers address is: County Secretary County Government of Embu P.O.Box 36 - 60100 EMBU The Engineer's address is: Director Roads Department of Infrastructure, Transport & Public Works P.O.Box 36 - 60100 EMBU

Signature of Bidder..... Date

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. Email address

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.....

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.....			

- *Attach proof of citizenship (Compulsory)*
- *Attach certified copy of Form CR12 (Compulsory)*

Part 3: Interest in the Firm:

Is there any person / persons in the Embu County Government who has interest in this firm? Yes
/No**

I certify that the information given above is correct.

.....
Date Signature of Bidder

**** Delete as necessary**

LETTER OF ACCEPTANCE
[letterhead paper of the Employer]

_____ [date]

To: _____
[name of the Contractor]

[address of the Contractor]

Dear Sir,

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

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

Authorized Signature

Name and Title of Signatory

Attachment : Agreement

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____ 20 _____ between COUNTY GOVERNMENT OF EMBU of [or whose registered office is situated at] P.O BOX 36, EMBU, KENYA (hereinafter called “the Employer”) of the one part AND _____ of [or whose registered office is situated at] _____ (hereinafter called “the Contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes] (name and identification number of Contract) (hereinafter called “the Works”) located at Embu County [Place/location of the Works] and the Employer has accepted the tender submitted by the Contractor for the execution and completion of such Works and the remedying of any defects therein for the Contract Price of Kshs _____ [Amount in figures], Kenya Shillings _____ [Amount in words].

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
 - (i) Letter of Acceptance
 - (ii) Form of Tender
 - (iii) Conditions of Contract Part I
 - (iv) Conditions of Contract Part II and Appendix to Conditions of Contract
 - (v) Specifications

(vi) Drawings

(vii) Priced Bills of Quantities

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name _____

Address _____

Signature _____

[ii] Name _____

Address _____

Signature _____

FORM OF TENDER SECURITY

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

KNOW ALL PEOPLE by these presents that WE having our registered office at(hereinafter called “the Bank”), are bound unto(hereinafter called “the Employer”) in the sum of Kshs..... for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this Day of20.....

THE CONDITIONS of this obligation are:

- 1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers
Or
- 2. If the tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
 - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

[date]

[signature of the Bank]

[witness]

[seal]

PERFORMANCE BANK GUARANTEE

To: _____ (Name of Employer) _____ (Date)
_____ (Address of Employer)

Dear Sir,

WHEREAS _____ (hereinafter called “the Contractor”) has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ (hereinafter called “the Works”);

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Kshs. _____ (amount of Guarantee in figures) Kenya Shillings _____ (amount of Guarantee in words), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings _____ (amount of Guarantee in words) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed 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 change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

BANK GUARANTEE FOR ADVANCE PAYMENT

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

Gentlemen,

Ref: _____ [name of Contract]

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

We, _____ [bank or financial institution], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ [name of Employer] on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding Kshs _____ [amount of Guarantee in figures] Kenya Shillings _____ [amount of Guarantee in words], such amount to be reduced periodically by the amounts recovered by you from the proceeds of the Contract.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between _____ [name of Employer] and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ (name of Employer) receives full payment of the same amount from the Contract.

Yours faithfully,

Signature and Seal _____

Name of the Bank or financial institution _____

Address _____

Date _____

Witness: Name: _____

Address: _____

Signature: _____

Date: _____

LETTER OF NOTIFICATION OF AWARD

Address of Procuring Entity

To: _____

RE: Tender No. _____

Tender Name _____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

1. Please acknowledge receipt of this letter of notification signifying your acceptance.
2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.
3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

(FULL PARTICULARS) _____

SIGNED FOR ACCOUNTING OFFICER

FORM RB 1

REPUBLIC OF KENYA
PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO.....OF.....20.....

BETWEEN

.....APPLICANT

AND

.....RESPONDENT (*Procuring Entity*)

Request for review of the decision of the..... (*Name of the Procuring Entity*) ofdated the...day of20.....in the matter of Tender No.....of20...

REQUEST FOR REVIEW

I/We.....,the above named Applicant(s), of address: Physical address.....Fax No.....Tel. No.....Email, hereby request the Public Procurement Administrative Review Board to review the whole/part of the above mentioned decision on the following grounds , namely:-

- 1.
- 2.
- etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

- 1.
- 2.
- etc

SIGNED(Applicant)

Dated on.....day of/...20...

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on day of20.....

SIGNED
Board Secretary

SECTION VI – SPECIFICATIONS, DRAWINGS & BILLS OF QUANTITIES

STANDARD SPECIFICATIONS

STANDARD SPECIFICATIONS

Standard Specifications refers to the Standard Specifications for Road and Bridge Construction, 1986 Edition.

SECTION 11: SPECIAL SPECIFICATIONS

SPECIAL SPECIFICATIONS

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SECTION 1 - GENERAL

101 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

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 length of road for which a certificate will be issued under Clause 48 of the Conditions of Contract is the entire length of the road when substantially completed.

109 NOTICE OF OPERATIONS

Add the following sub- Clause.

109.1 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.

109.2 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, storage and transporting of all explosive ancillary materials and all other items of related kind whatsoever required for blasting.

117 HEALTH, SAFETY AND ACCIDENTS

Add to section 117 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.

121 DIVERSION OF SERVICES

- (a) 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 tender rates.
- (b) Subject to the agreement with the Engineer, the Contractor shall be responsible for removal of alteration and relocation of existing services.
- (c) 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.

Notwithstanding Clause 124 of the Standard Specification all requirements of land for temporary works and construction purposes shall be to the approval of the Engineer but the Contractor will make all necessary arrangements with the property owners concerned and pay all charges arising there from. 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 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 a competent surveyor 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.

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 1 (one) or two (2) publicity signboards on the site as directed. The Engineer shall as shown in the Drawings and as required 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.

134 ENGINEER'S LABORATORY

The Contractor shall pay for all materials testing and Staff Allowances. Payments shall be made under the relevant item of the BOQ on provision of receipt.

137 ATTENDANCE UPON THE ENGINEER AND HIS STAFF

The Contractor shall provide, pay (including all overtime) attendant staff to fulfil the requirements of Clause 137 of the Standard Specification. The number of staff required for these duties shall be not exceed 6No. The Contractor will be paid on a prime cost basis plus a percentage for overheads and profits under relevant item of the Bills of Quantities.

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

The Contractor shall when instructed to do so shall Pay the Service Provider the amount of the invoice for the Supervision Vehicle during the period of the contract.

Payment for the vehicle shall be by a rate entered in the Preliminary and General Item of the BOQ.

139 RECEIPTED ACCOUNTS

The Contractor may be 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 relevant items of the BOQ.

140 ACCOMODATION FOR THE ENGINEER'S STAFF

Not Applicable

142 LIQUIDATED DAMAGES

Liquidated Damages at the rate shown in the Appendix to Form of Bid shall apply in the event of the works not being completed within the time for completion plus any extension of time which may be determined by the Engineer.

143 ENVIRONMENTAL PROTECTION

The Contractor shall ensure so far as is reasonably practicable and to the satisfaction of the Engineer; that the impact of the construction on the environment shall be kept to a minimum and that appropriate measures are taken to mitigate any adverse effects during the construction.

- (a) After extraction of materials, all borrows pits shall be back-filled to the satisfaction of the Engineer. In particular borrow pits near the project road shall be back-filled in such a way that no water collects in them.
- (b) Spilling of bitumen, fuels, Oils and other pollutants shall be cleared up.

SECTION 2 - MATERIALS AND TESTING OF MATERIALS

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.

- a) After four days soaking in the case of neat materials and
- b) After seven days curing plus seven days soaking in the case of cement improved materials

SECTION 3 - SETTING OUT & TOLERANCES

301

SETTING OUT

The contractor while pegging out the distances shall ensure that the existing alignment is followed unless instructed otherwise by the Engineer.

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 or any unsuitable material encountered in existing or newly constructed drains, drainage channels, and accesses.

403 REMOVAL OF STRUCTURES, FENCES AND OBSTRUCTIONS

When instructed by the Engineer, the Contractor shall demolish or remove structure and payment for this shall be made as per the bill item.

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.

(b)

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 for fill in embankments.

Material with high swelling characteristics or high organic matter content and any other undesirable material shall not be used, unless specifically directed by the Engineer.

Unsuitable material shall include:

- (i) All material containing more than 5% by weight or organic matter (such as topsoil, material from swamps, mud, logs, stumps and other perishable material)
- (ii) All material with a swell of more than 3% (such as black cotton soil)
- (iii) All clay of plasticity index exceeding 50.
- (iv) All material having moisture content greater than 105% of optimum moisture content (Standard Compaction)

Subgrade: Shall mean upper 300mm of earthworks either insitu or in fill and subgrade shall be provided for as part of earthworks operation and payment shall be made as “fill”. The material for subgrade shall have a CBR of not less than 8% measured after a 4 day soak in a laboratory mix compacted to a dry density of 100% MDD (AASHTO T99) and a swell of less than 1%.

Embankment repair: Where directed by the Engineer, any localised filling in soft, hard or natural; selected material requirements shall be executed in accordance with Clause 505.

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 upto 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 wingwalls.

Notwithstanding the provision of clause 503 of the standard Specification, Compaction of subgrade 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.

515 SIDE DRAINS

Side drains shall be constructed in accordance with clause 515 of the Standard Specification. This item shall be paid under item no. 5.04.

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).

517(e) Overhaul

A freehaul of 1.5 km shall be allowed.

518 Grading and shaping

Where directed by the Engineer, the Contractor shall carry out grading and shaping over the full width of the carriageway and side slopes, so that the final profile complies with a standard cross- section shown in the drawings. The grading involves scarification up to a maximum depth of 150 mm, reworking of material to render it uniform and not segregated, reshaping, grading to profile, removing of material from side drains to spoil as directed by the Engineer, watering and compacting to 95 % MDD AASHTO T180, to required carriageway surface tolerance and uniform cross-fall all as directed by the Engineer.

The whole width of the finished surface, after the grading shall be trimmed and cleared off as necessary to leave the surface and slopes smooth, even and free from fresh loose heaps or

windrows, stones or boulders or rocks, vegetation or any other deleterious material.

Measurement and Payment

Payment shall be made for the plan area instructed and approved by the Engineer

Item: Grading

Unit: Square metres

SECTION 6 - QUARRIES, BORROW PITS, STOCKPILES & 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

The Preliminary Materials Report included as Vol. II of the tender documents is only for guidance of the Tenderers and that the information therein is neither warranted nor guaranteed.

703 EXCAVATION OF FOUNDATIONS FOR STRUCTURES

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 BACKFILLING FOR STRUCTURES

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

709 EXCAVATION FOR RIVER TRAINING AND NEW WATER COURSES

Payments for river training and establishment of new watercourses 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 to drains, inlets and outlets of culverts to embankments and around structures shall consist of sound unweathered rock 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. The Engineer may instruct use of river stones and paid for as per the bill rate.

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

Reconstruction shall be carried out in accordance with Clause 710 of the Standard Specifications.

The Works shall involve removal of the damaged stone pitching and reconstruction of the said areas in accordance with Clause 710 of the Standard Specifications by use of the sound salvaged material together with any necessary additional material where all such materials shall comply with Section 7 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 County Yard or Majimbo Office.

712 RIP-RAP PROTECTION WORK

Quarry waste or similar approved material shall be used to backfill scoured and eroded side, outfall and cutoff drains. 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:-

Replacement of existing 450mm pipe culverts by 600mm diameter or 900mm
 Extending of existing 600mm and 900mm diameter pipes to be compatible with the increased road width.
 Desilting and cleaning of existing pipes and outfall drains to make them free flowing.

804 EXCAVATION FOR CULVERTS AND DRAINAGE WORKS

In the Standard Specifications, make the following amendments: -

(a) 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, and the volume in m³ of inlet/outlet structure 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.

(b) 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.

(c) 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©, paragraph 2, line 4, between the words “compacted” and “and shaped” insert the words “to 100% MDD (AASHTO T.99)”.

Hard material is a material, which 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 95% 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

- a) Delete paragraph 6 “for pipe culverts depth of 150mm”, entirely.

The rates entered for laying of pipe culverts shall allow for backfilling to pipe culverts and compacting to 95% MDD (AASHTO T.99) and these works shall **not** be measured and paid for separately.

814 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 graded crushed stone or stabilised gravel and surfaced with hot asphalt or a surface dressing as instructed by the Engineer.

817 REPAIRS TO DRAINS

- (i) Cleaning 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.

- (ii) Channels

The Engineer may instruct that the Contractor provides open channels in place of existing subdrains 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 subdrain 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.

- (iii) Rubble fills for protection work

Quarry waste or similar approved material shall be used to back fill scoured and eroded side, outfall and cutoff drains. 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.

- (iv) Stone Pitching

Stone pitching shall be constructed in accordance with clause 710 of the standard Specification.

- (v) Gabions

Gabions shall be constructed in accordance with clause 711 of the standard Specification.

- (vi) 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 specifications, unless suitable for re-use, and deposit of the material in a spoil dump to be approved by the Engineer.

818

Concrete scour checks

Concrete for scour checks shall be class 15/20.reinforcement shall be wire mesh A193 at the middle of the base of the wall, or as shown in the drawings or instructed by the Engineer.

Item: Concrete scour checks

Unit: M³

Concrete scour checks shall be measured in cubic metres of concrete placed calculated from the dimensions of the scour check shown on the drawings or as directed by the Engineer.

The rate for concrete scour checks shall include the cost of excavating, removing excavated material to spoil, providing and placing class 15/20 concrete, A193 reinforcement and shuttering, all complying with the requirement of he specifications.

(b) Earthfill scour checks

Earthfill scour checks shall be constructed using selected earthfill material, in accordance with section 5 of the specification, or as shown in the drawings or as instructed by the Engineer.

Item: Earthfill scour checks

Unit: M³

Earthfill scour checks shall be measured by cubic metres of earthfill calculated from the dimensions of the scour check shown on the drawings or as directed by the Engineer.

The rate for earthfill scour checks shall include for the cost of excavating, removing excavated material to spoil, providing, placing and compacting of the earthfill to at least 95% MDD (Standard Compaction) and trimming the slopes. An extra pitching the surfaces as per Clause 710 of the special specifications.

819**CLEANING AND MAINTENANCE**

1.

2. (i) Desilting of Pipe Culverts

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• Where instructed Contractor shall desilt 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.

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.

906 PASSAGE OF TRAFFIC THROUGH THE WORKS

The Contractor shall arrange for passage of traffic through the works during construction and the cost of doing so shall be payable under Item 9.01. To this end, the contractor shall be deemed to have inspected the site 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) Construct 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.

SECTION 10 - GRAVEL WEARING COURSE**1001****GENERAL**

The material for gravel wearing course shall be won from sources identified by the contractor but approved by the Engineer. Method B, specified in the Standard Specification, shall be used as the method of measurement.

The gravel to be used shall meet all the requirements of Clause 10 of the Standard Specification for Road and Bridge Construction. The compaction shall be at least 95 % MDD (AASHTO T180) at a moisture content of between 80% and 105% of the Optimum Moisture Content (AASHTO T180).

1003**MATERIAL REQUIREMENTS**

The material requirements for natural gravel for re-gravelling shall be as follows:

The grading of the gravel after placement and compaction on the road shall have a smooth grading curve within and approximately parallel to the following envelope.

Sieve (mm)	% by weight
37.5	100
28	85-100
20	85-100
14	65-100
10	55-100
5	35-92
2	23-77
1	18-62
0.425	14-50
0.075	10-40

The material shall have a minimum CBR of 20 at 95% MDD (AASHTO T180) and 4 day soak. The plasticity index shall not exceed 20%.

SECTION 12 - NATURAL MATERIAL SUBBASE AND BASE

1201 GENERAL

Where instructed by the Engineer, the Contractor shall undertake repairs, widening and reprocessing to the existing carriageway and shoulders in accordance with sections 12 and 14 of the Special Specifications.

a) Areas to be scarified and reprocessed

The contractor will scarify, add new material and reprocess sections as determined by the Engineer.

b) Pavement repairs

The Contractor will carry out repairs to base and subbase as directed by the Engineer and according to Specifications given in Sections 12 and 14 of the Standard Specifications.

c) Pavement widening

The Contractor shall, as directed by the Engineer, bench and compact the subgrade to 100% MDD (AASHTO T99), provide lay and compact material for subbase and base as directed by the Engineer and in accordance with Sections 5 and 12 of the Standard Specifications.

1203 MATERIAL REQUIREMENTS

Natural materials for base and subbase shall conform to the specifications given in Section 12 of the Standard Specifications for Road and Bridge Construction for cement and lime improved base and subbase.

1209 MEASUREMENT AND PAYMENT

Natural material for subbase and base shall be measured by the cubic metre placed and compacted upon the road calculated as the product of the compacted sectional area laid and the length.

1210 HAND PACKED STONE

Hand packed stone base is a layer of hand laid stone of defined size and durable in nature, laid in a manner such that when proof rolled and compacted it forms a stable and dense matrix as a road base.

a) Material for Hand Packed Stone Base

This shall consist of durable stone with nominal base dimensions of 75 mm square and minimum height of 150 mm or when compacted to give a layer of 150 mm. The stone shall be class C with the following requirements:

LAA	45 max
ACV	32 max
SSS	12 max
FI	30 max
CR	60 min.

It shall be free from foreign matter. The fines passing 0.425 mm sieve shall be **NONPLASTIC**

b) Laying

The stone shall be laid by hand closely together. The stone shall be carefully bedded and tightly wedged with suitable spalls. The base of the stone shall alternate with the apex in all directions or as directed by the Engineer. The layer shall be proof rolled with a loaded scrapper or truck with a minimum axle load of 8 tonnes in the presence of the Engineer who shall approve of its stability before compaction.

c) Compaction

This shall be by a steel wheeled roller of at least five tonnes per metre width of roll. It shall consist of four static runs or until there is no movement under the roller. There shall follow vibratory compaction until an average dry density of 85% minimum of specific gravity of stone has been achieved. No result shall be below 82% of specific gravity. The surface of the compacted layer shall then be levelled by quarry dust (0/6 mm). The dust shall have the following specifications:

The stone shall be class C

Grading

Sieve Size	% Passing
10	100
6.3	90-100
4	75-95
2	50-70
1	33-50
0.425	20-33

0.300	16-28
0.150	10-20
0.075	6-12

The dust shall be free from foreign matter and fines passing 0.425 mm sieve shall be **NON-PLASTIC**. The maximum layer shall be 40 mm or as directed by the Engineer

d) Measurement and Payment

Payment shall be by the cubic metre laid (m^3). Measurement of volume shall be determined as the product of length and compacted thickness laid. The rate quoted for this item should include the cost for laying the levelling quarry dust layer, as no extra payment shall be made for this layer.

1211 REPROCESSING EXISTING PAVEMENT LAYERS

(a) General

The existing surfacing and the base shall be reprocessed with additional material and the composite mixture shall be compacted to form the subbase layer.

Before commencement of the work the Contractor shall propose plants and equipments he proposes to use for this activity.

The Contractor after approval of his proposal shall carry out test section in accordance with Section 3 of the Standard Specifications.

- (b) The existing surfacing and base course shall be broken up to specified depth and reprocessed in place, where required. The underlying layers shall not be damaged, and material from one layer may normally not be mixed with that of another layer. Where unauthorized mixing occurs or where the material is contaminated in any way by the actions of the Contractor, and the contaminated material does not meet the specified requirements of for the particular layer, he shall remove such material and replace it with other approved material, all at his own expense.
- (c) Any mixture composition of the new layer must not contain more than 30% of the bituminous material by volume. The mixture must not contain pieces of bound bituminous material larger than 37.5mm, and any such material shall be removed at the Contractor's cost.
- (d) The requirements for imported material used in the respective pavement layers shall comply with the limitations, norms, sizes and strengths specified in the Standard Specifications clause 1203(b) and (d) and shall be worked as per Section 14 of the Standard Specification.

- (e) Material reworked in-situ or that obtained from existing pavement is not expected to comply with the material requirements but the reworking should achieve the specified requirements.
- (f) Where the thickness of any existing pavement layer requires to be supplemented within reprocessing and the thickness of the additional material after compaction will be less than 100mm, the existing layer shall be scarified to a depth that will give a layer thickness of at least 100mm after compacting the loosened existing and the additional material.

Controlling the Reworked Depth

The Contractor shall submit a proven method to method to control the depth of excavation, or layer to be reworked, to the Engineer for approval. The Engineer may order a trial section to be reprocessed before any major length of the road is rehabilitated.

Excavations

Excavations in the pavement shall be kept dry. In the event of water penetrating the underlying layers, construction of the consecutive 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 when excavating, both longitudinally (if appropriate) and perpendicular to the direction of travel. The step width shall be 500mm perpendicular to the direction of travel, and 150mm long longitudinally, unless otherwise instructed by the Engineer.

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

Measurement and Payment

(a) Item: In-situ reprocessing of existing pavement layers as subbase compacted to specified density (95% MDD AASHTO T180) and thickness.

Unit: M³

The tendered rate shall include full compensation for breaking up the existing pavement layer to specified depth, breaking down and preparing the material and the spreading and mixing in of any additional material

(a) Item: The addition of extra gravel to subbase.

Unit: M³

The tendered rate shall include full compensation for procuring and addition of the material to the in-situ scarified layers and the transportation of the material over unlimited free-haul distance. The

tendered rates will also include full compensation for prospecting for materials and any payments necessary to acquire the specified quality material.

- (b) Excavation of existing bituminous pavement materials including unlimited free-haul.

Unit: M³

The tendered rates shall include full compensation for excavating the existing bituminous material from the pavement layers and for loading, transporting the material for unlimited free-haul, off-loading and disposing of the materials as specified.

- (c) Excavation of the existing pavement

Unit: M³

The tendered rate shall include full compensation for excavating the existing material from the pavement layers and for loading, transporting the material for unlimited free-haul distance, off-loading and disposing of the material as specified.

Payment will only be made for breaking up and excavating existing pavement layers to the specified depth if the material is to be removed to spoil

SECTION 14 - CEMENT AND LIME TREATED MATERIAL

1401 SCOPE OF SECTION

This section deals with the addition and mixing in of cement or lime, herein after described as the “stabilizer”, to the upper layers of earthworks as described in section 5, natural materials as described in section 12, and crushed materials as described in section 13, of the Specification.

Following the addition and mixing in of the stabilizer the material is referred to as “treated material”.

Treated material may either be lime or cement improved material, or cement stabilized material.

This section also deals with the compaction and curing of the treated material.

Treated materials may be used in the upper earthworks layers, shoulder layers, subbase layer or base layer.

1402 SOURCES OF MATERIALS

In accordance with Sections 5, 12, and 13 of this Specification.

1403 MATERIAL REQUIREMENTS

- (a) Natural materials

In accordance with Sections 5, 12, and 13 of this Specification.

- (b) Cement and Lime

- (i) Cement

Unless otherwise specified cement shall be ordinary Portland cement complying with the requirements of section 2 of this specification.

- (ii) Lime

Lime shall be hydrated calcium lime or quicklime and shall comply with the requirements of section 2 of this specification.

(iii) Storage and Handling

The requirements of Section 17 of this specification shall apply to cement. All lime shall be kept under cover and protected from moisture. Consignments shall be used in the same sequence as they are delivered. Stocks which become damaged or which are stored on the Site for more than 3 months shall not be used, and shall be replaced at the contractor's expense. Operators and labour shall be provided with protective clothing, masks and goggles.

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1404 AMOUNT OF STABILIZER TO BE ADDED.

The amount of cement or lime to be added shall be determined by the Engineer following laboratory trials, and site trials carried out by the Contractor in accordance with Section 2 of this Specification.

1405 MIX-IN-PLACE METHOD OF CONSTRUCTION

The mix-in-place method may be used for the addition and mixing in of stabilizer.

(a) Mixing equipment

The equipment for pulverizing the material and mixing in the stabilizer shall be purpose - built equipment, capable of pulverizing the materials and mixing in the stabilizer to the full depth of the loose layer necessary to give the specified thickness of compacted material mixed and compacted in accordance with this section of this Specification.

The equipment may be either single or multipass machines and shall only be acceptable if, during the site trials carried out in accordance with Section 2 of this Specification, it can produce material to the specified requirements.

If single-pass equipment is used for plastic soils, the degree of pulverization as determined in accordance with Test 17 of BS 1924 shall be not less than 80 percent.

The mixers shall be equipped with a device for controlling the depth of processing and mixing blades shall, be maintained or reset periodically so that the correct depth of mixing is obtained at all times.

Mixing by grader will not be permitted.

(b) Preparation of the layer

Before the stabilizer is applied, the material to be treated shall be spread and broken down and oversize material removed so that the maximum size of the particles is not more than specified. If multi-pass processing is employed, the material shall first be pulverised to the required tilt by successive passes. The material shall then be shaped true to line, grade and cross-section and, if

required, lightly compacted. The loose thickness shall be such as to give the specified thickness after full compaction has been carried out.

The moisture content of the layer before the addition of the stabilizer shall be adjusted to within the range of 70% to 85% of the Optimum Moisture Content (AASHTO T180).

(c) Spreading the stabilizer

After the layer to be treated has been prepared to the satisfaction of the Engineer, the stabilizer shall be uniformly spread over the width to be worked at the specified rate. If a spreader is used to spread the stabilizer ahead of the STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION CEMENT AND LIME TREATED MATERIAL Page 14.3 mixer, it shall be fitted with a device to ensure a uniform and controllable rate of spread both transversely and longitudinally. Only sufficient stabilizer for immediate use shall be spread ahead of the mixing operation and any which, in the opinion of the Engineer, becomes defective, shall be replaced at the Contractor expense. Only equipment actually used in the spreading or mixing operation shall be allowed to pass over the stabilizer, when so spread, before it has been mixed into the material to be treated.

(d) Mixing and watering

Immediately after the stabilizer has been spread, it shall be thoroughly and intimately mixed into the material, for the full depth of the layer. Mixing shall continue until the resulting mixture forms a fine and homogeneous tilt. The mixing machine shall be set so that it cuts at least 100mm into the edge of any adjoining lane processed previously so as to ensure that all the material forming the layer has been properly processed. Care shall be taken both during this and during subsequent watering operations that the underlying layer is not disturbed and that no material from the underlying layer or shoulders is mixed with that being processed. If watering is necessary to bring the mixture to the required moisture content, then this shall be done after spreading and mixing in the stabilizer. Water shall be added in a uniform and controllable manner and, where necessary, in successive increments. Each increment shall be mixed in a separate mixing operation. Care shall be taken to avoid a concentration of water at any point or a flow of water over the surface.

Any part of the mixture which becomes too wet after the stabilizer has been added and before the mixture is compact will be rejected and any such part shall be allowed to dry out until its moisture content is satisfactory and shall be retreated with fresh stabilizer and finished off in accordance with this Clause.

Throughout the process of mixing in the stabilizer and water, a uniform thickness of the mixture shall be maintained and, if necessary, the mixture shall be graded to maintain the correct uncompacted thickness and shape. Any part of the mixture that becomes segregated shall be removed and replaced.

1406 STATIONARY PLANT METHOD OF CONSTRUCTION

(a) Mixing Equipment

Stationary mixing plant shall be of the power driven paddle or pan type and may be of the batch or continuous type.

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If batch mixers are used, the appropriate measured amounts of material and stabilizer shall first be placed in the mixer, water being then added as necessary to bring the moisture content of the resulting mixture within the range determined in the laboratory and site trials. Special care shall be taken with batch type paddle mixers to ensure that the stabilizer is spread uniformly in the loading skip so that it is fed evenly along the mixing trough and that with both paddle and pan mixers the stabilizer is proportioned accurately by a separate weighing or proportioning device from that used for the material being stabilised. Mixing shall be continued until the mixture has the required uniformity and for not less than 1 minute unless a shorter minimum period is permitted by the Engineer after satisfactory trials.

If continuous mixing is used, the paddles, baffles and rate of feed of materials shall be adjusted to give uniformly mixed material.

If a spray is used for distributing water into the mixer, it shall be adjusted to give uniformity in moisture content throughout the mix.

(b) Transporting

Mixed material shall be transported to the road in suitable vehicles. Material that becomes segregated or is affected by weather shall be removed and replaced at the Contractor's expense.

(c) Laying

The mixed material shall be spread by means of a mechanical paver to the required width and such thickness that the tolerance requirements as specified in Section 3 of this Specification are obtained after final compaction. Segregation shall be avoided and the layer shall be free from pockets of coarse or fine material.

1407 COMPACTION AND FINISHING

For cement treated materials final compaction and finishing shall be completed within 2 hours after the cement comes into contact with the material to be treated.

For lime treated materials, final compaction and finishing shall be completed within 4 hours after the lime comes into contact with the material to be treated.

(a) Thickness limitations

The compacted thickness of any treated layer laid, processed and compacted at one time shall not exceed 180mm. Where a greater thickness is required, the material shall be laid in two or more layers. The compacted thickness of any base layer shall not be less than 3 times the maximum particle size of the material and the compacted thickness of any subbase layer shall not be less than twice the maximum particle size of the material.

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(b) Compaction requirements

The minimum density for all lime and cement treated materials shall be 95% MDD (AASHTO T180). The moisture content at the time of compaction shall be between 95% and 105% of Optimum Moisture Content (AASHTO T180).

(c) Finishing

The surface finish after compaction of any treated layer shall be free from ridges, compaction planes, laminations, loose and segregated material and other surface irregularities and shall be to line and level and within the tolerances specified in Section 3 of this Specification. If the surface fails to meet the requirements of this Specification the Contractor shall take the action set out in the appropriate part of Section 3 of this Specification or such other action as the Engineer may instruct or agree.

1408 JOINTS BETWEEN NEW AND EXISTING WORK

The forming of construction joints and the protection of previously treated or other work shall be carried out so as to produce a uniformly compacted and homogeneous layer free from ridges or, other irregularities.

Full width working, without longitudinal joints, will generally be required. Half-width working may be instructed by the Engineer to pass traffic. When forming longitudinal joints, mix-in-place method at least 100mm of the first laid half-width layer shall be retreated and mixed in with the second half-width layer.

When forming transverse joints, with the mix-in-place method, at least 1.0m length of the previously laid treated work shall be incorporated into the new treated layer and the Engineer may instruct that the percentage of stabilizer be increased at these places.

When forming longitudinal or transverse joints with the stationary plant method of construction, previous work shall be cut back to expose fully treated and compacted material.

1409 PROTECTION AND CURING

Treated layers shall be kept continuously damp by lightly spraying with water, from completion of compaction until one of the curing systems specified below is placed.

Treated layers shall be protected, within 4 hours of completion of compaction in the case of cement treated material and 8 hours in the case of lime treated material, by one of the following methods: -

(i) Completely covering the layer with clear or light coloured approved polythene sheeting of minimum thickness 0.1mm. The sheeting shall be laid to cover the whole of the surface of the layer. At joints the sheeting shall be lapped by at least 500mm and any damaged sheeting shall be replaced at the Contractor's expense.

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The sheeting shall be securely held in contact with the layer by an approved method.

(ii) Completely covering the treated material with a layer of damp uncompacted gravel or soil material of minimum thickness 100mm. This material, which may be that forming the next layer, shall be kept continuously damp.

(iii) Spraying the layer with A3 anionic emulsion at a rate of 1.51/m² to be applied in accordance with Parts A and B of Section 15 of this Specification. This method shall not be permitted where the following layer is to be a bituminous mix in accordance with Section 16 of this Specification.

Unless otherwise instructed by the Engineer, no prime will be required where method (iii) is adopted and the contractor shall comply with the requirements of Parts A and B of Section 15 of this Specification.

Plant used for dumping and spreading material, and the application of water or emulsion shall be approved by the Engineer and shall have individual axle loads not exceeding 6 tonnes.

Immediately prior to placing protection methods (i) or (iii) the surface of the treated layer shall be made thoroughly damp by lightly spraying with water.

The curing system shall be kept in place and intact for a minimum of 7 days after completion of compaction although small areas may be temporarily removed for the purposes of carrying out control testing but only for the minimum amount of time required for the testing.

1410 TRAFFIC

Traffic or equipment, other than that actually engaged in the various treatment or protection processes, shall not run over the layer being processed or compacted.

On completion of curing no traffic or equipment shall be allowed on the treated layer with the exception of that required for proofrolling, priming or construction of the subsequent layer.

1411 TOLERANCES

(a) Geometric tolerances

The treated upper earthworks, subbase and base shall be constructed within the tolerances specified in Section 3 of this Specification.

(b) Amount of stabilizer

(i) Mix-in-place method of construction.

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The average amount of stabilizer, measured before mixing, over a length of 100 m, shall not be less than the amount ordered.

The average amount of stabilizer in the treated material, measured at five points over a length of 100 m, shall not be less than the amount ordered.

The amount of stabilizer, measured after mixing, shall at no point be less than 70% or more than 130% of the amount ordered.

(ii) Stationary plant method of construction

The average amount of stabilizer in the treated material measured at five points over a length of 100m shall not be less than the amount ordered.

The amount of stabilizer measured after mixing shall, at no point be less than 90% or more than 110% of the amount ordered.

(iii) Determination of stabilizer content

The cement content in mixed materials shall be determined according to Test 14 of BS 1924 or to AASHTO T211-65 (1982).

The lime content in mixed materials shall be determined according to Test 15 of BS 1924.

1412 MEASUREMENT AND PAYMENT

For the purpose of measurement and payment no distinction shall be made between the mix-in-place and stationary plant methods of construction.

The work of providing, placing, spreading mixing, watering shaping and hauling the materials to be stabilised will be measured and paid for in Sections 5, 11, 12 and 13, as appropriate, of this Specification.

For the additional work of providing and mixing-in the stabilizer and curing the treated materials the Contractor will be paid as follows:-

(a) Item: Stabilizer

Unit: Tonne of each type of stabilizer

The provision of the stabilizer shall be measured by the tonne calculated as the specified weight of stabilizer added to the material.

The rate for stabilizer shall include for the cost of provision, storage, handling, transport and spreading of the stabilizer at any point on the Works and complying with the requirements of Clauses 1401, 1403, 1404, 1405, 1406, 1408 and 1411 of this Specification.

(b) Item: Mix-in stabilizer

Unit: m³

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Mixing stabilizer into the material shall be measured by the cubic metre of treated material calculated as the product of the compacted sectional area specified to be treated and the length instructed.

The rate for mixing shall include for the cost of complying with the requirements of Section 14 of this Specification.

(c) Item: Curing treated material

Unit: m²

Curing treated material shall be measured by the square metre of the layer cured calculated as the product of the specified width of treated layer and the length cured.

The rate for curing shall include for the cost of watering, provision placing and maintenance of the curing system, and for complying with the requirements of Clause 1409 and Parts A and B of Section 15 of this Specification.

SECTION 15 - BITUMINOUS SURFACE TREATMENTS

1501B 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: -

a) **Cracks 3.0mm or less in width**

The entire crack area shall be cleaned by brushing with a wire brush and then blowing with a compressed air jet and the crack sealed with 80/100 cutback bitumen using a pouring pot or pressure lance and hand squeegee. The surface shall then be dusted with sand or crushed dust.

b) **Cracks greater than 3.0mm in width**

Before these cracks are filled a steel wire brush or router shall be used to clean them and then a compressed air jet shall be used to clean and remove any foreign or loose

material in the crack until the entire crack area is clean.

When the crack and surrounding area have been thoroughly cleaned, dry sand shall be forced into the crack until it is sealed in the manner specified for cracks less than 3.0mm width.

c) Potholes, edges and other repair areas

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 or MC 70 cut-back bitumen prime coat at a rate of 0.8-1.2 litres/m², 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 B - PRIME COAT

1502B MATERIALS FOR PRIME COAT AND TACK COAT.

For prime coat, the binder shall be a medium-curing cutback MC 70 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 diluents.

Prime coat shall be applied to gravel areas that are to receive 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.

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

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

This section covers different types of bituminous mixes for base and surface (wearing and binder courses) and is divided into the following parts: -

Part A General

Part B Asphalt Concrete for carriageway

PART A – GENERAL

1601A SCOPE OF PART A

Part A comprises all the general requirements for bituminous mixes, which apply to Part B as well.

1602A REQUIREMENTS FROM OTHER SECTIONS

The following sections of this Specification apply to Part B of this section and shall be read in conjunction therewith:-

Section 2	Materials and Testing of Materials
Section 3	Setting Out and Tolerances
Section 6	Quarries, Borrow Pits, Stockpile and Spoil Areas
Section 15	Bituminous Surface Treatments and Surface Dressing

1603A CONSTRUCTION PLANT

(a) General

The Contractor shall submit to the Engineer in accordance with Section 1 of its Specification, full details of the construction plant he proposes to use and the procedures he proposes to adopt for carrying out the permanent Works.

The Engineer shall have access at all times to construction plant for the purposes of inspection. The Contractor shall carry out regular calibration checks in the presence of the Engineer and shall correct forthwith any faults that are found.

All construction plant used in the mixing, laying and compacting of bituminous mixes shall be of adequate rated capacity, in good working condition, and shall be acceptable to the Engineer. Obsolete or worn-out plant will not be allowed on the work.

(b) Mixing Plant

Bituminous materials shall be mixed in a plant complying with ASTM Designation D995 and shall be located on the Site unless otherwise agreed by the Engineer. It shall be equipped with at least three bins for the storage of heated aggregates and a separate bin for filler. All bins shall be covered to prevent the ingress of moisture.

The plant may be either the batch-mix type or the continuous-mix type and shall be capable of regulating the composition of the mixture to within the tolerances specified in Clause 1614A of this Specification.

The bitumen tank shall be capable of maintaining its contents at the specified temperature within a tolerance of 5⁰C and a fixed thermometer easily read from outside the tank. Any bitumen that has been heated above 180⁰C or has suffered carbonisation from prolonged heating shall be removed from the plant and disposed of.

(c) Laying Plant

Bituminous materials shall be laid by a self-propelled spreader finisher equipped with a hopper, delivery augers and a heated adjustable vibrating screed. It shall be capable of laying bituminous materials with no segregation, dragging, burning or other defects and within the specified level and surface regularity tolerance. Delivery augers shall terminate not more than 200mm from the edge plates.

(d) Compaction Plant

The Contractor shall provide sufficient rollers of adequate size and weight to achieve the specified compaction. Prior to commencing the laying of bituminous mixes in the permanent Works the Contractor shall carry out site trials in accordance with Section 2 of this Specification to demonstrate the adequacy of his plant and to determine the optimum method of use and sequence of operation of the rollers.

It is important to achieve as high a density as possible at the time of construction and it is expected that vibrating rollers will be required to produce the best results. However, it is essential that thorough pre-construction trials are carried out to ensure that:-

- (a) The roller is set up to have the optimum amplitude and frequency of vibration for the particular material being laid
- (b) That the roller does not cause breakdown of the aggregate particles.
- (c) That the optimum compaction temperatures are established which allow compaction without causing ripple effects or other distortions of the surfacing.

Immediately before placing the bituminous mix in the pavement, the existing surface shall be cleaned of all material and foreign matter with mechanical brooms or by other approved methods. The debris shall be deposited well clear of the surface to be covered.

Any defect of the surface shall be made good and no bituminous mix shall be laid until the Engineer has approved the surface.

A tack coat shall be applied in accordance with Section 15 of this Specification. If the Engineer considers a tack coat is required prior to laying the bituminous mix or between layers of the bituminous mix, due solely to the

Contractor's method of working, then such tack coat shall be at the Contractor's expense.

1605A DESIGN AND WORKING MIXES

At least two months prior to commencing work using a bituminous mix, the Contractor shall, having demonstrated that he can produce aggregates meeting the grading requirements of the Specification, submit samples of each constituent of the mix to the Engineer. The Engineer will then carry out laboratory tests in order to decide upon the proportion of each constituent of the initial design mix or mixes to be used for site trials to be carried out in accordance with Clause 1606A of this Specification.

Should the Engineer conclude from the site trials that the mix proportion or aggregate grading are to be changed, the Contractor shall submit further samples of the constituents and carry out further site trials all as directed by the Engineer.

The Engineer may instruct the alteration of the composition of the -75 micron fraction of the aggregates by the addition or substitution of mineral filler. The Engineer may also instruct the alteration of all or part of the -6.3mm fraction of the aggregates by the addition or substitution of natural sand.

The Contractor shall make the necessary adjustments to his plant to enable the revised mix to be produced.

Following laboratory and site trials the Engineer will determine the proportions of the working mix and the Contractor shall maintain this composition within the tolerances given in Clause 1614A.

Should any changes occur in the nature or source of the constituent materials, the Contractor shall advise the Engineer accordingly. The procedure set out above shall be followed in establishing the new mix design.

1606A SITE TRIALS

Full scale laying and compaction site trials shall be carried out by the Contractor on all asphalt pavement materials proposed for the Works using the construction plant and methods proposed by the Contractor for constructing the Works. The trials shall be carried out with the agreement, and in the presence of the Engineer, at a location

approved by the Engineer.

The trials shall be carried out to: -

- a) Test materials, designed in the laboratory, so that a workable mix that satisfies the specification requirements can be selected.
- b) To enable the Contractor to demonstrate the suitability of his mixing and compaction equipment to provide and compact the material to the specified density and to confirm that the other specified requirements of the completed asphalt pavement layer can be achieved.

Each trial area shall be at least 100 metres long and to the full construction width and depth for the material. It may form part of the Works provided it complies with this Specification. Any areas that do not comply with this Specification shall be removed.

The Contractor shall allow in his programme for conducting site trials and for carrying out the appropriate tests on them. The trial on any pavement layer shall be undertaken at least 21 days ahead of the Contractor proposing to commence full-scale work on that layer.

The Contractor shall compact each section of trial over the range of compactive effort the Contractor is proposing and the following data shall be recorded for each level of compactive effort at each site trial: -

- i. The composition and grading of the material including the bitumen content and type and grade of bitumen used.
- ii. The moisture content of aggregate in the asphalt plant hot bins.
- iii. The temperature of the bitumen and aggregate immediately prior to entering the mixer, the temperature of the mix on discharge from the mixer and the temperature of the mix on commencement of laying, on commencement of compaction and on completion of compaction. The temperature of the mixture is to be measured in accordance with BS 598, Part 3, Appendix A.
- iv. The type, size, mass, width of roll, number of wheels, wheel load, tyre pressures, frequency of vibration and the number of passes of the compaction equipment, as appropriate for the type of roller.
- v. The target voids and other target properties of the mix together with the results of the laboratory tests on the mix.
- vi. The density and voids achieved.
- vii. The compacted thickness of the layer.
- viii. Any other relevant information as directed by the Engineer.

At least eight sets of tests shall be made by the Contractor and the Engineer on each 100 metres of trial for each level of compactive effort and provided all eight sets of

results over the range of compactive effort proposed by the Contractor meet the specified requirements for the material then the site trial shall be deemed successful. The above data recorded in the trial shall become the agreed basis on which the particular material shall be provided and processed to achieve the specified requirements.

1607A MIXING OF AGGREGATES AND BITUMEN

The bitumen shall be heated so that it can be distributed uniformly and care shall be taken not to overheat it. The temperature shall never exceed 170⁰ C for 80/100-penetration grade bitumen.

The aggregates shall be dried and heated so that they are mixed at the following temperatures: -

125-165⁰C when 80/100 bitumen is used

The dried aggregates shall be combined in the mixer in the amount of each fraction instructed by the Engineer and the bitumen shall then be introduced into the mixer in the amount specified. The materials shall then be mixed until a complete and uniform coating of the aggregate is obtained.

The mixing time shall be the shortest required to obtain a uniform mix and thorough coating. The wet mixing time shall be determined by the Contractor and agreed by the Engineer for each plant and for each type of aggregate used. It shall normally not exceed 60 seconds.

1608A TRANSPORTING THE MIXTURE

The bituminous mix shall be kept free of contamination and segregation during transportation. Each load shall be covered with canvas or similar covering to protect it from the weather and dust.

1609A LAYING THE MIXTURE

Immediately after the surface has been prepared and approved, the mixture shall be spread to line and level by the laying plant without segregation and dragging.

The mixture shall be placed in widths of one traffic lane at a time, unless otherwise agreed by the Engineer. The compacted thickness of any layer shall be at least 2.5 times the maximum size of the aggregate for wearing course and at least 2 times for binder course. The minimum thickness shall be 25mm.

Only on areas where irregularities or unavoidable obstacles make the use of mechanical laying impracticable, may the mixture be spread and compacted by hand.

1610A COMPACTION

Immediately after the bituminous mixture has been spread, it shall be thoroughly and uniformly compacted by rolling.

The layer shall be rolled when the mixture is in such a condition that rolling does not cause undue displacement or shoving.

The number, weight and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. The sequence of rolling operations shall be as agreed with the Engineer and proved during site trials.

Initial rolling

with steel tandem or three-wheeled roller shall follow the laying plant as closely as possible. The rollers shall be operated with the drive roll nearest the laying plant, at a slow and uniform speed (not exceeding 5 Km/Hr).

Rolling shall normally commence from the outer edge and proceed longitudinally parallel to the centreline, each trip overlapping one half of the roller width. On super elevated curves, rolling shall begin at the low side and progress to the high side. Where laying is carried out in lanes care must be taken to prevent water entrapment.

Intermediate rolling with a pneumatic-tyred or vibratory roller shall follow immediately. Final rolling with a steel-wheeled roller shall be used to eliminate marks from previous rolling.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept lightly moistened with water.

In areas too small for the roller, a vibrating plate compactor or a hand tamper shall be used to achieve the specified compaction.

1611A FINISHING, JOINTS AND EDGES

Any mixture that becomes loose and broken, mixed with dirt or foreign matter or is in any way defective, shall be removed and replaced with fresh hot mixture, which shall be compacted to conform to the surrounding area.

Spreading of the mixture shall be as continuous as possible. Transverse joints shall be formed by cutting neatly in a straight line across the previous run to expose the full depth of the course. The vertical face so formed shall be painted lightly with hot 80/100 penetration grade bitumen just before the additional mixture is placed against it.

Longitudinal joints shall be rolled directly behind the paving operation. The first lane shall be placed true to line and level and have an approximately vertical face. The mixture placed in the abutting lane shall then be tightly crowded against the face of the previously placed lane. The paver shall be positioned to spread material overlapping the joint face by 20-30mm. Before rolling, the excess mixture shall be raked off and discarded.

When the abutting lane is not placed in the same day, or the joint is destroyed by traffic, the edge of the lane shall be cut back as necessary, trimmed to line and painted lightly with hot 80/100 penetration grade bitumen just before the abutting lane is placed.

Any fresh mixture spread accidentally on the existing work at a joint shall be carefully removed by brooming it back on to uncompacted work, so as to avoid formation of

irregularities at the joint. The finish at joints shall comply with the surface requirements and shall present the same uniformity of finish, texture and density as other sections of the work.

The edges of the course shall be rolled concurrently with or immediately after the longitudinal joint. In rolling the edges, roller wheels shall extend 50 to 100mm beyond the edge.

1612A SAMPLING AND TESTING OF BITUMINOUS MIXTURES

The sampling of bituminous mixtures shall be carried out in accordance with AASHTO T168 (ASTM Designation D979).

1613A QUALITY CONTROL TESTING

During mixing and laying of bituminous mixtures, control tests on the constituents and on the mixed material shall be carried out in accordance with Clause 1612A and Section 2 of this Specification.

If the results of any tests show that any of the constituent materials fail to comply with this Specification, the Contractor shall carry out whatever changes may be necessary to the materials or the source of supply to ensure compliance.

If the results of more than one test in ten on the mixed material show that the material fails to comply with this Specification, laying shall forthwith cease until the reason for the failure has been found and corrected. The Contractor shall remove any faulty material laid and replace it with material complying with this Specification all at his own expense.

1614A TOLERANCES

Surfacing courses and base shall be constructed within the geometric tolerances specified in Section 3 of this Specification.

The Contractor shall maintain the composition of the mixture as determined from the laboratory and site trials within the following tolerances, per single test: -

Bitumen Content	0.3% (by total weight of total mix)
Passing 10mm sieve and larger sieves	6% (by total weight of dry aggregate including mineral filler)
Passing sieves between 10mm and 1.0mm sieves	4% (by total weight of dry aggregate including mineral filler)
Passing sieves between 1.0mm and 0.075mm sieve	3% (by total weight of dry aggregate including mineral filler)
Passing 0.075mm sieve	2% (by total weight of dry aggregate)

including mineral filler)

The average amount of bitumen in any length of any layer, calculated as the product of the bitumen contents obtained from single tests and the weight of mixture represented by each test, shall not be less than the amount ordered.

The average amount of bitumen for each day's production calculated from the checked weights of mixes shall not be less than the amount ordered.

The average amount of bitumen in any length of any layer, calculated as the product of the bitumen contents obtained from single tests and the weight of mixture represented by each test, shall not be less than the amount ordered.

The average amount of bitumen for each day's production calculated from the checked weights of mixes shall not be less than the amount ordered.

The final average overall width of the upper surface of a bituminous mix layer measured at six equidistant points over a length of 100m shall be at least equal to the width specified. At no point shall the distance between the centreline of the road and the edge of the upper surface of a bituminous mix layer be narrower than that specified by more than 13mm.

1615A MEASUREMENT AND PAYMENT

No separate measurement and payment shall be made for complying with the requirements of Clauses 1601A to 1614A inclusive and the Contractor shall be deemed to have allowed in his rates in Parts B and C of Section 16 of this Specification for the costs of complying with the requirements of Part A of Section 16 of this Specification

PART B - ASPHALT CONCRETE FOR SURFACING**1601B DEFINITION**

Asphalt concrete means a thoroughly controlled, hot-mixed, hot-laid, plant mixture of well-graded dried aggregate and penetration grade bitumen, which, when compacted forms a dense material.

A distinction is drawn between asphalt concrete Type I (High Stability) and asphalt concrete Type II (Flexible). The asphalt concrete type to be used will be Type I.

1602B MATERIALS FOR ASPHALT CONCRETE TYPE 1**a) Type of bituminous material**

The type of material to be used on severe sites will be of the continuously graded type similar to Asphaltic Concrete or Close Graded Macadam. It is essential that these materials are sealed with a single or double surface dressing or a Cape seal.

b) Penetration Grade Bitumen

Bitumen shall be 80/100 penetration grade since material is being laid at an altitude of more than 2,500m.

c) Aggregate

Coarse aggregate (retained on a 6.3mm sieve) shall consist of crushed stone free from clay, silt, organic matter and other deleterious substances. The aggregate class will be specified in the Special Specification and it shall comply with the requirements given in Table 16B-1(b). The grading for 0/20 mm for carriageway and 0/14mm for shoulders for binder course is as specified below:

Sieve size	0/20	0/14
28	100	-
20	90-100	100
14	75-95	90-100
10	60-82	70-90
6.3	47-68	52-75
4	37-57	40-60
2	25-43	30-45
1	18-32	20-35
0.425	11-22	12-24
0.300	9-17	10-20
0.150	5-12	6-14
0.075	3-7	4-8

TABLE 16B-1(b) - REQUIREMENTS FOR COARSE AGGREGATE

Coarse Aggregate (Retained on a 6.3mm Sieve)	
Test	Maximum Value
LAA	30
ACV	25
SSS	12
FI	25

Fine aggregate (passing a 6.3mm sieve) shall be free from clay, silt, organic and other deleterious matter and shall be non-plastic. Unless otherwise specified in the Special Specification it shall consist of entirely crushed rock produced from stone having a Los Angeles Abrasion of not more than 40. The Sand Equivalent of the fine aggregate shall not be less than 40 and the SSS not more than 12.

c) Mineral Filler

Mineral Filler shall consist of ordinary Portland Cement

1603B GRADING REQUIREMENTS

The grading of the mixture of coarse and fine aggregate shall be within and approximately parallel to the grading envelopes given in Table 16B-1(b), for 0/14mm as specified for binder course, as described below.

GRADING REQUIREMENTS

To arrive at a suitable design it is necessary to investigate a number of gradings so that a workable mix, which also retains a minimum of 3 % voids at refusal density, is identified.

The largest particle size used should not be more than 25mm so that the requirements of the Marshall test method can be complied with.

Although the complete range of nominal maximum particle sizes is shown in the Tables, the total thickness of material laid should not be more than 75mm.

1604B REQUIREMENTS FOR ASPHALT CONCRETE TYPE 1

The mixture shall comply with the requirements given in Table 16B-2 as specified in the Specification. In addition, minimum Marshall Stability for 2 x 75 blows shall be 9

kN and maximum 18 kN and at compaction to refusal shall have 3% VIM.

The proportion, by weight of total mixture, of bitumen shall be 5.0 – 6.5 % for 0/14 mm and 4.5 – 6.5 % for 0/20mm. This shall be termed the nominal binder content. The binder content of the working mix will be instructed by the Engineer following laboratory and site trials.

In order to determine the suitability of a coarse aggregate source a Marshall test programme shall be carried out. It will be advantageous to use a crushed rock which is known from past experience to give good results in this test procedure. A grading conforming to the Type I Binder Course detailed in Table 16B-1(a) 0/20 of this Specification should be tested (but with 100% passing the 25mm sieve) and it shall meet the requirements of Table 16B-2 of this Specification.

Having established the suitability of the aggregate source several gradings shall be tested in the laboratory, including that used for the Marshall test, to establish relationships between bitumen content and VIM at refusal density. For each mix, samples will be made up to a range of bitumen contents and compacted to refusal using a gyratory compactor and a vibratory hammer in accordance with the procedure described in BS 598 (Part 104 : 1989), with one revision.

It should first be confirmed that compaction on one face of the sample gives the same refusal density as when the same compaction cycle is applied to both faces of the same sample. The procedure, which gives the highest density, must be used.

From the bitumen content-VIM relationship it will be possible to identify a bitumen content which corresponds to a VIM of 3 - 7%. If it is considered that the workability of the mix may be difficult then compaction trials should be undertaken. It is advisable to establish two or more gradings for compaction trials.

The mixes identified for compaction trials should be manufactured to the laboratory design bitumen content and to two other bitumen contents of +0.5% and +1% additional bitumen. Cores will be cut to determine the density of the compacted material, having completed this the core will then be reheated to $145 \pm 5^\circ\text{C}$ in the appropriate mould and compacted to refusal in the vibrating hammer test. To be acceptable the cores cut from the compaction trial must have a density equivalent to at least 95% of refusal density.

The compaction trials will identify a workable mix which can be made to a bitumen content which gives 3% VIM at refusal density.

1605B

MIXING AND LAYING HEAVY DUTY ASPHALT

The temperature of the bitumen and aggregates when mixed shall be $110 \pm 3^\circ\text{C}$ above the softening point (R&B) of the bitumen.

Compaction should commence as soon as the mix can support the roller without undue displacement of material and completed before the temperature of the mix falls below 90°C .

The minimum thickness of individual layers should be as follows:-

- | | | |
|----|--------------------|------|
| a) | For the 37.5mm mix | 65mm |
|----|--------------------|------|

- | | | |
|----|--------------------|------|
| b) | For the 25.0mm mix | 60mm |
| c) | For the 19.0mm mix | 50mm |
| d) | For the 12.5mm mix | 40mm |

1606B COMPACTION

Rolling shall be continued until the voids measured in the completed layer are in accordance with the requirement for a minimum density of 98% of Marshall optimum, or, a minimum mean value of 95% of refusal density (no value less than 93%) as appropriate.

1607B MEASUREMENT AND PAYMENT

- a) Item : Asphalt Concrete

Unit: m³ of Asphalt Concrete Used

Asphalt concrete shall be measured by the cubic metre compacted on the road calculated as the product of the length instructed to be laid and the compacted cross-sectional area shown on the Drawings or instructed by the Engineer.

The rate for asphalt concrete shall include for the cost of providing, transporting, laying and compacting the mix with the nominal binder content and complying with the requirements of Parts A and B of Section 16 of this Specification.

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 wingwalls 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/mm²

Maximum size of coarse aggregate : 20mm

Maximum cement content: 300 kg/m³.

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 wingwalls 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, wingwalls 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 54 reinforcing bar 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 men 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

(c)

(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.

(i) 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.

(c) 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) OF CULVERT WALLS AND SLABS

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 walls and slabs.

(a) Concrete Materials

(d)

(1) Cement:

Cement shall be of 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 have 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:

(i) Grading of Fine Aggregates

Sieve Size	Percentage by Weight Passing
10 mm	100
5 mm	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

(ii) Grading of Coarse Aggregates

Size of Coarse Aggregate	Amounts finer than each standard sieve percentage by weight							
	40	30	25	20	15	10	5	2.5
	100	-	-	90-100	-	30-69	0-10	-

Other requirements for aggregates are as follows:

(iii) 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

(iv) 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.

Concrete class 25/20

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	

(d) **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.

(e) **Concrete Work**

(i) **Batching**

Batching shall be done by weight with accuracy of:

Cement	: ½ percent
Aggregate	: ½ percent
Water and Admixture	: 1 percent.

(e)

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.

(ii) **Mixing and delivery**

Slump of mixed concrete shall be checked and approved at an accuracy of +25mm against designated slump in these specifications.

(iii) **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).

(iv) **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.

(v) **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**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 postholes. The signs shall be stored at the Contractor’s store and they shall become the property of the Employer who shall remove them prior to the expiry of the maintenance period.

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.

Where a salvaged existing sign complies with the requirements of new road signs, the Engineer may instruct the Contractor to remove the sign for safe storage, and re-erect it.

Measurement and payment shall be made by the number of road signs re-erected as directed and the rate shall include for excavation, concrete foundations and backfilling around posts and removal of surplus material to spoil.

2006 GUARDRAILS AND HANDRAILS

Contrary to the Standard Specification, guardrail posts shall be concrete 200mm 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 Flexbeam” or similar obtained from a manufacturer approved by the Engineer.

Handrails, steel bolts and nuts shall be provided on all bridges.

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 Bill of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed descriptions given in the conditions of Contract and Specifications for the full direction and description of work and materials.
3. The Quantities set forth in the Bill of Quantities are estimated and provisional, representing substantially the work to be carried out, and are given to provide a common basis for 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. 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.
5. A price or rate shall be entered in ink against every item in the Bill of Quantities with the exception of items, which already have Provisional sums, affixed thereto. The 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.
6. Provisional sums in the Bill of Quantities shall be expended in whole or in part at the discretion of the Engineer in accordance with Sub-Clause 52.4 and Clause 58 of Part I of the Conditions of Contract.
7. The price and rates entered in the Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional plant to be used, labour, insurance, supervision, compliance testing, materials, erection, maintenance 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.
8. Errors in the pricing of the Bills of Quantities will be corrected in accordance with Clause (28) of instructions to bidders.

BILLS OF QUANTITIES					
CONSTRUCTION OF MURURIRI DRIFT IN NTHAWA WARD					
ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1.01	Provide, erect and maintain contract signboard throughout the contract as directed by the engineer	Nr	1	30,000.00	30,000.00
1.02	Excavate for, provide, lay, joint and haunch 900mm diameter culverts with 150mm thick class 15/20 concrete complete with headwalls and wingwalls	M	18		
1.03	Excavation for foundation walls	M ³	60		
1.04	Provide and fix reinforcement bars to the drift retaining walls	Ton	0.6		
1.05	Provide formwork to produce F2 finish to the sides of drift retaining walls	M ²	150		
1.06	Provide and lay concrete class 20/25 to the drifts	M ³	44		
1.07	Provide and place A142 fabric mesh reinforcement to drift slab and walls	M ²	150		
1.08	Provide and place rock fill to drifts	M ³	60		
1.09	Provide and place steel marker posts with reflective tape at each corner of the drift as directed by the engineer	Nr	4		
Total carried to summary sheet					

QUOTATION FORM					
ROAD NO.	DESCRIPTION				AMOUNT(KSHS)
1	Construction of the proposed Mururiri drift				
GRAND TOTAL					
Quotation Amount in Words.....					
Tenderers Name and Stamp.....					
Signature.....			Date.....		
Witnessed by(Name).....					
Signature.....			Date.....		

DRAWINGS

SCHEDULE 1: SCHEDULE OF BASIC RATES OF MATERIALS

(Ref: Conditions of Contract)

Bidders shall complete the blank section of this schedule only, and shall make no alterations to any item nor insert any additional materials. The prices inserted shall be those prevailing 30 days before submission of Bids and shall be quoted in Kenya shillings using the exchange rates specified in the Bidding Data. The prices shall be supported by bona fide quotations for use as provided in Clause 70.

ITEM NO	DESCRIPTION	COUNTRY OF ORIGIN	NAME OF SUPPLIER	UNIT	RATE KSHS. CTS	
1.	Petrol, Regular Grade			Litre		
2.	Petrol, Premium/ super Grade			Litre		
3.	Automotive Diesel Fuel			Litre		
4.	Industrial Diesel Oil			Litre		
5.	Kerosene Fuel			Litre		
6.	Cement			Tonne		
7.	Flex beam Guardrail			Metre		
8.	Gabion Mesh			M ²		
9.	Reinforcing Steel			Tonne		

The employer shall / has the right to confirm the authenticity of prices from the said suppliers.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 2: MAJOR ITEMS OF CONSTRUCTION PLANT AND EQUIPMENT

Date of Arrival on Project (Days after commencement)	
Power Rating	
Owned/ Leased/ Imported	
Source	
Estimated CIF Mombasa Value (If to be Imported)	
Capacity	
New or Used	
Year of Manufacture	
No. of Each	
Description Type, Model, Make	

The Bidder shall enter in this schedule all major items of plant and equipment which he proposes to bring to site. Only reliable plant in good working order and suitable for the work required of it shall be shown on this Schedule.

I certify that the above information is correct.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 3: 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 on his behalf correspondence 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)

*To be filled by all Bidders.

*Both representative and alternate **must** attach copy of National Identification card or Passport

SCHEDULE 4: KEY PERSONNEL

DESIGNATION	NAME	NATIONALITY	SUMMARY OF QUALIFICATIONS AND EXPERIENCE		
			Qualifications	General Experience (Yrs)	Specific Experience (Yrs)
Headquarters Partner/Director or other key staff (give designation)					
Site Office Site Agent Supervising Engineer Construction supervisors Site Surveyor Other Key Staff Foremen (i) Earthworks (ii) Concrete					

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 of the Conditions of Contract (where required, use separate sheets to add extra data for column 4). Bidders shall attach signed and certified CVs of all key staff.

I certify that the above information is correct.

.....
(Signature of Bidder)

.....
(Date)

**SCHEDULE 5: SCHEDULE OF ROADWORKS CARRIED OUT BY THE BIDDER IN THE
LAST FIVE YEARS**

DESCRIPTION OF WORKS	NAME OF CLIENT	VALUE OF WORKS (KSHS) *	YEAR COMPLETED/ REMARKS
<u>A) Non-completed Works</u>			
<u>B) Completed Works</u>			
<u>C) Specific Construction Experience</u>			

I certify that the above works are being carried out by me and that the above information is correct.

.....
(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 6: SCHEDULE OF ONGOING PROJECTS

DESCRIPTION	NAME & ADDRESS OF CLIENT	DATE OF COMMEN CEMENT	DATE OF COMPLETION	VALUE OF WORKS (KSHS)	VALUE COMPLETED UP TO DATE %	PHYS DATE

I certify that the above works are being carried out by me and that the above information is correct.

.....
(Signature of Bidder)

.....
(Date)

SCHEDULE 7: SCHEDULE OF LOCAL LABOUR BASIC RATES

The rates inserted in this schedule will be those used in determining changes in cost of local labour as provided in Clause 70.1 of the Conditions of Contract Part 2.

LABOUR CATEGORY	MONTH/SHIFT/HOUR	UNIT	RATE SHS

NOTE: Categories to be generally in accordance with those used by the Kenya Building Construction Engineering and Allied Trade Workers Union

I certify that the above information is correct.

.....
Date

.....
Signature Of Bidder

SCHEDULE 8: FINANCIAL STANDING

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

	Year	Year	Year	Year	Year
	KShs.	KShs.	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	Year	Year
	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

.....

- (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 9: OTHER SUPPLEMENTARY INFORMATION

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

.....

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

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

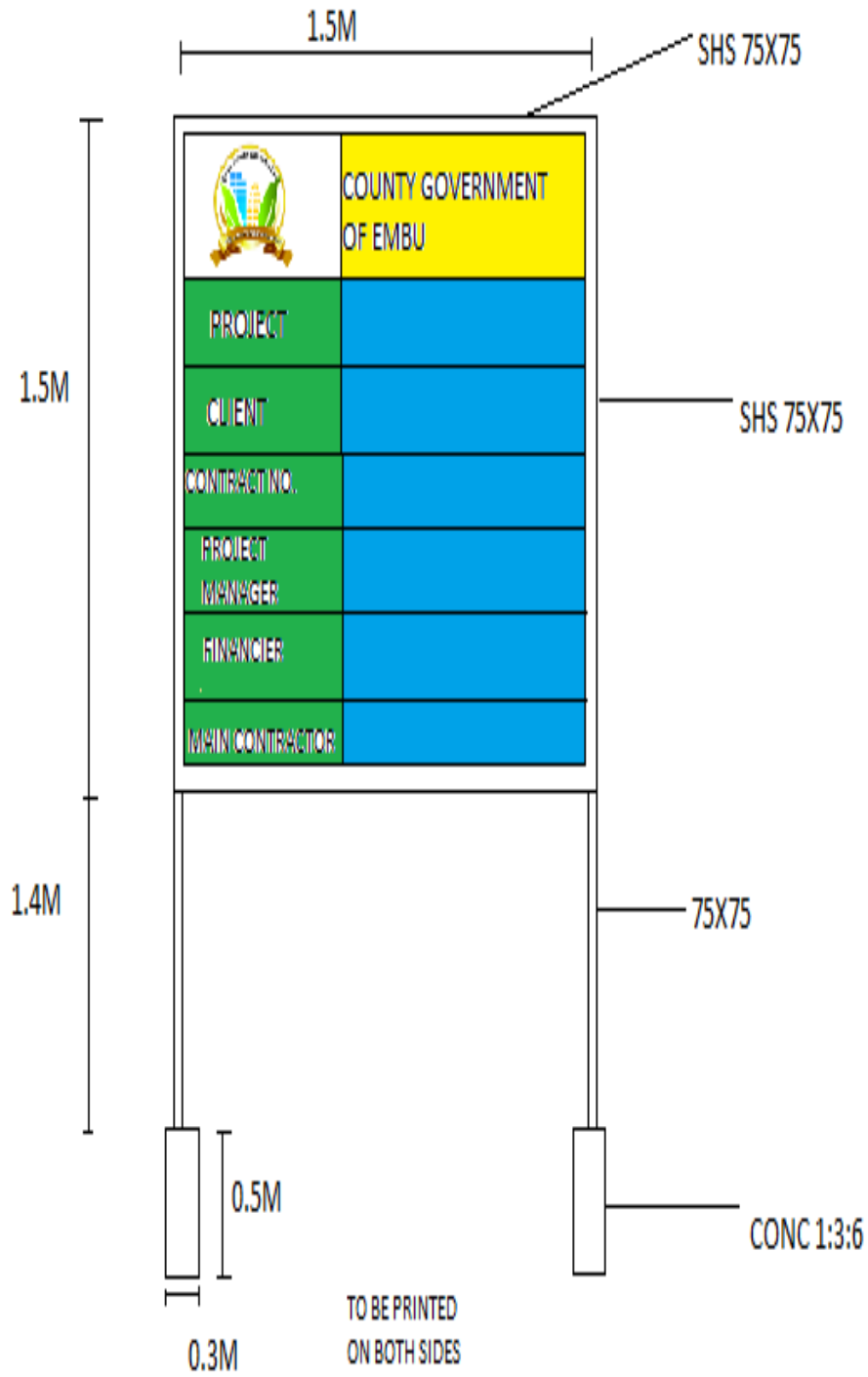
I certify that the above information is correct.

.....
 Date

.....
 Signature Of Bidder

SCHEDULE 10: 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 one (1) page and not more than three (3) pages.



STANDARD PROJECT SIGN BOARD

