NGORONGORO CONSERVATION AREA AUTHORITY

CONTRACT No. AE/055/2021-22/HQ/TCRP/W/02

FOR

REHABILITATE OF THE OLDUVAI TO NASERA ROCK ROAD - 25 KM

Ngorongoro Conservation Area Authority
P.o.Box 1,
Ngorongoro Crater

DECEMBER, 2021

FORM OF AGREEMENT

FORM OF AGREEMENT

This Agreement, made the 22ND day of DECEMBER 2021 between **NGORONGORO CONSERVATION AREA AUTHORITY, P.O BOX 1, NGORONGORO CRATER, ARUSHA** (hereinafter called "the Employer") and **M/S DENIKO CONSTRUCTION LIMITED, P.O BOX 14819, ARUSHA** (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute **rehabilitation of the Olduvai Museum to Nasera rock road - 25 km**, contract no. **AE/055/2021-22/HQ/TCRP/W/02** (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such works and the remedying of any defects therein in the sum of **Seven Hundred Twenty Five Million Three Hundred Sixteen Thousand Five Hundred Only (TZS 725,316,500.00)** VAT inclusive (hereinafter called "Contract Price") for the contract duration of Four (4) months commencing within fourteen (14) days after signing the Contract and site Possession.

Now this Agreement witnesses as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects wherein the Contract Price of **Seven Hundred Twenty Five Million Three Hundred Sixteen Thousand Five Hundred Only (TZS 725,316,500.00)** VAT inclusive 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.

Signed by, for and on behalf of the PE (NGORONGORO **CONSERVATION AREA AUTHORITY)**

SEALED with COMMON SEAL of the said
NGORONGORO CONSERVATION AREA AUTHORITY,
P.O.BOX 1
NGORONGORO CRATER

Name: DR. FREDDY MANONGI
Qualification: CONSERVATION COMMISSIONER.
Signature: ....

P. O BOX 1, NGORONGORO CRATER, ARUSHA

SEAL

2. Name: Jumanne Dede
Qualification: Ag: SACC - Legal Services
Signature: ....

P. O BOX 1, NGORONGORO CRATER, ARUSHA

Signed by, for and on behalf of the Contractor **(M/S DENIKO CONSTRUCTION LIMITED)**

SEALED with COMMON SEAL of the said
M/S DENIKO CONSTRUCTION LIMITED,
P. O. BOX 14819, ARUSHA

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

1. Name: CHRISTOPHER RICHARD
Qualification: CIVIL ENGINEER
Signature: ....

P. O. BOX 14819, ARUSHA

SEAL

2. Name: ALLEN PHILEMON OLOTU
Qualification: MANAGING DIRECTOR.
Signature: ....

P. O. BOX 14819, ARUSHA

SPECIAL CONDITIONS OF CONTRACT

Special Conditions of Contract (SCC)

Instructions for completing the Special Conditions of Contract
The following Special Conditions of Contract shall supplement the General Condition of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract.

SCC Clause	GCC Clause	Description
1.	1.1	Defect Liability Period will: 90 days for gravel and 365 days for structures. The Employer is: Conservation Commissioner, Ngorongoro Conservation Area Authority, P.O Box 1, Ngorongoro Crater, Arusha TEL: +255 27 255 253 7006/19 +255 27 255 253 7046 FAX: +255 27 255 253 7007 Phone: +255 754 474 804 Email: cc@ncaa.go.tz. pmu@ncaa.go.tz The Project Manager is: *Eng. Daniel M. Chegere* Ngorongoro Conservation Area Authority, P.O Box 1, Ngorongoro Crater, Arusha cc@ncaa.go.tz. pmu@ncaa.go.tz The Works consist of rehabilitation of the Olduvai Museum to Nasera rock road - 25km which include gravel excavation, haul, spread, watering, compact and drainage works. The Commencement Date shall be within Twenty-One (21) days after signing the Contract and site Possession. The Intended Completion Date for the whole of the Works shall be: Four (4) Months after commencement, possession date and mobilization. The works is expected to commence within 14 days after date of contract signing. Mobilization shall be 21 days after commencement date. The Site is located within Ngorongoro Conservation Area

		Authority and is defined in drawings.
2.	2.2	Indicate whether sectional completion is specified: Not specified.
3.	2.3	List other documents that form part of the c

		includes, but is not limited to, war, riots, civil disorder, earthquake [redacted]

3. Conditions Precedent	3.1	Having signed the Contract, it shall come into effect on the date on which the following conditions have bee

26. Discoveries	26.1	Anything of historical or other interest or of significant value unexpectedly discovered on, in, or under the land at the Site shall be the property of the

41. Tests	41.1	The Project Manager may instruct the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and in the event the test shows that it does, the Contractor shall pay for the test and any samples thereof. If there is no Defect, the test shall be a Compensation Event.
42. Correction of Defects	42.1	The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period stated in the **SCC**, which begins from the Completion Date.
43. Extension of Defect Liability Period	43.1	Every time notice of a Defect is given; the Contractor shall correct the notified Defect(s) within the period of time specified in the Project Manager's notice.
	43.2	The Defects Liability Period may be extended by the Project Manager for as long as Defects remain to be corrected.
44. Uncorrected Defects	44.1	In the event the Contractor has not corrected a Defect(s) within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the Defect corrected, including any other related cost(s) and the Contractor will pay the said cost.
		D. Cost Control
45. Bill of Quantities	45.1	The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.
	45.2	The Bill of Quantities is used to calculate the Contract Price. The Contractor shall be paid for the quantity of the work done at the rate in the Bill of Quantities for each item.
46. Changes in the Quantities	46.1	If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.
	46.2	The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.
	46.3	If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

47. Variations	47.1	All Variations shall be included in updated Work Programs produced by the Contractor.
48. Payments for Variations	48.1	The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.
	48.2	If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work is not above the limit stated in GCC 44.1 [Uncorrected Defects] or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
	48.3	If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.
	48.4	If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
	48.5	The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning notice.
49. Cash Flow Forecasts	49.1	When the Works Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.
50. Payment Certificates	50.1	The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.
	50.2	The Project Manager shall check the Contractor's

		monthly statement and certify the amount to be paid to the Contractor within twenty-eight (28) days from the receipt of the statement.
	50.3	The value of work executed shall be determined by the Project Manager.
	50.4	The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
	50.5	The value of work executed shall include the valuation of Variations, Compensation Events and Variation of Price.
	50.6	The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
	50.7	The Project Manager shall not be bound to certify any payment, if the net amount, after all retentions and deductions would be less than minimum amount of Interim Payment Certificate stated in the **SCC.**
51. Payments	51.1	Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest issued by the Bank of Tanzania on the date of Contract signature for each of the currencies in which payments are made.
	51.2	If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
	51.3	Unless otherwise stated, all payments and deductions will be paid or charged in the proportions of currencies comprising the Contract Price.
	51.4	Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

52. Currencies	52.1	The currency of payment shall be stated in the SCC.
		Where payments are to be made in currencies other than the Tanzania Shillings, the exchange rates to be used for calculating such amounts shall be the Bank of Tanzania exchange rate prevailing on the date of contract signature.
53. Compensation Events	53.1	The following shall be Compensation Events: (a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the **Special Conditions of Contract.** (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract. (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time. (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects. (e) The Project Manager unreasonably does not approve a subcontract to be let. (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to Tenderers (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site. (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons. (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor. (i) The advance payment is delayed.

		(j) The effects on the Contractor of any of the Employer's Risks. (k) The Project Manager unreasonably delays issuing a Certificate of Completion. (l) Other Compensation Events described in the Contract or determined by the Project Manager shall apply.
	53.2	If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall, upon consultation with Employer, decide whether and by, how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
	53.3	As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, if agreed by the Employer, the Contract Price may be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager in consultation with Employer shall adjust the Contract Price based on the Project Manager's own forecast.
	53.4	The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning notice or not having cooperated with the Project Manager.

54. Effect of Changes in Tax Laws	54.1	The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of Tenders for the Contract and the date of the last Completion certificate.
	54.2	The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 55 [Price Adjustment].
	54.3	In the event that the Laws Governing Taxes, Duties and other levies have changed between the signature date and the last completion certificate thereby affecting the Contract Price, the Employer and the Contractor, shall mutually adjust the contract price accordingly.
55. Price Adjustment	55.1	The amounts payable to the Contractor, pursuant to GCC 50.1 [Payment Certificate], may be adjusted in respect of the rise or fall in the cost of labour, Contractor's Equipment, Plant, materials, and other inputs to the Works, by applying to such amounts the formulae prescribed in this clause.
	55.2	To the extent that full compensation for any rise in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise of costs.
	55.3	The adjustment to be applied to amount payable to the Contractor as certified in Payment Certificates shall be determined by a formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be as follows; $Pn = a + b\frac{Ln - Lo}{Lo} + c\frac{Mn - Mo}{Mo} + d\frac{En - Eo}{Eo} + etc.$ where; **Pn** is a price adjustment factor to be applied to the amount in each specific currency for the payment of the work carried out in the subject month, where such variations and daywork are not otherwise subject to adjustment; **a** is a constant, specified in the **Appendix to Tender**, representing the nonadjustable portion in contractual

payments;

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

Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements in the specific currency of origin for month "**n**," determined pursuant to CGC 55.5, applicable to each cost element; and

Lo, Mo, Eo, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in GCC 55.5

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

$$F = PnxPc$$

where;

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

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

- any amount for payment or repayment of any advance payment;
- any amount for materials on site (if any);
- any amounts for nominated sub-contractors (if any)
- any amounts for any other items based on actual cost or current prices; or
- any sums for increase or decreases in the Contract Price paid under GCC 55.3

		and (ii) The amount calculated in accordance with (i) above of GCC 55.3 and included in the last preceding statement.
	55.4	The sources of indices shall be those listed in the **Appendix to Tender,** as approved by the Project Manager. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract Price and expected foreign currency requirements shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his Tender the tabulation of Weightings and Source of Indices in the **Appendix to Tender**, which shall be subject to approval by the Project Manager.
	55.5	The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of Tenders. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Project Manager will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available
	55.6	If the Contractor fails to complete the Works within the time for completion prescribed under GCC 20 [Commencement and Completion of Works] adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favourable to the Employer, provided that if an extension of time is granted pursuant to GCC 35 [Extension of the Intended Completion Date], the above provision shall apply only to adjustments made after the expiry of such extension of time.
	55.7	The weightings for each of the factors of cost given in the **Appendix to Tender** shall be adjusted if, in the opinion of the Project Manager, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work already executed or instructed under GCC 48 [Payment for Variations] or for any other reason.

56. Retention	56.1	The Employer shall retain from each payment due to the Contractor the proportion stated in the **Special Conditions of Contract.** The total amount of retention shall not exceed the amount specified in the **Special Conditions of Contract**
	56.2	On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and the other half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected.
	56.3	On completion of the whole Works, the Contractor may substitute retention money with an 'on demand" or unconditional Bank guarantee.
57. Liquidated Damages	57.1	The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the **SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the maximum amount of performance security stated in the **SCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.
	57.2	Where the Project Manager, after assessment of work progress, upon satisfaction that the Contractor will not complete the works within the contract period, may issue a notice to the Contractor requiring the payment of liquidated damages pursuant to GCC 57.1
	57.3	If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 51.1 [Payments]
58. **Bonus**	58.1	If stated in the **Special Conditions of Contract** the Contractor shall be paid a Bonus calculated at the rate per calendar day for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

59. Advance Payment	59.1	If stated in the SCC the Employer shall make advance payment to the Contractor of the amounts stated in the SCC by the date stated in the SCC, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.
	59.2	The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.
	59.3	The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, as specified in the **SCC** following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
60. Performance Securities	60.1	The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable as specified in the TDS and **SCC** and in accordance with the conditions of contract.
	60.2	The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond
	60.3	Where circumstances necessitate the amendment of the contract after signature, and such amendment is effected, the Employer shall require the Contractor to provide additional Performance Security to cover any cumulative increase of more than ten percent of the Initial Contract Price.

61. Day-works	61.1	If applicable, the Day-works rates in the Contractor's Tender shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
	61.2	All work to be paid for as Day-works shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.
	61.3	The Contractor shall be paid for Day-works subject to obtaining signed Day-works forms.
62. Cost of Repairs	62.1	Loss or damage to the Works or Materials to be incorporated in the Works between the Commencement Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.
		E. Discharge of the Contract
63. Completion Certificate	63.1	The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager will so issue upon satisfaction that the work is completed.
64. Site Hand Over	64.1	When the Certificate of Completion is issued by the Project Manager, the Contractor shall handover the site and the works to the Employer within time specified in the **SCC**
65. Final Account	65.1	Upon the expiry of the defect liability period, the Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract. The Project Manager shall, within fifty-six (56) days, verify the account and, upon satisfaction, certify any final payment due to the Contractor and thereafter issue a defect liability certificate.
	65.2	In the event the Project Manager is not satisfied with the Account submitted by the Contractor pursuant to sub-GCC 65.1, shall within 56 days issue a schedule of correction. If the final account remains unsatisfactory after it has been re-submitted, the Project Manager shall, upon consultation with the Employer, decide on the amount payable to the Contractor and issue a payment certificate.

66. Operating and Maintenance Manuals	66.1	The Contractor shall supply to the Employer the "as built" Drawings and/or operating and maintenance manuals and any other related documents by the handover period stipulated pursuant to GCC 64.1 [Site Hand Over].
	66.2	If the Contractor does not supply the Drawings and/or manuals stated in GCC 66.1 by the dates specified pursuant to GCC 64.1 [Site Hand Over] or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the **Special Conditions of Contract** from payments due to the Contractor.
67. Termination	67.1	The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
	67.2	Fundamental breaches of Contract shall include, but shall not be limited to, the following: a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Works Program and the stoppage has not been authorized by the Project Manager; b) the Project Manager instructs the Contractor in writing to delay the Works progress, and the instruction is not withdrawn in writing within 28 days; c) contractor's failure to submit performance security within the time stipulated in the SCC; d) the Employer or the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation; e) a payment certified by the Project Manager is not paid by the Employer to the Contractor after 84 days from the date of the Project Manager's certificate; f) Failure of the Contractor to correct the defect after lapse of time specified in the notice to correct defects issued by the Project Manager; g) where the Contractor fails to furnish and maintain the required Site Security pursuant to GCC 33.1 [Security of the Site};

h) The Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the SCC; and

i) If the Employer determines, based on the reasonable evidence that the Contractor has engaged in corrupt, coercive, collusive, obstructive or fraudulent practices, in competing for or in executing the Contract.

For the purpose of this paragraph:

"corrupt practice means the offering, giving receiving or soliciting of anything of value to influence the action of a public officer in the procurement process or contract execution;

"coercive practice" means impairing or harming, or threatening to impair or harm directly or indirectly, any party or the property of the party for the purpose of influencing improperly the action or that party in connection with public procurement or in furtherance of corrupt practice or fraudulent practice;

collusive practices" mean impairing or harming, or threatening to impair or harm directly or indirectly, any part or the property of the Party for the purpose of influencing improperly the action or a part or in connection with public procurement or government contracting or in furtherance of a corrupt practice or a Fraudulent Practice

"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 tenderers, prior to or after submission designed to establish tender prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition;

"obstructive practice" means acts intended to materially impede access to required

		information in exercising a duty under this contract;
	67.3	When either party to the Contract gives notice of a fundamental breach of Contract to the other party for a cause other than those listed under GCC 67.2 above, the Project Manager shall decide whether the said breach is fundamental or not.
	67.4	Notwithstanding the above, the Employer may terminate the Contract for convenience.
	67.5	If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.
68. Payment upon Termination of Contract	68.1	If the Contract is terminated because of a fundamental breach by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
	68.2	If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

69. Property	69.1	All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the contract is terminated for fundamental breach by the Contractor,
70. Suspension of Financing	70.1	In the event that the source of financing is suspended to the Employer, from which part of the payments to the Contractor are being made: (a) The Employer shall notify the Contractor of such suspension within Seven (7) days of having received the financing agency's suspension notice. (b) After the Notice has been issued and within fourteen (14) days, the Parties shall mutually agree on the future events of the Contract
71. Force Majeure	71.1	Neither Party shall have any liability or be deemed to be in breach of the Contract for any delay or other failure in performance of its obligations under the Contract, if such delay or failure is a result of an event of Force Majeure.
	71.2	For purpose of this clause, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent.
	71.3	If a Party (hereinafter referred to as "the Affected Party") is or will be prevented from performing its substantial obligation under the contract by Force Majeure, it shall give a Notice to the other Party giving full particulars of the event and circumstance of Force Majeure and the reasons for the event of Force Majeure preventing the Affected Party from, or delay the Affected Party from performing its obligations under the Contract. The Notice shall be given within fourteen days after the Affected Party becomes aware, or should have become aware, of the relevant event or circumstances constituting Force Majeure.

DENIKO
CONSTRUCTION LTD
Civil Works & Building Contractors

Ref. No. DCL/0579/21

Date: 17th December, 2021

Conservation Commissioner,
Ngorongoro Conservation Area Authority,
P.O. Box 1
Ngorongoro Crater
ARUSHA - TANZANIA

RE: TENDER NO. AE/055/2021-22/HQ/TCRP/W/02 FOR REHABILITATION OF OLDUVAI TO NASERA ROCK ROAD (25KM)

SUB: LETTER OF ACCEPTANCE

Reference is made to your letter Ref. No. AF.158/570/01-C/73 dated 17th December, 2021 on the above mentioned subject matter.

We hereby accept your offer to execute the above mentioned Tender at a Contract Sum of **TShs.725,316,500/= [say Tanzania Shillings Seven Hundred Twenty Five Thousand Three Hundred Sixteen Five Hundred Only] VAT Inclusive** for a contract period of **Four [4] months.**

We thank you for your offer and look forward to working with you.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

Christopher Richard
SITE ENGINEER

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF NATURAL RESOURCES AND TOURISM

NGORONGORO CONSERVATION AREA AUTHORITY

In reply please quote:

Ref. No. AF.158/570/01-C/73 **Date:** 17th December, 2021

M/S Deniko Construction Limited
P.O. Box 14819,
Arusha-Tanzania.
Email: denikoconstruction@yahoo.com
Mobile: +255 762 813 859

RE: **LETTER OF ACCEPTANCE FOR TENDER NO. AE/055/2021-22/HQ/TCRP/W/02 REHABILITATION OF THE OLDUVAI TO NASERA ROCK ROAD 25KM**

Please refer to the above subject matter,

2. This is to inform you that, following a successful negotiation conducted on 16th December, 2021 between the parties, NCAA Tender Board in its extra ordinary meeting held on 16th December, 2021 approved your bid which you submitted online through TANePS and opened on Friday 10th December, 2021 in regard to above mentioned tender for a contract price of **Tanzania Shillings Seven Hundred Twenty Five Million Three Hundred Sixteen Thousand Five Hundred Only (TZS. 725,316,500.00) VAT inclusive for a contract period of Four (4) months** commencing within fourteen (14) days after signing the contract and site possession.

3. The terms and conditions of the contract are as per invitation for tender and negotiation conducted between parties.

Dr. Christopher D. Timbuka

Acting **CONSERVATION COMMISSIONER**

c.c. The Chief Executive Officer,
Public Procurement Regulatory Authority,
Kambarage Tower, 9th Floor PSPF Road,
P.O. Box 2865,
DODOMA, TANZANIA.
Email: ceo@ppra.go.tz

: The Controller and Auditor General,
P.O. Box 9080,
DAR ES SALAAM
Email: ocag@nao.go.tz

: Attorney General
P.O. Box 9050,
DAR ES SALAAM
Email: info@agctz.go.tz

: Internal Auditor General
P.O. Box 911
DAR ES SALAAM
Fax: +25522211032

: Permanent Secretary , Ministry of Finance and Planning,
(Att. Directorate of Government Asset Management Division)
18 Jakaya Kikwete Road
P.O. Box 2802
40468 DODOMA
Email: assets.management@mof.go.tz

: Tanzania Revenue Authority
P.O. Box 11491
DAR ES SALAAM
Email: services@tra.go.tz

CERTIFICATE OF CONTRACT COMMENCEMENT

To be issued to the Contractor after contract signing

SPECIFICATIONS

TECHNICAL SPECIFICATIONS

PART I - PRELIMINARY AND GENERAL

1.01 Reference to General Conditions of Contract

The specifications are to be read in conjunction with the General Conditions of contract to which the Contractor is referred for the full meaning of each clause and allowance must be made in the tender prices, for compliance therewith.

1.02 Specifications and Drawings

The Tender Drawings, together with such other drawings as may be issued by the engineer, form part of the Specifications. The specification and workmanship shall be governed by the following in order of preference:

(i) Specifications as detailed on the Contract Drawings

ii) Specifications and workmanship as detailed in this document.

Where the Specifications and Drawings describe portions of the works in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labour, material, tools, equipment and incidentals, and do all the work involved in executing the Contract in satisfactory and workman like manner.

1.03 Scope of Works

The Works comprised in the contract include all operations, labour, materials and works, both temporary and permanent, which may be necessary for the construction and maintenance of the works, together with modifications and substitutions, all in accordance with the Contract Documents.

1.04 Sureties

The Bond of Surety, in conformity with ***Clause*** 13 of the General Conditions of contract, shall be submitted to the Engineer by the Contractor at the time of signing the Contract or at such time as stated in the Tender Documents. The sum tendered in ***Pay Item No.*** 1.3 for the provision of the bond of surety will be paid in full in the first interim certificate.

1.05 Insurance

A certificate from an approved Insurance Company to the effect that the Contractor has taken out all the insurances required in terms of Clause 13, of the General Conditions of Contract within 14 days of the award of the tender, or such period as stated in the Tender Document.

The sum tendered in Pay *Item No. 1.4* for the provision of the insurance will be paid in full in the first interim certificate.

1.06 <u>Establishment on site</u>

The Pay *Item No.* 1.5 included in the Bill of Quantities is presided to reimburse the Contractor for the cost of all operations necessary for and directly related to the establishment on site. The item includes full compensation for:

(a) Erection of adequate and suitable accommodation for the Contractor's labor force on site;

(b) Supply of drinking water and provision of sanitary facilities to the satisfaction of the Ministry of Health and Social Welfare;

(c) Erection of works office for the Contract, adequately furnished and of appropriate size;

(d) Erection of an equipment workshop *(if deemed necessary in this case)* adequately furnished and equipped and of appropriate size.

(e) Office accommodation and facilities for the Engineer. The Contractor is to allow in his rates for attendance on the Engineer including provision of labor, materials and instruments necessary to enable him to carry out checks on the setting out and control of the Works. The Engineer will not require a separate office but the Contractor shall make available facilities in his own offices for the Engineer's use. Among the facilities to be provided to the Engineer shall be at least two rooms, each at least 15 square metres in area. The rooms shall have an external entrance/exit separate to that of the Contractor's quarters. The following minimum furniture shall also be supplied for the use of the Engineer:
- 2 desks 1.5 x 1.0 with drawers
- 6 chairs
- 1 steel filing cabinet with 4 drawers
- 1drawing table

(f) Any other operation necessary for establishment on site and to enable work to commence on the project.

The sum of bid for establishment on site will be paid 70% upon completion of erection of the Contractor's Works office and camp, but not before work has commenced on the project, to the satisfaction of the Engineer; and 30% to be paid in monthly instalments for operation and maintenance of the camp.

1.07 Mobilization/ Demobilization of Plant and Equipment

The Contractor shall mobilize all plant and equipment agreed in the Contract Agreement not later than 21 - *30 days* following the commencement date of the Contract. The Contractor shall demobilize all plant and equipment prior to issuing the certificate of final completion.

Pay item 1.2 included in the Bills of Quantities is provided to reimburse the Contractor for the cost of transporting his plant and equipment to the work site at the commencement of work and for demobilizing the plant and equipment after the works are completed.

The Sums of bid for mobilization of plant and equipment will be paid *80%* upon completion of mobilization of the plant and equipment and *20%* upon demobilization.

1.08 Accommodation of Public Traffic During Construction

(i) Safety and Convenience of Existing Traffic

Any measures necessary for the safety and convenience of the public will be the responsibility of the Contractor who shall treat them as of prime importance.

The Contractor shall provide flagmen, signs, fences, barriers and lights for the proper direction of traffic, as directed by the Engineer and shall comply with all regulations governing such matters.

(ii) Construction of Detours

Where it is necessary to divert traffic from an existing road, detours shall be constructed on the alignment indicated by the Engineer.

The Contractor will be given possession of the site in sections, sufficiently ahead of road construction works to enable detours to be built in good time and to the Engineer's satisfaction, before the need for them occurs.

The standard of construction and the vertical and horizontal alignment shall be specified by the Engineer.

(iii) Barricades and Signs

Barricades shall be substantially made and painted in alternate bands of yellow and black and shall extend across the road. Gaps shall not be left in the barricades for the entrance of construction traffic.

(iv) Maintenance of Detours

The maintenance of detours will be the responsibility of the Contractor and shall adequately provide for the comfort, convenience and safety of the public.

(v) Signs

All signs shall be in a form prescribed in the Traffic Signs Manual issued by Ministry of Infrastructure

(vi) Payment

The sum tendered in *Pay Item No. 1.6* for Accommodation of Traffic shall include for all plant, labour and materials necessary to carry out the work including placing and removal of barricades and signs to different locations as the work proceeds and for all other work incidental and necessary thereto. The sum tendered for this item will be paid in equal monthly instalments over the contract period.

1.09 Exploratory Excavations

The Contractor shall upon the Engineer's request carry out exploratory excavations and take samples for testing at the Regional Manager's Office Laboratory, TANROADS, or any other laboratory acceptable to the Engineer.

Such exploratory excavations will be paid for by the Day Work rates and a provisional sum in respect of such anticipated work have been included in the Bills of Quantities as part of *Pay Item 1.1*

1.10 Possession of Site

The operations of the Contractor shall be confined to the area of and immediately adjoining the works included in this Contract, Clearance shall be kept to the satisfaction of the Engineer to permit the statutory authorities or other Contractors to enter the site to carry out other works and to maintain the free flow of traffic so far as is practical with safety on the existing carriageway.

The Contractor shall obtain the approval of the Engineer for the setting of all camps, offices, workshops, sheds,, temporary roads, deviations, paths etc., necessary for the execution of the Contract.

The Contractor must allow for safe crossing by construction traffic of existing roads and tracks.

Where it is necessary to work outside the road reserve and to enter either private or occupied land during the course of road construction or maintenance for the purpose of making temporary road diversions, sinning road construction or maintenance materials or for any other reason, the land owner or occupier shall first be consulted by the Contractor and his written permission obtained.

In the event of the owner or occupier withholding their permission, the full circumstances of the case shall be referred to the Engineer and no further action shall be taken until his instructions are received.

When the Contractor intends to move his camp to a new location during the construction period, advance notice of at least one month must be given to the Engineer. The Contractor must allow in his rates for such intended moves.

1.11 Water and Power Supply

The supply of water for construction purposes and water and power supply for the Contractor's office and camp will be the Contractor's responsibility.

If an approved independent source for water supply is used the Contractor will be responsible for all costs, and be called upon to provide analysis of the water to prove its suitable.

1.12 Instruments

The Contractor shall provide all survey and measuring instruments of every kind necessary for his use in the execution of the works. The survey instruments shall include level instrument, Abney levels, staffs, ranging poles, tapes, camber boards and other basis survey equipment, while theodolite shall not be required. The cost of providing these survey and measuring instruments must be included in the tender rates. The ownership of the instruments will remain with the Contractor at the end of the Contract period.

1.13 Watching and Lighting

The Contractor provide and maintain all light, watchmen and protective fences or barricades as may be necessary in connection with the works.

No separate payment will be made for watching and lighting and the cost of providing this must be included in the tender rates.

1.14 Protection of Existing Services and Structures

Before commencing any section of the works, the Contractor shall obtain at his own cost full information with regard to the position of all existing services and structures and shall exercise the utmost care when working in their vicinity. He must serve notice of his intention to work near the services or structure to the responsible authority, and obtain their written approval before commencing work, which must be carried out in accordance with the responsible authority's requirements. The Contractor's tendered rates shall include for all costs arising out of the protection of existing services and structures.

The Contractor shall also bear the full cost of remedial work to existing services which are damaged by the Contractor during construction.

PART 2 - ROAD WORKS

2.01 Form-up Road Formation

- **Light reshaping < 2m^3 per lm -** Raising road profile level by up to **20cm.**
- **Heavy reshaping < 5m^3 per lm -** Raising of road profile level by up to **40cm.**

(i) Description of Work

In general the road will be constructed longitudinally to the ruling natural grade, and transversely in accordance with the typical cross sections by balancing the Earthworks within the cross section. The earthwork involved in forming up the road prism will therefore in general be guide limited and uniform along the road except on certain sections of the roads where cut and fill operations with longitudinal haulage of material are required. These section of road defined as "cut sections" and "fill sections" on the drawings - occur for instance where improvement of sight distance over crests is required, in hilly and mountainous terrain where extensive earthworks are needed to establish the typical cross section or at waterway crossings where fill may be required to suit knew drainage structure levels or where the road needs to be raised due to low bearing capacity of the natural soil or in areas liable to flooding.

Only for these "cut sections" and "fill sections" as defined on the drawings will the Earthworks be carried out and paid for on a cubic metre basis, while the term "form-up road formation" will apply for the remaining sections of the road and paid for by the linear metre for the different types of typical cross sections specified on the Drawings.

The forming up of road formation is essentially a side haul or grading operation and virtually no longitudinal haulage of any kind is envisaged. The formation preparation shall include the following:

(a) Removal of grass roots and humus topsoil present in the full construction width between the outside edges of the side drains detailed. No material should be left in the formation construction, which if incorporated in the formation construction would adversely affect the stability of the compacted Earthworks. Removal topsoil, humus, grass etc. Shall be placed on side drain slopes in a manner such that drainage into the side drains is not impeded; or it may be disposed of as waste as directed by the Engineer.

(b) Carry out the Earthworks necessary to produce the completed profiles of side drains and formation to the specified standards, lines, level, grades and dimensions detailed or directed. This will include the excavation of material from side drains, existing formation, borrow or elsewhere as directed and the transverse or longitudinal movement up to 500 metre of this material to fill or waste as instructed on site. This operation will provide the complete side drains and formation as detailed and specified.

The full width of the subgrade shall be compacted as specified in Section 2.08.

The term "form-up road formation" may in general be said to apply to those lengths of the road where the finished sub grade level at the carriageway centre line is within +/-250 mm of existing ground level. The "cut sections" and "fill sections" are then defined as occurring where the finished subgrade level is, for fill, more than 250mm above and for cut more than 250mm below existing ground level, measured on the carriageway centre line before clearance.

The Drawings may sub divide the forming operation into **(a) "light reshaping"** being sections with Earthworks of less than approximately 2 m^3 per linear metre of road; and **(b) "heavy reshaping"** being sections with Earthworks between approximately 2 m^3 and $5m^3$ per linear metre of road.

This division into light and heavy reshaping is based entirely on a visual estimate by the Engineer and should only be considered as guidance for the Contractor's estimate of labour and plant input required carrying out the forming up operation.

(ii) Measurement

Measurement shall be by the linear metre of road formation prepared to the horizontal and vertical alignments, cross falls, cambers, super elevations, etc., for the Typical Cross Section types as detailed on the drawings and shall include for side drain construction.

(iii) Payment

The rate offered shall allow for all items of work detailed or implied in the cleared construction width between the outer extremities of the side drains and shall include removal of grass roots and humus topsoil, forming up to final cross section, including cut to fill, except for cuts and fills outside the limits detailed herein and excluding rock excavation but including sub grade compaction, and all other ancillary items to provide a completed formation as detailed or directed.

Excavation of rocks or boulders occurring within the carriageway and measuring not less than 0.20 cubic metre in volume will if ordered to be removed by the Engineer be paid for as extra over the rate for form-up road formation.

2.02 Cut and Borrow to Fill

(i) **Description of Work**

As description in section 2.04 earthworks will be carried out and paid for on a cubic metre basis only for those sections of the roads defined as "cut section" or "fill sections" on the drawings. The Contractors shall, for these sections of road, carry out a longitudinal profile and cross section survey at intervals as directed by the Engineer and using local datum. Two level pegs shall be set out at each cross-section point, one in each side of the carriageway and clear of construction.

These shall be used for each stage of construction and shall remain in position until the road construction is complete. Any pegs destroyed during construction shall be immediately replaced.

No work shall commence upon such portion of the construction unit such time as ground levels have been taken by the Contractor in an approved manner, and checked and accepted by the Engineer to ensure that a firm basis has been established for measurement and setting out purposes. Should the Contractor fail to comply with this requirement the Engineer reserves the right to base the final measurement on other survey data.

In general terms excavation shall be measured under two items. The first is a cut or borrow to fill item which will be measured as compacted fill and the second is a cut to spoil item which will be measured as an in-situ volume before excavation.

Fills shall be constructed to the lines, grades, cross section, and dimensions etc. Shown on the drawings and as directed by the Engineer. The material used for fill construction shall be selected approved soil and shall be free from all deleterious matter.

Fills shall be constructed in layers of materials in loose thickness not exceeding 200 mm and each layer shall be compacted as specified in Section 2.07. Where possible the quality of material used in fill construction shall improve with each successive layer upwards.

The Engineer reserves the right to control excavation and to direct where materials arising from cut shall be deposited and how and where it shall be used, and also to direct where borrow materials which may be essential for fill shall be obtained.

Before commencing work on any section of the road, the Contractor shall ensure that he has adequate instructions concerning the use of soil from cut. No claims for double handling will be considered. Excess excavation beyond the net outline detailed or directed shall be made good at the Contractor's expense in a manner acceptable to the Engineer.

Where there is a shortage of excavated materials to achieve the required formation levels, the side drains may be widened as instructed on site or additional material may be obtained from local borrow as the Engineer may direct and provided always that side drains shall be maintained clean and true in line and capable of continuous discharge of storm water without pending.

Where embankments exceed 1.5 metre in height in sidelong ground the Engineer may direct the excavation of horizontal benches in bank foundation. Side drains emptying from cuts to embankments and all other drains shall be so constructed as to avoid damage to embankment by erosion.

The Contractor shall take all risks from water, clean or foul, stream, river, surface, storm or ground water, whatever the source or sources may be. Water shall not be allowed to accumulate at any point in the earthworks. The Contractor shall, at his own expense, effectively drain and keep dry all the works during the period of construction and shall take particular care to prevent surface water accumulating, soaking in, and softening the formation during construction.

Any loss of shape or compaction resulting from water affecting the earthworks shall be rectified by the Contractor at his own expense. All side drains, sumps or temporary excavations for dewatering shall be formed, maintained and used outside and clear of the main works and shall be properly filled in if so directed by the Engineer when their use ceases. The rates tendered must allow for all risks from dewatering of the earthworks during construction.

Excavation of material due to slips and falls in cuttings and banks attributable to carelessness of the Contractor shall be made good at the Contractor's expenses in a manner acceptable to the Engineer.

(ii) Measurement

The unit for measurement of fill from cut or borrow shall be the cubic meter of material measured in place after compaction.

The volume measured shall be the compacted volume between the ground profile including the volume of excavation of benches and shall be computed by the method of average end areas from levelled cross sections. The Contractor must allow in his rates for any additional work, working space and the like, that he may require.

(iii) Payment

The rate offered for material in fill must include for removal of grass roots-and other deleterious material from the surface and for excavation to level (including side drains where necessary) in cut or borrow, side casting and loading, hauling not exceeding 200 metres, unloading, spreading, shaping, watering and maintaining to camber, grades and levels, mixing and compacting all as described and control of level in both cut and fill.

Haulage in excess of 200 mitres will be paid for according to the tendered rate **in Pay Item No. 2.6** and specified in **Section 2.10**

2.03 <u>Cut to Spoil</u>

(i) Description of Work

Where anthill or other inferior material (this may include topsoil) is encountered in the construction of the formation, or where there is an excess of excavation over fill, the material concerned shall where directed be cut to spoil in positions directed by the Engineer. Anthill material shall be excavated to a depth of 0.5 m below subgrade level over the full subgrade width and replaced with selected fill which shall be measured and paid for as cut or borrow to fill.

No spoiling shall take place on private land without the authority of the Engineer and the consent of the owner or occupier. Spoiling shall be carried out in such a way that natural drainage is not impeded or impaired.

(ii) Measurement

The unit of measurement for cut to spoil shall be the cubic meter of material measured in place before excavation, and computed by the method of average end areas from levelled cross sections taken both before clearance and after excavation.

(iii) Payment

The rate for each cubic metre of cut material spoiled shall include for excavation to grade and level (including side drains where necessary), loading, haulage not exceeding 200 metres, unloading, spreading and trimming as directed.

Excavation of rocks or boulders occurring in the cut and measuring not less than $0.20m^3$ in volume will be paid for as extra over to cut to spoil under Item 2.3.

2.04 Compaction

(i) Description of Works

(a) Fill and Subgrade

Each layer of fill and subgrade shall be moistened or dried to uniform moisture and then thoroughly compacted to 95% of the maximum dry density as determined by AASHTO T99 (Standard Proctor Compaction). Other types of field density tests may be used for control purposes after density values corresponding to those obtained by AASHTO T147 have been established. All subgrade and fill material shall as soon as practicable after deposition be compacted uniformly over the full width to the required compaction degree.

(b) Gravel Wearing Course

Compaction of wearing course material shall be in accordance with the requirements for fill and subgrade except that the required compaction degree shall be 100% of the maximum dry density as determined by AASHTO T99 (Standard compaction).

The natural moisture content of the material varies, depending on soil type, location, season, evaporation and precipitation. Usually, the natural moisture content is lower than the optimum moisture content for compaction as determined by the standard Proctor compaction test (AASHTO T99) and moistening is therefore, normally a pre-requisite to achieve satisfactory compaction. A soil, which is too dry, cannot be expected to achieve satisfactory compaction. A soil, which is too dry, cannot be expected to achieve the required compaction degree, whereas a soil, which is too wet normally, will require only a short period of exposure to sun and wind until it is dried sufficiently.

Necessary application of water shall be included in the tendered rates covering the compaction operations required.

Compaction may be carried out by use of various types of plant. Table 1 and Table 2 show the minimum number of passes required to obtain the specified compaction densities for fill and gravel course respectively using

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different type of compaction plant and depending on the type of material and thickness of the compacted layer.

If the Contractor complies with the requirements of Table 1 and Table 2 he can normally expect approval of the compaction by the Engineer. Note: Compliance with the "Guide-lines" of Table 1 and Table 2 does not relieve the Contractor of the responsibility for achieving the Maximum Dry Densities indicated in Clause 2.08 (a) and (b) above. The use of plant not included in the tables will be permitted only if the Contractor demonstrates at site trials that a state of compaction is achieved by; the alternative method equivalent to that obtained using the equipment listed in Table 1 and Table 2. The procedure to be adopted for these site trials shall be agreed with and approved by the Engineer.

The Engineer shall carry out field density tests on all sections and layers of formation fill and gravel wearing course prior to approving the works for payment. The frequency of the density tests is at the discretion of the Engineer, but will occur in minimum intervals of 100m.

The Contractor shall if the test results shown insufficient compaction carry out such further work as the Engineer may decide, in order to comply with the specified compaction requirements.

TABLE 1: COMPACTION REQUIREMENTS FOR FILL
[D = Maximum depth of compacted later (mm) N = Minimum number of passes]

TYPE OF COMPACTION PLANT	SIZE OF COMPACTION PLANT	COHESIVE SOILS		WELL GRADED GRANULAR AND DRY COHESIVE SOILS		UNIFOMLY GRADED MATERIALS	
		D	N	D	N	D	N
SMOOTH WHEELED ROLLER	(Mass per metre width of roll)						
	Over 2100kg up to 2700kg	125	8	126	8	125	10*
	Over 5400kg up to 5400kg	125	6	126	6	125	8*
	Over 5400kg	150	4	150	4	Unsuitable	
GRID ROLLER	Over 2700kg up to 5400kg	150	10	Unsuitable		150	10
	Over 5400kg up to 8000kg	150	8	125	12	Unsuitable	
	Over 8000kg	150	4	150	12	Unsuitable	
TAMPING ROLLER	Over 4000kg	225	4	150	12	250	4
PNEUMATIC	(Mass per wheel)						

TYRED ROLLER	Over 1000kg up to 1500kg	125 6	Unsuitable	150 10*
	Over 1500kg up to 2500kg	150 5	Unsuitable	Unsuitable
	Over 2000kg up to 2500kg	175 4	125 12	Unsuitable
	Over 2500kg up to 4000kg	225 4	125 10	Unsuitable
	Over 4000kg up to 6000kg	300 4	125 10	Unsuitable
	Over 6000kg up to 8000kg	350 4	150 8	Unsuitable
	Over 8000kg up to 12000kg	400 4	150 8	Unsuitable
	Over 12000kg	450 4	175 6	Unsuitable
VIBRATING ROLLER	(Mass per metre width of vibrating roll)			
	Over 270kg up to 450kg	Unsuitable	75 16	150 16
	Over 450kg up to 700kg	Unsuitable	75 12	150 12
	Over 700kg up to 1300kg	100 12	125 12	150 6
	Over 1300kg up to 1800kg	125 8	150 8	200 10*
	Over 1800kg up to 2300kg	150 4	150 4	225 12*
	Over 2300kg up to 2900kg	175 4	175 4	250 10*
	Over 2900kg up to 36000kg	200 4	200 4	175 8*
	Over 3600kg up to 43000kg	225 4	225 4	300 8*
	Over 4300kg	275 4	275 4	300 4*

* The roller shall be towed by track-laying tractors. Self-propelled rollers are unsuitable.

TABLE 2: COMPACTION REQUIREMENTS FOR GRAVEL WEARING COURSE

TYPE OF COMPACTION PLANT	SIZE OF COMPACTION PLANT	NUMBER OF PASSES FOR LAYERS NOT GREATER THAN:		
		100 MM	150MM	225 MM
SMOOTH WHEELED ROLLER	(Mass per metre width of roll)			
	Over 2700 kg up to 5400 kg	16	Unsuitable	
	Over 5400 kg	8	Unsuitable	
PNEUMATIC TYPE	(Mass per wheel)			
	Over 4000 kg up to 6000 kg	12	Unsuitable	Unsuitable
	Over 6000 kg up to 8000 kg	12	Unsuitable	Unsuitable
	Over 8000 kg up to 12000 kg	10	16	Unsuitable
	Over 12000 kg	8	12	Unsuitable
VIBRATING ROLLER	(Mass per metre width of vibrating roll			
	Over 700 kg up to 1300 kg	16	Unsuitable	Unsuitable

	Over 1300 kg up to 1800 kg Over 1800 kg up to 2300 kg Over 2300 kg up to 2900 kg Over 2900 kg up to 3600 kg Over 3600 kg up to 4300 kg Over 4300 kg up to 5000 kg Over 5000 kg	6 4 3 3 2 2 2	16 6 5 5 4 4 3	Unsuitable 10 9 8 7 6 5
VIBRATING PLATE COMPACTOR	(Mass per unit area of base plate) Over 1400 kg/m2 to 1800 kg/m2 Over18900 kg/m2 to 2100 kg/m2 Over 2100 kg/m2	8 5 3	Unsuitable 8 6	Unsuitable Unsuitable 10
VIBRO-TAMPER	(Mass) Over 50 kg up to 65 kg Over 65 kg up to 75 kg Over 75 kg	4 3 2	Unsuitable 6 4	Unsuitable 10 8
POWER RAMMER	(Mass) Over 100 kg up to 500 kg Over 500 kg	5 5	8 8	Unsuitable 12

Definition and Requirements Associated with **Table 1 and 2**

(a) The depth of compacted layer is the height by which the embankment is raised by each successive compacted layer.

(b) The number of passes is the number of times that each point on surface of the layer being compacted has been traversed by the item of compaction plant.

(c) The compactive effort of each COMPACTOR is a function of the mass of the machine and the compaction plant in the table listed in terms of their masses. The mass per metre of roll is the total mass on the roll divided by the total roll width. Where a smooth-wheeled roller has more than one axle the one giving the highest value of mass per metre width will be considered.

(d) A tamping roller, for the purpose of this specification, is a machine with rolls from which "feet" project. The projected end area of each "foot" shall exceed 0.01 m2 and the sum of areas of the feet shall exceed 15 percent of the area of the cylinder swept by the ends of the feet. The requirements for tamping rollers apply to machines that have 2 rolls in tandem. If only one tamping roll traverses each point on the surface of the layer on any one pass of the machine, the minimum number of passes shall be twice the number given in Table 1.

(e) For pneumatic tyred rollers mass per wheel is the total mass of the roller divided by the number of wheels. In assessing the number of passes of pneumatic tyred rollers the effective width shall be the sum of the widths of the individual wheel tracks together with the sum of the spacing between the wheel tracks provided that each spacing does not exceed 230 mm. Where the spacing exceeds 230 mm the effective width shall be the sum of the widths of the individual wheel tracks only.

(f) Vibrating rollers are self-propelled or towed smooth-wheeled rollers having means of applying mechanical vibration to one or more rolls.

- The requirements for vibrating rollers are based on the use of the lowest gear on a self-propelled machine with mechanical transmission and a speed of 1.5-2.5 km/h for a towed machine, or a self-propelled machine with hydrostatic transmission. If higher gears or speeds are used an increased number of passes shall be provided in proportion to the increase in speed of travel.
- Where the mechanical vibration is applied to two rolls in tandem, the minimum number of passes shall be half the number given on the tables for the appropriate mass per metre width of one vibrating roll. If one roll differs in mass per metre width from the other the number of passes shall be calculated as for the roll with the smallest value.
  Alternatively the machine may be treated as having a single vibrating roll with a mass per metre width equal to that of the roll with the higher value.
- Vibrating type rollers operating without vibration will be classified as smooth-wheeled rollers.

- Vibrating rollers shall be operated with their vibratory mechanism operating only at the frequency of vibration recommended by the manufacturers. All such rollers shall be equipped or provided with a device automatically indicating the frequently at which the mechanism is operating.

(g) Vibrating-plate compactors are machines having a base-plate to which is attached a source of vibration consisting of one or two eccentrically weighted shafts.

- The mass per unit area of base-plate of a vibrating plate COMPACTOR is calculated by dividing the total mass of the machine in its working condition by its area in contact with compacted soil.

- Vibrating-plate compactors shall be operated at the frequency of vibration recommended by the manufactures. They shall normally be operated at travelling speeds of less than 1 km/h but if higher speeds are necessary the number of passes shall be increased in proportion to the crease in speed of travel.

(h) Vibro-tampers are machines in which an engine-driven reciprocating mechanism acts on a spring through which oscillation are set up in a base-place

(i) Power rammers are machines which are actuated by explosions in an internal combustion cylinder, each explosion being controlled manually by the operator.

(j) In the case of power rammers and dropping-weight compactors one pass will be considered as made when the compacting shoe has made one strike on the area in question.

(k) For items marked * the rollers shall be towed by track-laying tractors. Self- propelled rollers are unsuitable.

(l) Where combinations of different types of categories of plant are used, the compaction requirements shall be:

- the depth of layer shall be that for the type of plant requiring the least depth of layer and

- the number of passes for each type shall be such proportion of the appropriate number in the table as will together produce the same total compaction effort as any type operated sighly in accordance with the tables.

(ii) Measurement

There will be no measurement for compaction of fill, subgrade and wearing course. The work shall be covered under the operations Form-Up Road Formation, Cut or Borrow to fill and Gravel/Wearing Course.

(iii) Payment

There will be no separate payment for compaction of fill, subgrade and wearing course, which shall be included in the tendered rates for **Pay Items No. 2.4, 2.5 and 2.6.**

2.05 Establishment and Reinstatement of Borrow Areas

(i) Description of Work

All borrow materials required for the work under this Contract shall be obtained from source approved by the Engineer and by clearing the borrow area, stripping excess or unsuitable overburden, excavating selected material which is required for specific use in the construction of the works, stockpiling if required, disposing of excess or unsuitable overburden, trimming of borrow area on completion of operations all in accordance with this specification and as directed by the Engineer.

No borrow area shall be opened up without the approval of the Engineer.

Existing and potential borrow areas have been identified for the project areas. The contractor shall however carry out his independent exploration for searching for possible materials within economic haulage distance at his own cost.

The Contractor shall, upon the Engineer's request carry out exploratory excavations and take samples for testing at the Regional Engineer's Materials Laboratory, Iringa or other laboratory approved by the Engineer. Exploratory excavation will be paid for by the day work rates and a provisional sum in respect of such anticipated work has been included in the Bill of Quantities.

(ii) Materials

(a) Overburden

Overburden is topsoil or other material, which is unsuitable or not required for any construction purposes.

(b) Borrow Materials

Borrow materials shall include soils and natural gravel used as fill and wearing course material. Borrow material shall not include sand, rock and/or crushed stone used in the construction of stone paving or pitching, retaining walls or concrete work unless otherwise allowed and provided for by the Engineer.

Borrow material shall be material approved by the Engineer and meeting requirements for particular fills, wearing courses or other use for which the material is intended. Unsuitable material brought on-to the works shall be removed and disposed of as directed by the Engineer at the Contractor's expense.

The Contractor shall conduct his operations in any approved pit or borrow area or portion thereof which may include mixing of various types of material available in the pit so as to produce acceptable material.

(iii) Control

(a) Opening Borrow Pit

The decision as to which source of supply the Contractor shall operate from at any time shall rest with the Engineer, and Contractor shall at any stage of the work operate from that approved source of supply which in the opinion of the Engineer is most suitable, having regard to the quality and quantities of the various types of materials available and the ultimate cost of the work to the Employer. No allowance will be made for moving the Contractor's plant etc. From one to another of the designated sources, or from one location to another at any of the individual sources named or subsequently approved by the Engineer.

(b) Clearing

The site of the borrow area shall be cleared of all trees, bush, stumps, grass, debris etc. Before excavation is commenced. Any trees felled on the site shall remain the property of the landowner/occupiers or the Employer, in the case of acquired land.

Grass and topsoil, where present, shall be stripped and stockpiled adjacent to the borrow area in such a manner that on rehabilitation of the borrow pit, this material may be spread as final cover to the affected area.

(c) Overburden

Removal of overburden shall be carried out to the depths ordered by the Engineer and shall be placed outside the perimeter of the borrow area in an approved manner.

The Contractor shall advise the Engineer in good time of his intention to operate from any source of supply before any clearance or excavation at such source is commenced and shall, on receipt of the Engineer's authority to proceed, excavate trial pits for measurement purposes to a depth sufficient to assess the thickness of the gravel seam. Such trial pits shall be located on a 10m x 10m grid over the area concerned. Overburden removal beyond the limits of selected borrow excavation will not be paid for.

(d) Excavation of Borrow Material

After removal of the overburden, borrow materials required for fill may be removed without stock piling but the Contractor must ensure that all material removed is approved for use by the Engineer.

The Engineer shall take samples of borrow material for laboratory testing to determine its suitability; at the minimum rate of 1 test for every 500m3 excavated. Laboratory testing shall consist of sieve analysis, Atterberg Limits and Standard Proctor Density.

(e) **Reinstatement of Borrow Pits.**

On completion of operations at the borrow pits, all piles of waste material or overburden which have accumulated on the natural ground surface by reason of the Contractor's operations shall be replaced in the pit, and excavations shaped off to slopes not exceeding one (1) vertical in two (2) horizontal and the borrow pit drained to the satisfaction of the Engineer. Where borrow pits shall remain in use, the Engineer may direct that excavations shall not be or only partly shaped off. Borrow pits shall as far as possible be excavated in such a manner that no water will collect or stand in them.

Topsoil, where present in the original excavation shall be spread to a uniform depth and finished off in a clean presentable condition to a standard normally associated with trimming operations.

Fencing displaced by the Contractor's shall be replaced and made good to the satisfaction of the landowner/occupier and the Engineer.

(f) **Haul Roads**

Haul roads to borrow areas shall be constructed in approved positions and shall be the shortest route possible. After completion of operation haul roads shall if not instructed otherwise by the Engineer be shaped up and remain for future use.

(iii) **Measurement**

Clear Borrow Areas, Removal of Overburden and Rehabilitation of Borrow Areas Measurement shall be per cubic metre of overburden measured in place before clearing and shall be based on the depth of overburden revealed after the completed and accepted removal of overburden over the whole area concerned.

(iv) **Payment**

Clear Borrow Areas, Removal of Overburden and Rehabilitation of Borrow areas. The rate quoted in Pay Item No. 2.5 shall include for clearing the site of the borrow area and removing the overburden prior to the excavation of borrow material, for replacing the overburden and waste material in the borrow pit after completion of borrowing operations and for levelling-off the overburden so replaced and as described.

No separate payment shall be made for removal of overburden and Rehabilitation of Borrow Areas.

2.06 Gravel Wearing Course

(i) Description of Work

Wearing course construction shall include the supply and compaction of suitable material laid on the compacted and approved subgrade in the final thickness detailed and in conformity with the lines, grades and typical cross sections shown on the drawings. Generally, gravel wearing course material shall be applied on all sections to a minimum depth of 150mm. Section where the subgrade has a low bearing capacity or steep gradients may require thicker layers of wearing course material.

The wearing course shall be constructed in the following manner:

(a) Excavate, load and haul suitable gravel of approved quality from nearest source and dump in either a continuous windrow at one side of the carriageway or in separate heaps properly spaced and controlled by a competent person.

(b) Spread the material over the carriageway width and break up large pieces to give a material of uniform quality and tilth, to the satisfaction of the Engineer. Oversized pieces of more that 50-mm in diameter shall be hand-picked or knapped. Work must be programmed so that lengths of 0.5 km are constructed at any one time and so that the Engineer may inspect the windrowed or dumped material before it is spread. Care must be taken that the subgrade is not damaged. Mixture of wearing course material with the subgrade material is not allowed unless directed by the Engineer in order to achieve a satisfactory composition of the entire in-situ and supplied material.

(c) Spread and level wearing course material to sufficient loose depth to give a final compacted thickness as shown on the drawings or as may be directed. Maximum thickness of un-compacted material in one layer shall not exceed 200mm. Where a greater compacted thickness than 150 mm is required, the wearing course shall be constructed in separate layers not less than 75mm in compacted thickness. Each layer shall be shaped to the specified camber and super-elevation and compacted before the succeeding layer is placed.

(d) During the spreading and levelling, water shall be added as necessary to provide uniform moisture content within +/-2% of the optimum moisture content to secure that the material can be compacted to the specified density.

(e) Immediately following the spreading and levelling, each layer shall be compacted to the full width as specified in Section 2.08 and to the satisfaction of the Engineer. The compaction shall progress gradually from the sides to the center parallel with the centerline of the road. Any irregularities or depressions that develop shall be corrected by loosening the material at their places and adding or removing material until the surface is smooth and uniform.

The thickness of the completed wearing course shall not be more than 10 mm less than the thickness shown on the drawings. After the final compaction, the thickness shall be measured at one or more points at random locations within each 100-metre section. Whenever a measurement indicates a variation from the thickness shown on the drawings of more that the allowable tolerance, additional measurements shall be taken at intervals of approximately 10 metres until the measurements indicate the thickness is within the allowable tolerance shall be corrected by adding material as necessary and shaping and compacting as specified. The cutting of test holes and refilling with materials properly compacted shall be done by the Contractor under the supervision of the Engineer.

It is desirable to compact the material while it is damp. The content should not be so high as to cause instability or excessive movement under the compaction plant employed.

The construction traffic should be routed carefully over the wearing course so that the maximum possible compaction is achieved in this way. If adequate care is taken with this operation the use of conventional compaction equipment will be limited.

(ii) Materials

Wearing course material shall be obtained from sources approved by the Engineer. Existing and potential borrow areas have been identified for the project area and their location is shown on the drawings, but the Engineer may request the Contractor to carry out exploratory excavations for locating additional suitable sources in accordance with **Section 1.09.**

Experience has shown that a great variety of natural gravel perform well in practice as wearing course and therefore no rigid standards can be stipulated as essential for good performance.

The performance of the wearing course material is mainly influenced by the properties of the material passing the 2.00 mm sieve although it is general desirable for the natural gravel to be well graded and not to exceed a maximum of 50mm, but 37.5mm is preferred (after compaction). Where possible, wearing course gravel shall comply with the following grading envelopes:

	Percentage Passing by Mass Maximum size of particle (mm)			
Sieve Size (mm)	37.5	26.5	19.0	13.2
37.5	100	100	100	100
26.5	85 - 100	100	100	100
19.0	70 - 100	80 - 100	100	100
13.2	60 - 85	60 - 85	75 - 100	100
4.75	40 - 60	45 - 65	50 - 75	60 – 100
2.00*	25 - 45	30 - 50	35 - 55	45 – 70
0.425	15 - 40	15 - 40	18 - 45	25 – 50
0.075	7 - 30	7 - 30	7 - 30	7 - 30

*** These sieves are the most important.**

The optimum value of the plasticity index (PI), determined on material passing the 0.425-mm sieve, is predominantly dependent on the climate in which the material is to be used and on the grading of the material. The following range is suggested:

PI = 8-20

In a dry area, a PI in the upper half of the range is desirable, particularly where the gravel has a coarse grading. In this type of climate, a high PI reduces the tendency of raveling and corrugation. In a very dry area, the upper limit of PI may be exceeded.

In a wet area, a PI in the lower half is desirable particularly when fine-grained gravel, such a sand-clay mixture is used. In such an environment, a low PI reduces the tendency of the gravel to pothole or to become slippery in rain.

(iii) Measurement

Measurement for wearing course gravel shall be the cubic metre of compacted material in place on the road calculated as the length or road acceptably graveled multiplied with the specified thickness of gravel times the average of the subgrade width and the carriageway width as shown on the drawings.

(iv) Payment

The rate quoted for wearing course gravel shall be full compensation for excavation, stockpiling and placing all materials including the labor, equipment, tools and incidentals necessary for loading, hauling up to a distance of one 10 kilometers and delivering the material to the site of the work, placing, applications of water if required, mixing, spreading and compacting all as specified.

Haulage in excess of the free haul distance of ten (10) kilometers will be paid for according to the tendered rate **in Pay Item No. 2.6** and specified in **Section 2.10**

2.07 Overhaul

(i) Description of Work

This work shall consist of hauling of fill or wearing course material in excess of the free haul distance.

The haul distance shall be measured along the shortest practical route determined by the Engineer as feasible and satisfactory. Free haul is the distance which the material must be transported on any trip before qualifying for overhaul payment, which is 10 km for fill and wearing course gravel.

The rate tendered and paid for material hauled will include allowance for free haul as well as for loading time, waiting and unloading time etc. Which are common to trips of all lengths. Overhaul distance is the length of haul less free haul.

(ii) Measurement

Overhaul shall be measured and paid for at a rate per cubic metre - km in excess of the free haul distance, computed as follows:

- Overhaul shall be the product of the number of cubic metres of overhaul material measured in its final compacted position and the overhaul distance in kilometers or fractions thereof.
- The overhaul distance shall be the distance between the centers of volume of the overhauled material in its original position and its authorized position of placing less the free haul distance.
- The haul route for measurement purposes shall be the shortest practical route determined by the Engineer, irrespective of the actual route selected by the Contractor.

(ii) Payment

The rate for each cubic metre-kilometer of overhaul will include full compensation for all supervision, labor, equipment, tools, fuel, and necessary incidentals.

2.08 Rock Excavation

(i) Description of Work

In the course of construction large quantities of rock are not likely to be encountered; but in the event of rock having to be removed for drainage or formation construction measurement and payment of rock will be defined as follows:

Rock shall be that material which, in the Engineer's opinion, cannot be broken up or removed by means of crowbars and wedges and which is measuring not less than 0.20 cubic metres in volume. The Engineer's decision of what constitutes rock in terms of the specification is final. All other excavation shall be classified as Common Excavation.

Rock occurring within the formation width shall be excavated to 150 mm below subgrade level and refilled with approved material and compacted as specified in Section 2.08.

Removal of rocks by use of explosives shall be carried out in strict accordance with current explosives regulations and at all times be under the supervision of a fully qualified person in terms of these regulations. If, in any situation blasting is considered dangerous, the same shall not be resorted to. The Engineer's decision in this respect shall be final.

Should any damage of any kind occur, the Contractor shall, at his own expense, carry out such work of repair or restoration as the Engineer may direct and shall be full and solely responsible for such damage or any claims that may arise thereof.

Care shall be taken that no undischarged cartridges are left in the excavation. Careless or indiscriminate use of explosives will result in the Engineer withdrawing permission for their use and under such circumstances the Contractor shall resort to other methods of excavation. Safe and secure storage shall be provided for explosive on the site of the works.

The Contractor shall seek the consent of the Engineer before using explosives and shall take adequate precautions to warn road users and others that blasting is in progress.

(ii) Measurement

Measurement for Rock Excavation shall be the cubic metre of material removed measured before excavation

(iii) Payment

The rate of rock excavation will be paid as extra over the rates for Pay Item Nos. 2.4,2.5, 3.1 and 3.2 and will include full compensation for breaking up of a rock to suitable size and for removal from the road section to spoil areas for a distance not exceeding 100m including provision of all labor, materials, equipment, tools and incidentals necessary to complete the work.

2.09: DESILT EXISTING DRAINS

- Side Drains
- Mitre/Catch water Drains
- Culvert Inlets/Outlet
- Desilting/Clearing of Structures

(a) Side Drains

(i) Description

Deposited material such as silt and other obstructions shall be removed from the side drains as directed by the Engineer. Material is to be removed to a place where it can no longer cause silting and obstruct the free flow water such as the downhill side of the road or to a suitable location as directed by the Engineer. On completion of desilting the original drainage profile should be fully restored.

(ii) Measurement

The quantity of side drain desilting undertaken shall be measured in linear metres; with the distinction clearly made between '**Light**' and '**Heavy**' desilting.

(iii) Payment

The unit rate per linear metre of side drain desilting shall be full compensation for labour, equipment and transport necessary to carry out the prescribed works including all excavation to specific lines and levels and haulage and unloading where directed.

(b) Mitre / Catch Water Drains

(i) Description

Deposited materials and other obstructions shall be removed from mitre/catch-water drains as directed by the Engineer. Excavated materials is to be removed to the downhill side of the drain profile and shall be shaped to a trapezoidal section as per the original cross section or according to the directions provided by the Engineer. On completion of desilting the original drainage profile should be fully restored.

(ii) Measurement

The quantity of mitre/catch water drain desilting undertaken shall be measured in linear metres.

(iii) Payment

The unit rate per linear metre shall be full compensation for labour, equipment and transport necessary to carry out the works prescribed, including excavation to specified lines and levels, haulage, unloading and shaping where directed.

(c) Culvert Inlets/Outlets

(i) Description

Both the inlet and outlet of culvert structures shall be free of silt, vegetation and other obstructions, and where required material should be excavated to return the drains to their original profile. Structure inlets/outlets are defined as area covering the structure opening plus one metre either side, or, the area between the ends of the wing-walls (whichever is the greatest) and extending for a distance of 20 linear metres up and down stream. As directed by the Engineer material is to be removed to a place where it can no longer cause silting.

(ii) Measurement

The quantity of excavated material in its original position shall be measured in cubic metres.

(iii) Payment

The unit rate per cubic metre shall be full compensation for labour, materials, equipment and transport required to carry out the prescribed works, including excavation to lines and levels specified and loading, haulage and unloading where directed.

(d) Desilting/Clearing of Structures

(i) Description

Structures should be free from obstructions such as silt, vegetation or other deposited material throughout their length. Material is to be removed to a location specified by the Engineer where it can no longer cause silting or obstruct the free flow of water.

(ii) **Measurement**

The quantity of excavated material in its original position shall be measured in cubic metres.

(iii) **Payment**

The unit rate per cubic metre shall be full compensation for labour, materials, equipment and transport required to carry out the prescribed works, including excavation to lines and levels specified and loading, haulage and unloading directed.

2.10: Pavement Re-Formation.

- **Light grading -** **No watering and compaction is required**
- **Heavy grading -** **Watering and compaction is necessary**

(i) **Description**

Maintaining surface condition and correcting defects on gravel / earth road surfaces by removing high spots and drawing loose material from the road side back across the roadway using a grader. The material should as necessary be watered and compacted in compliance with *Table I*. After grading, the road cross-section will conform to the typical cross-section shown in the Contract Documents. The final road surface shall contain no loose material.

The Engineers decision is final regarding the designation between **(a) Light Grading** and **(b) Heavy Grading** and will be reflected in the BOQ supported by strip map clearly identifying where light and heavy grading is required

(ii) **Measurement**

The unit of measurement for grading and earth roads shall be linear kilometers of fraction thereof.

(iii) **Payment**

The quantities, determined as provided above, shall be paid for at the Contractor unit price per unit of measurement. Prices and payment shall be full compensation for all labour, equipment, tools and incidentals necessary to complete the work prescribed above.

PART 3 - DRAINAGE WORKS

3.01 General

The storm water drainage work consists of excavation of roadside drains in the preparation of the formation, excavation of mitre drains, catch water drains and outfall drains, excavations for and the construction of culverts and vented drifts, concrete and masonry works, stone pitching, gabions, erosion checks and such other ancillary works necessary for their construction and completion of the works, as may be directed.

In the layout and construction of the drainage systems particular care shall be taken to avoid conditions, which may create soil erosion.

3.02 Open Drains

(i) Description of Work

(a) Side Drains

Side drains shall generally be constructed simultaneously with the road formation, and shall be excavated to a minimum invert gradient of 0.5 percent, if possible.

The completed drainage system must be freely operating and trimmed to a neat workmanlike finish with no ponding. As the invert must follow the road grade as closely as possible, conditions may arise in soft material on a steep grade that could cause erosion. The Engineer may, under such conditions, direct that erosion checks be constructed across the drain to reduce the effective grade of the drain invert to about 4% for highly erodible natural soils.

Excavation of side drains is not measured separately but is included in the forming up operation and paid for under Pay Item No. 2.2.

(b) Mitre Drains

Mitre drains shall be considered as drains constructed at an angle to the center line of the road to divert water from the side drains. The size, shape and frequency of mitre drains are as shown on the drawing or as directed by the Engineer. As a general rule mitre drains shall be shallow and wide and constructed to the flattest grades consistent with efficient discharge of water. Mitre drains shall normally discharge freely on natural ground surface or into natural drainage or culvert outlet or inlet channels.

Where necessary mitre drains shall be continued beyond the limits of the road reserve, provided the consent of the land owner/occupier is obtained through the correct channels.

(c) **Miter Banks**

Mitre banks shall be considered as the barrier in the normal side drain which diverts the flow of water from the side drain into the miter drain. Miter banks shall be of adequate size and shape to be effective at all times, and shall be constructed of approved soil or gravel compacted in layers not exceeding 150mm in thickness, true to lines, levels and cross sections shown on the drawings or as directed by the Engineer. Miter banks may also be constructed of hand-packed stone covered with a layer soil. The cost of construction of miter banks shall be include in the rate of miter drains.

(d) **Catch water Drains**

Catch water Drains are constructed clear of the road so as to intercept water before it reaches the road or side drain. Catch water drains are to be constructed to the typical cross section as shown on the drawings and approximately along the contour at such grades so as to discharge water without causing erosion or situation into miter drains or culvert inlets or outfall drains.

(e) **Inlet and outfall Drains**

Inlet and outfall drains shall be considered as channels leading into or discharging from culverts. They shall be excavated with shape and at locations as shown on the drawings or as directed by the Engineer.

(ii) **Measurement**

Measurement for mitre drains and catch water drains shall be by the metre of existing drains reshaped and the metre of new drains excavated to the typical cross sections shown on the drawings or as directed. Measurement will be made of the total length of drains from its highest point to final point of outfall. Measurement of inlet and outfall drains shall be by the cubic metre of material excavated measured in its original position.

(iii) **Payment**

The rate per metre for reshaping of existing drains and excavation of new mitre drains and catch water drains shall be full compensation for excavation, shaping and trimming inverts and slopes as required and for disposal of all excavated material. The rates for mitre drains shall include for the construction of mitre banks. Payment for inlet and outfall drains shall be made under Pay Item No. 3.2 at the rate tendered for excavation for drainage structures.

3.03 <u>Excavation and Backfilling for Drainage Structures Other Than Culverts</u>

(i) Description of Work

(a) Culverts

Unless otherwise specified or directed by the Engineer in writing, trenches shall be excavated in any material to a total base width of not less that the external diameter of the culvert pipe plus 300mm. The Contractor must allow in his rates for any additional working space required, for the making of joints and for trimming of trenches to correct levels and grades and for provision of adequate bedding depths, all to the satisfaction of the Engineer.

(b) Vented Drifts

Excavation for foundations and structures for vented drifts shall be to the required dimensions and depths as detailed on the drawings, together with any further excavation necessary for working space.

Material arising from the excavation which is surplus to backfill requirements may be approved for use as fill or side fill, or neatly banked along the lower side of the drains, or if required and approved, shall be used in the construction of mitre banks.

(c) Backfilling

All spaces excavated and not occupied by pipes or other permanent work shall be refilled with selected material.

All material used for backfill shall be of a quality acceptable to the Engineer, and shall be free from large lumps, wood or other extraneous matter.

Backfilling shall be carried out as soon as possible after the pipe work or concrete work has been inspected and approved by the Engineer. Specially selected material without stones and conforming in stability to cover requirements specified or shown on the drawings, shall be placed alongside the pipe or concrete in layers not exceeding 150mm in loose thickness and the material shall be thoroughly and evenly compacted to give pipe work maximum support from the trench sides and shall be carried out in such a manner that a pipe work is not disturbed. Refilling of the trench shall be continued in 150mm loose layers.

Each layer (as well as all disturbed material adjacent to the pipe) shall be thoroughly compacted by means of hand tampers or mechanical rammers to the satisfaction of the Engineer. The top 150mm shall be of approved wearing course material.

Where necessary the backfill material shall be uniformly moistened before being compacted to ensure that compaction is to the Engineer's satisfaction.

(ii) Measurement

(a) Excavation

Excavation for that inlet and outfall drains as specified in Section 3.02(b) shall be measured in cubic metres to the dimensions shown on the drawings or directed by the Engineer.

Excavation in rock will be measured and paid for in cubic metres as Extra Over in Pay Item No. 2.10

(b) Backfilling

Measurement for Backfilling shall be the cubic metres, in place, as determined from the theoretical limits as shown on the drawings.

(iii) Payment

The rates per cubic metre for excavation shall include full compensation for supervision, labour, plant, equipment and materials for the work including all timbering and protection of excavations, dewatering and disposal of surplus excavated.

3.04 Concrete Pipe Culvert

(i) Description of Work

The work consists of the excavation, construction and backfilling of culvert which may consists of any of the following:

(a) Plain concrete pipes with concrete surround;
(b) Reinforced concrete pipes with concrete bed and haunch;
(c) Cast in-situ internally formed pipes; and
(d) Box culverts with concrete floor, stone masonry walls and a reinforced concrete deck;
(e) If the Contractor wishes to use an alternative design concrete of pipe culvert he shall submit details of the design and method of construction at the time of tendering.

Pipe culverts and box culverts shall be constructed in accordance with details shown on the drawings. The Engineer may in addition order the construction of concrete bedding, haunching, concrete surrounds, drop inlets, aprons and headwalls.

Culverts shall be placed as directed by the Engineer. The Engineer shall specify the invert elevations if these are different from the existing channel elevation.

(ii) Materials

(a) Concrete

The concrete shall comply with the requirements specified in Section 3.07 and the class of concrete shall be as recommended on the drawings or as directed by the Engineer.

(b) Reinforced Concrete Pipes.

Reinforced concrete pipes shall conform to the requirements of AASHTO M170 for the size and class shown in the Bill of Quantities or on the drawings. Unless a specific type is called for, the pipe may be either the bell and spigot type or the tongue and groove type.

(c) Plain Concrete Pipes

Plain concrete pipes shall be manufactured with class 20 concrete. Concrete pipes shall be smooth, straight, circular, free from cracks, honeycombing or other defects.

Plain pipes shall have the minimum shell thickness given in the table below.

Internal Diameter mm	Minimum Shell Thickness mm
300	40
600	50
750	55
900	75

The use of plain concrete pipes of nominal internal diameter greater than 900mm is not permitted.

(d) Internally Formed Pipe Culverts

Forms used in the construction of pipe culverts may be inflatable tubing or collapsible metal sheeting.

The concrete shall consist of Class 20 concrete of minimum 200mm thickness.

(e) The stone masonry shall comply with the requirements specified in Section 3.08.

(iii) Construction

(a) Trenches

Culverts shall be constructed in trenched conditions, except where the Engineer has approved an alternative method. Excavation shall be carried out in accordance with Section 3.03.

(b) **Placing of Concrete Pipes**

All concrete pipes shall be laid on a concrete bed. Pipes shall be uniformly supported throughout their length and laid true to line and minimum grade of 1%. Pipe shall be haunched as shown on the drawings. Pipes which deform or crack or are damaged before or during the maintenance period shall be removed and replaced by the Contractor at his own expense.

(c) **Internally Formed Concrete Culverts**

Steel formers and inflatable tubing shall be laid on a concrete invert slab cast 150mm thick. The formers shall be correctly aligned and securely anchored to prevent movement during placing of concrete.

Formers shall not be deflated or removed from the concrete surround for at least 12 hours after placing concrete.

(d) **Backfilling**

All backfilling work where required will normally be carried out as described in Section 3.03.

(e) **End Treatment**

Where required, headwalls and aprons at the inlets and outlets to concrete pipe culverts shall be constructed in Class 20 concrete in accordance with the drawings or as directed by the Engineer. Where required grouted stone pitching shall be provided at the inlets and outlets to pipe culverts in accordance with the drawings or as directed by the Engineer. Other forms of end treatment such as drop inlets, silt traps, etc. Shall be constructed in accordance with the drawings or as directed by the Engineer.

(f) **Minimum Cover to Culverts**

Minimum cover to culverts shall be 0.3 m in respect of all pipe culverts.

(iv) **Measurement**

(a) **Excavation and Backfilling**

There will be no separate measurement for the excavation and backfilling of culvert pipes. If the amount of excavation and fill greatly exceed the dimensions noted in the standard drawings, the Engineer may permit the Contractor to claim for the excess excavation and backfilling. In these cases, the unit of measurement will be the cubic metre and the method of measurement shall be given in Section 3.03.

(b) **Concrete Culverts Pipes**

Concrete pipes will be measured by the linear metre of pipe in position along the center line.

(c) **Concrete**

The concrete in headwalls, aprons and drop inlets will be measured by the cubic metres of concrete of the particular class of concrete complete in place and accepted. There will be no separate measurement for formwork to concrete for pipe culverts.

(d) **Stone Masonry**

The unit of measurement will be the cubic metre and the method of measurement shall be given in Section 3.08.

(v) **Payment**

(a) **Excavation and Backfilling**

There will be no separate payment for the excavation and backfilling of culvert pipes. If the amount of excavation and fill greatly exceed the dimensions noted in the standard drawings, the Engineer may permit the Contractor to claim for excess excavation and backfilling. In such cases, the unit of payment will be the cubic metre and the method of payment will be given in Section 3.03.

(b) **Concrete Pipes**

The rate for each linear metre of pipe in place will include full compensation for all excavation, backfilling, labor and equipment for the supply, loading, transport, and offloading of pipes and materials, and laying the pipes.

(c) **Concrete**

The rate for each cubic metre of the various classes of concrete in headwalls, aprons, drop inlets, concrete, bedding, haunching and surrounds to precast pipe culverts and culverts constructed with internal formers will include full compensation including all labor, equipment, and tools required for the execution of the following operations and for all work incidental and necessary thereto:

- Supply of all materials, excluding steel reinforcement
- Provision, construction and removal of formwork
- Mixing, transporting, placing and vibrating the concrete
- forming construction joints and shrinkage joints
- The provision of unformed surfaces
- Curing and protection of completed concrete work.

(d) **Stone Masonry**

The unit of measurement will be the cubic metre and the method of measurement shall be given in Section 3.08

3.05 Corrugated Metal Pipe Culverts

(i) **Description of Work**

This work consists of the construction of galvanized corrugated sheet metal pipe culverts of the sizes shown on the drawings, furnished and installed in accordance with these specifications and in conformity with the lines and grades given on the drawings or by the Engineer.

(ii) **Materials**

(a) **Pipes**

The galvanized corrugation metal pipes shall conform to the requirements of AASHTO M36. The gauge for the designated sizes of pipes shall be as shown on the drawings or specified in the Bill of Quantities.

(b) **Concrete**

Concrete for inlet and outlet structures shall comply with the requirements specified in Section 3.07 and the class of concrete shall be as recommended on the drawings or as directed by the Engineer.

(iii) **Construction**

(a) **Excavation and Backfilling**

Excavation and backfilling shall be performed in accordance with the requirements of Section 3.03

(b) **Placing of Pipes**

The pipes shall be bedded on a material consisting of sand or a sandy soil in which all of the material passes a 9.5 mm sieve and not more than 10 percent passes a 0.075mm sieve.

The separate sections of pipe shall be joined firmly together and with outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides. The pipes shall be laid carefully and true to lines and grade as directed. Any pipe which shows any undue settlement after being laid, or is damaged, shall be taken up and re-laid or replaced without extra compensation.

(c) **End Treatment**

Where require, headwalls and aprons at the inlets and outlets to the corrugated metal pipe culverts shall be constructed in Class 20 concrete in accordance with the drawings or as directed by the Engineer. Wing walls shall be constructed in masonry or concrete Class 20. Where required grouted stone pitching shall be provided at the inlets and outlets to the pipe culverts in accordance with the drawings or as directed by the Engineer. Other forms of end treatment such as drop inlets, silt traps, etc shall be constructed in accordance with the drawings or as directed by Engineer.

(d) Minimum cover to culverts shall be 0.3m in respect of all pipe culverts.

(iv) **Measurement**

(a) Excavation and Backfilling

Excavation for drainage structures including inlet and outfall drains as specified in Section 3.02 (b) shall be measured in cubic metres to the dim ensions shown on the drawings or as directed by the Engineer. The depth of excavation shall be measured from the level at which excavation commences or other dimensions as shown on the drawings.

Excavation in rock will be measured and paid for in cubic metre as an Extra Over in Pay Item No. 2.08.

There will be no separate measurement for the excavation and backfilling of culvert pipes. If the amount of excavation and fill greatly exceed the dimensions noted in the standard drawings, the Engineer may permit the Contractor to claim for the excess excavation and backfilling.

Measurement for backfilling shall be the cubic metres, in place, as determined from the theoretical limits as shown on the drawings.

(b) Corrugated Metal Pipes

Corrugated metal pipes will be measured by the liner metre of pipe in position along the centre line.

(c) Concrete

The concrete in headwalls, aprons, and drop inlets will be measured by the cubic metre of concrete of the actual class complete in place and accepted. There will be no separate measurement for formwork to concrete for pipe culverts.

(iii) Payment

(a) Excavation and Backfilling

The rates per cubic for excavation respectively backfilling must include full compensation for supervision, labor, plant, equipment and materials for the work including all timbering and protection of excavations, dewatering and disposal of surplus excavated.

(b) Corrugated Metal Pipe

The rate for each linear metre of pipe in place will include full compensation for all labor and equipment for the supply, loading transport, and off-loading of pipes and materials, for bedding and laying the pipes all as specified.

(c) Concrete

The rate for each cubic metre of concrete in headwalls, aprons and drop inlets will include full compensation including all labour, equipment and tools required for the execution of the following operations and for all works incidental and necessary thereto:

- supply of all materials, excluding possible steel reinforcement, which is paid for under pay Item No. 3.7;
- provision placing and removal of formwork;
- mixing, transporting, placing and vibrating the concrete;
- forming construction joints and shrinkage joints;
- the provision of unformed surfaces;
- Curing and protection of completed concrete work.

3.06 Extension and Removal of Existing Drainage Structures

(i) Description of Work

Bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic unless otherwise directed.

Existing inlets or outlets shall be broken down or demolished where necessary and waste material or rubbish disposed of as directed by the Engineer. Existing pipes shall be removed where necessary and salvaged for later re-use. All such work shall be carried out in a manner to prevent damage to old work which is to remain. All removed pipes which in the opinion of the Engineer are suitable for re-use shall be neatly stacked in the vicinity of the place or removal in a position as directed by the Engineer.

The substructure of existing structures shall be removed down to natural stream bottom and those parts outside of the stream shall be removed down to 0.3 metres below natural ground surface

Where such portions of existing structures lie wholly or in part within the limits for a new structure, these shall be removed as necessary to accommodate the construction of the proposed structure.

In the case of extensions to existing culverts the extension pipes may be laid prior to the completion of the formation where such pipes have adequate cover but the Contractor shall be entirely responsible for protecting such newly laid pipes against damage of any kind and shall replace the damaged pipes at his own expense.

Where any existing headwall requires special treatment to conform with the requirements for headwalls as specified, it shall be repaired or replaced by a new structure as specified or directed.

If existing headwalls constructed in stone masonry are removed, the stone may be cleaned and re-used in grouted pitching or new masonry work, if suitable.

(ii) Measurement

(a) Concrete

The unit of measurement for removal of concrete or masonry etc. in culverts and drainage structures shall be the cubic metre of material measured in place before removal.

(b) Pipes

The unit of measurement for pipes removed and stacked for re-use shall be the linear metre of pipes removed.

(iii) Payments

(a) Concrete

The rate per cubic metre for removal of concrete, masonry etc. will include full compensation for the execution of the work as specified, including demolition and disposal of waste material and for all incidental and necessary thereto.

(b) Pipes

The rate per metre for removal of pipes, irrespective of diameter, and stacking for re-use will include full compensation for the execution of the work as specified including required excavation and for all work incidental and necessary thereto. Pipes which are damaged on removal will not be paid for.

3.07 <u>Vented/Unvented Drifts</u>

(i) Description of Work

Vented drifts shall be constructed in accordance with the details shown on the drawings and as directed by the Engineer. The work comprises excavation, reinforced concrete work for the provision of invert slabs, deck slabs and approach slabs, laying of 600mm, 750mm and 900mm pipes for the vents (in vented drifts only) and construction of masonry cut-of and return walls.

(ii) Materials

(a) Concrete

The concrete shall comply with the requirements specified in Section 3.07 and the classes of concrete shall be as recommended on the drawings or as directed

(b) **Pipes**

Pipes shall be either concrete pipes or corrugated metal pipes in accordance with the requirements laid down in Section 3.04 and 3.05 respectively.

(iii) **Construction**

Construction shall be carried out in accordance with the notes and details shown on the drawings and the other relevant sections of the specification dealing with excavation, backfilling, pipe laying and concreting.

Approach and invert slabs for vented drifts shall be constructed on 200mm thick compacted layer of wearing course or similar approved gravel to the dimensions shown on the drawings or as directed by the Engineer.

Masonry in toe walls, cut off walls and return walls shall be constructed as follows:

A trench shall be excavated to the dimensions shown on the drawings and shall be backfilled with natural rock of average size of not less than 200mm in any two dimensions placed in layers with interstices filled with grout shall consist of one part cement and four parts of sand.

(iv) **Measurement**

(a) **Excavation**

The unit of measurement for the excavation for vented drifts will be the cubic metre and the method of measurement of excavations as given in Section 3.03.

(b) **Gravel Bed to Slabs**

The unit of measurement for the gravel bed shall be the cubic metre of material compacted in place to the dimensions shown on the drawings or as directed.

(c) **Concrete Pipes**

Concrete pipes will be measured by the linear metre of pipe in position along the center line.

(d) **Concrete**

The concrete in approach slabs, deck slabs, invert slabs and surrounds to pipes will be measured by the cubic metres in accordance with the dimensions given in the drawings.

(e) **Reinforcement**

The unit of measurement for bar reinforcement is the kilogram. The total mass of bar reinforcement will be calculated from the total length indicated on the drawings multiplied by the effective cross sectional area and the nominal density.

The unit of measurement for mesh reinforcement is the square metre. The total area of mesh will be calculated from the net plan area of reinforcement.

(f) **Masonry**

The unit of measurement for masonry is the cubic metre, measured in accordance with the dimensions on the drawings.

(iv) **Payment**

(a) **Excavation**

Payment for excavation will be as given in Section 3.03

(b) **Gravel Bed to Slabs**

Payment for the gravel bed to slabs will be by the tendered rate in Pay Item No. 2.7 for wearing course gravel and shall include for furnishing, placing, spreading and compacting all materials to the Engineer's satisfaction including preparation of underlying surface to receive the gravel layer after necessary excavation has taken place.

(c) **Pipes**

The rate for each linear metre of pipe in place will include full compensation for all labour and equipment, for the supply, loading, transport, and off-loading of pipes and materials, and laying the pipes.

(d) **Concrete**

The rate for each cubic metre of concrete in approach slabs, deck slabs, invert slabs and surrounds to precast pipes and pipes constructed with internal formers will be as follows:

The rate for each cubic metre of concrete will include full compensation for the execution of the following operations and for all work incidental and necessary thereto:

- Supply of all materials, excluding steel reinforcement;
- Provision, placing and removal of all formwork;
- mixing, transporting, placing and vibrating the concrete;
- forming construction joints and shrinkage joints;
- The provision of unformed surface;
- Curing and protection of completed concrete work.

(e) **Reinforcement**

The rate per kilogram for bar reinforcement will include full compensation for supply and delivery, cutting, bending, placing, provision of laps and for all work incidental and necessary thereto.

(f) **Masonry**

The rate per cubic metre of masonry work in toe-walls and return walls will include for the supply of all materials; constructed as specified and for all work incidental and necessary thereto.

3.08 Structural Concrete

(i) General

This section covers the manufacture, transport, placing and testing of concrete in the works where plain or reinforced concrete is specified.

(ii) Concrete Mixes

Concrete mixes required for various parts of the works are indicated on the drawings and are designated by their characteristic strengths in N/mm2 (Mpa) in accordance with the provisions of BS 5328. The table below, gives details of the prescribed concrete mixes which may be used on the works.

Weights of cement and total dry aggregate in kg to produce approximately one cubic metre of full compacted concrete, together with the percentage by weight of fine aggregate in total dry aggregates are shown.

STANDARD CONCRETE MIXES

CONCRE TE	CEME	TOTAL DRY	FINE AGGREGA	WORKABIL	NOMINAL MAX SIZE

CLASS	NT KG	KG	TE %	ITY	OF AGGREGAT ES
7.5	210	1900	35-50	Medium	20mm
10	240	1850	35-50	Medium	20mm
15	280	1800	35-50	Medium	20mm
20	320	1800	30-40	Medium	20mm
25	360	1750	30-40	Medium	20mm

Unless otherwise directed the Contractor shall comply with the relevant provisions of BS 5328 for proportioning, whether by mass or by volume, and mixing concrete.

(iii) Placing

The Contractor shall give to the Engineer a minimum or 24 hours' notice of his intention to place concrete. The supervision employed should be such as to ensure the required standard of control of materials and workmanship. The Engineer should be afforded all reasonable opportunity and facility to inspect the materials and the manufacture of concrete and to take any samples or to make any tests. All such inspection, sampling and testing should be carried out with the minimum of interference with the process of manufacture and delivery.

All concrete shall be transported in a manner to avoid any segregation of materials and placed as rapidly as possible after mixing and before initial set takes place. It shall be deposited as nearly as possible in its final position in small quantities, so as to avoid re-handling or flowing. In no case is concrete to be dropped from a height of more than 1.5 metres except when prior approval has been obtained from the Engineer.

Care shall be taken to ensure that the reinforcement is not displaced from its correct position and that the concrete entirely surrounds the rods. Once placed in position the concrete is to be left undisturbed and protected from vibration, loading, excessive temperature variations and rapid drying out. In walls, the concrete shall be placed in horizontal layers about 150mm thick.

Construction joints shall be avoided as far as possible. Where they are necessary, the surface of the old concrete shall be roughened and all laitance and scum shall be removed immediately before placing the fresh concrete, the joint face shall be wetted and coated with a thin layer of neat cement paste.

After concrete has been placed, appropriate measures must be taken, as approved by the Engineer, to prevent the concrete drying out too rapidly.

All finished concrete must be sound, and any that is honeycombed or is in any other way defective may be rejected by the Engineer. In such cases it is to be broken out and replaced at the Contractor's expense.

(iv) Weather Condition

Hot weather presents problems in the mixing, placing and curing of concrete. If the temperature of the concrete at the time of placing exceeds 32 oC the Engineer may instruct the Contractor to either suspend concreting or, alternatively the Contractor may cool the constituent materials of the concrete. During hot weather, all exposed concrete surfaces which have recently been cast, shall be suitably screened from the sun in an approved manner. Arrangements shall be made to the satisfaction of the Engineer to prevent or minimize the harmful effects of rain during placing of concrete.

(v) Testing

Where considered necessary by the Engineer he shall require tests to be carried out to evaluate the consistency and strength of the concrete. All testing shall be carried out at the Contractor's expense.

(a) Slump Test

When required, while concreting is in progress, the consistency of the mixture shall be ascertained by carrying out a slump test in the form and manner described in B.S. 1881.

The results of the test shall be within the following limits: 25mm - 75mm slump.

(b) Test Cubes

The Contractor shall at his own expense cast concrete cubes 150mm x 150mm x 150mm from concrete, as deposited in the work, as often as directed by the Engineer.

Such cubes must be casted in the presence of the Engineer and in the form and manner described in B.S. 1881

The cubes are to be casted in groups of two, three or four and are to be tested as directed. They shall normally be taken from each 20 cubic metre of concrete or from each continuous pour of less than 20 cubic metres. They shall be marked with a distinguishing sign which shall be entered in Concrete Cubes Log Book with origin of each cube and date of casting also entered.

(c) **Acceptance Criteria**

Compliance with the following characteristic strength shall be assumed if when tested at 28 days.

- the average crushing strength determined from the first 2, or the first 3 consecutive test results, or from consecutive but non-overlapping, groups of 4 test results complied with the appropriate limits in column A of the table below,
- any individual test result complies with the appropriate Limits in column B of the table below:

COMPREHENSIVE STRENGTH COMPLIANCE REQUIREMENTS

Concrete Class	Test Results	Average of Test results exceeds the specified characteristic strength by at least	Any individual test result is not less than the specified characteristic strength minus
7.5 to 15	First 2 First 3 Consecutive 4	0 N/mm2 1N/mm2 2N/mm2	2 N/mm2 2 N/mm2 2 N/mm2
20 and above	First 2 First 3 Consecutive 4	1 N/mm2 2 N/mm2 3 N/mm2	3 N/mm2 3 N/mm2 3 N/mm2

Sampling, compacting and curing of test specimens shall conform to B.S.1881. Cubes must be dispatched packed in damp sand in good time to arrive for testing. Storage, packing and dispatching to the laboratory shall be at the expenses of the Contractor.

f) **Formwork**

Forms shall conform to the shapes, lines, levels and dimensions of the concrete as shown on the drawings. The centering, shuttering and casting of the concrete work shall be true, rigid and properly braced and sufficiently strong to resist without bulging or distorting, loads and shock. All joints shall be sufficiently tight to prevent leakage.

If in the opinion of the Engineer, the formwork is at any time insufficiently rigid or in any way defective, then the Contractor shall strengthen and improve such formwork in such manner as the Engineer shall direct.

No formwork shall be removed without the permission of the Engine, and unless otherwise instructed by the Engineer, it shall be left in position before easing and removal for three days.

The Contractor shall be responsible for any injury to the work and any consequent damage caused by or arising from the removal or striking of molds, centering and supports, and any advice, permission or approval given by the Engineer relative to the removal and striking of molds, centering and supports shall not relieve the Contractor from the responsibility herein defined.

g) **Reinforcement**

Bends in bars shall be cold formed on an approved manually motor operated machine in which the power is applied smoothly and evenly and at such a speed so as to cause no fracture or damage in the reinforcement. Reinforcement damaged in any way shall be removed from the site. Before being placed in position, the rods shall be thoroughly cleaned of all grease, dirt, bituminous material, scale and loose rust.

Great care must be taken in placing the rods and mesh in their correct positions as shown on the drawings and in retaining them during the placing of the concrete.

When the ends of bars are to be formed into a U-hook, they must be bent to a semi-circular hook, the internal diameter of which is to be not less than twice the diameter of which is to be not less than twice the diameter of the rod, with a straight end beyond the semicircular portion having a length of not less than four times the diameter of the rod.

Unless otherwise shown on the drawings, all joints in reinforcing rods are to be lapped 24 times the diameter of the rod for compression laps and 30 times the diameter of the rod for tension laps. The laps must be securely tied with 16 or 18 S.W.G annealed iron wire. Rods crossing one another are to be bound at every intersection, unless otherwise directed with 16 or 18 S.W.G annealed iron wire.

All stirrups are to be properly fastened to the main reinforcement so as to retain their position during the placing of the concrete. Welding will not be permitted in any rod.

The Contractor shall notify the Engineer when any section is ready for concreting and no concrete shall be placed in position until the steel work has been inspected and approved by the Engineer.

The concrete cover to the main reinforcement shall be 50mm or as stated on the drawings.

(vi) Measurement

(a) Concrete

The unit of measurement for cast-in-situ concrete is the cubic metre measured in accordance with the dimensions given in the drawings.

(b) Reinforcement

The unit of measurement for bar reinforcement is the kilogram. The total mass of bar reinforcement will be calculated from the total length indicated on the drawings multiplied by the effective cross sectional area and the nominal density.

The unit of measurement for mesh reinforcement is the square metre. The total area of mesh will be calculated from the net plan area of reinforcement.

(vii) Payment

(a) Concrete

The rate for each cubic metre of concrete will include full compensation for the execution of the following operations and for all work incidental and necessary thereto:

- Supply of all materials, excluding steel reinforcement;
- Provision, placing and removal of formwork;
- Mixing, transporting, placing and vibrating the concrete.
- forming construction joints and shrinkage joints.

- The provision of unformed surface
- curing and protection of completed concrete work.

(b) **Reinforcement**

The rate per kilogram for bar reinforcement will include full compensation for supply and delivery, cutting, bending, placing and fixing and for all work incidental and necessary thereto.

(c) **Formwork**

There will be no separate payment for formwork and the Contractor must allow for this item in his rate for concrete.

3.09 Stone Masonry

(i) **Description of Work**

This work shall consist of the construction of stone masonry structures or portions of structures in conformity with the dimensions and design shown on the drawings.

Stone for masonry shall be sound and durable and shall be subject to the Engineer's approval. In general, stones shall be angular and the length of any stone shall not exceed three times its height. The breadth on the bed shall be not less than one-quarter nor greater than quarters of the thickness of the masonry wall.

Masonry in toe-walls and cut-off walls shall be constructed as follows:-

A trench shall be excavated to the dimensions shown on the drawings and the approved stones placed in layers with interstices filled with grout. The grout shall consist of one part cement and four parts of sand.

Masonry fancework shall be built up by stones free from depressions and projections. The facework must not be built to a height exceeding 400mm above the backing which shall then be brought up level with the fancework. At no time shall the backing be built up higher than the fancywork. The fancywork shall not be displaced by the placing of the backing.

Newly laid masonry shall be protected against the harmful effects of weather. Weep holes shall be provided in walls with exposed face as shown on the drawing or directed by the Engineer.

(ii) **Measurement**

The unit of measurement for masonry shall be the cubic metre measured in accordance with the dimensions on the drawings.

(iii) Payment

The rate per cubic metre of masonry works shall be full compensation for furnishing and placing all materials including mortar, for provision of weep holes and for all labor, tools, equipment and incidentals necessary to complete the work as specified.

3.10 Loose Stone Pitching

(i) Description of Work

This work shall consist of placing loose stones for protection of embankment slopes and the inlets and outlets to drainage structures at locations shown on the drawings or directed by the Engineer. Stones shall be dumped into place so as to be reasonably uniform, free from humps or depressions and with no excessively large cavities below or individual stones projecting above the general surface.

The stones shall be hard and durable of such quality that they will not disintegrate on exposure to water or severe weather conditions. Stone shall vary in weight from 10 to 100 kilograms each and not less than 25 percent shall weigh over 50 kilograms.

(ii) Measurement

The unit of measurement for loose stone pitching shall be the number of cubic metres measured in place.

(iii) Payment

The rate for each cubic metre of loose stone pitching will include full compensation for supply and placing of materials including all labor, equipment, tools and incidentals necessary to complete the work.

3.11 Grouted Stone Pitching

(i) Description of Work

This work shall consist of placing a stone and concrete grout protection on embankment slopes, in drain inverts and at the inlets and outlets to drainage structures.

The area to be covered with stone pitching shall be trimmed to the line, level and slope indicated on the drawings or as directed. The prepared surface shall be firm and well compacted and must be approved by the Engineer before placing of rock commences.

Stones shall then be placed in contract with each other and firmly bedded into the slope. The thickness of rock normal to the slope shall be not less than 150 mm. Interstices between the large stones shall be filled with grout.

The grout shall consist of one part of cement to four parts of sand unless otherwise directed. Before final set of grout, the surface shall be swept with a stiff broom. The grouted surface shall be kept moist for at least four days. Weepholes must be provided in the surface at a frequency of one per square metre unless otherwise directed.

(ii) Measurement

The unit of measurement for grouted stone pitching shall be the square metre of completed surface.

(iii) Payment

The rate for each square metre of pitching will include full compensation for all slope preparation, supply of materials, construction of the surface as specified and all work incidental and necessary thereto.

3.12 Wire Mesh Gabions

(i) Description of Work

This work shall consist of furnishing and placing wire mesh gabions in accordance with all requirements of the drawings and these specifications and as directed by the Engineer.

Subgrades for gabions shall be firm and well compacted and must be approved by the Engineer before placing of wire mesh baskets commences. Prior to placing of rock fill, gabions shall be tensioned in such manner as will permit perfect shape, alignment and compaction of fill. Fill for gabions shall consist of hard, durable rock pieces that will not deteriorate when submerged in water or exposed to severe weather conditions. Rock pieces shall be generally uniform in size and shall be of proper dimensions to be retained by the specified mesh size.

(ii) Materials

Gabions shall be made of galvanized steel wire and shall be supplied to site folded flat to facilitate handling and transportation.

Body wire shall be of metric gauge 17 (3.05mm). Selvage perimeter wire shall be metric gauge 19 (3.75mm). Tying and connecting wire shall be metric gauge 15 (2.5mm).

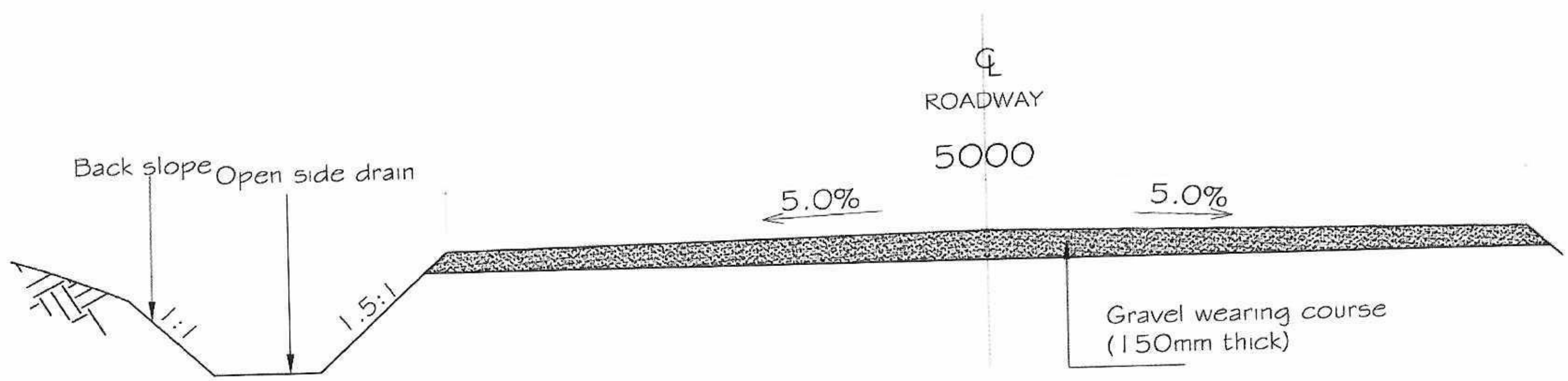
(iii) Measurement

The measurement of wire mesh gabions shall be the cubic metres comprising the volume of the gabion baskets furnished, placed, filled and accepted.

(iv) Payment

The rate for each cubic metre of wire mesh gabions shall include full compensation for all labour, materials equipment and incidentals necessary for furnishing and placing gabions including rock fill, tying and connection, levelling and compaction of subgrade and all other related work.

DRAWINGS



ROAD CROSS-SECTION

All dimensions are in r

BILL OF QUANTITIES

SECTION IX: BILL OF QUANTITIES

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

REHABILITATION OF OLDUVAI MUSEUM TO NASERA ROAD -25KM					
BILL OF QUANTITIES:					
ITEM	DESCRIPTION	UNIT	QTY	RATE	Amount (TShs)
PART 1: PRELIMINARIES					
1.1	Allow for establishment on site including removal on completion of Works	LS	1	5,000,000/=	5,000,000/=
1.2	Mobilization/Demobilization of Equipment	LS	1	37,000,000/=	37,000,000/=
1.3	Allow for accomodation of traffic, road diversion and maintenance during the construction period.	LS	1	4,000,000/=	4,000,000/=
1.4	Allow for sampling, transportation and testing of samples as directed by the Engineer.	PS	1	3,500,000/=	3,500,000/=
1.5	Provision of Project progress report and photos	LS	1	4,000,000/=	4,000,000/=
1.6	Provide and erect standard road sign as per Engineer or supervisor instruction and approval	No	1	4,000,000/=	4,000,000/=
	TOTAL PRELIMINARIES AND GENERAL ITEMS				57,500,000/=
PART 2: ROAD WORKS					
2.1	Excavate, Load, Haul up to 30km,spread,water,and compact gravel wearing course materials	m^3	18,750	25,000/=	468,750,000/=
2.2	Carry out gravel filling at locations as instructed by the site Engineer.	m^3	1,875	18,000/=	33,750,000/=
2.3	Overhaul fill and gravel	m^3.km	11,250	4,500/=	50,625,000/=
	TOTAL ROAD WORKS				553,125,000/=
PART 3: DRAINAGE WORKS					
3.1	Open Drains				
a.	Excavation of catch water drains	Lm	8,000	5,000/=	40,000,000/=
b.	Excavation of mitre drains	Lm	2,400	4,500/=	10,800,000/=
	TOTAL DRAINAGE WORKS				50,800,000/=

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

Rehabilitation of main road from Golini to Seneto juction (50km) and access road to Olduvai Museums (5km)		
GENERAL SUMMARY:		
ITEM	**DESCRIPTION**	**AMOUNT(Tsh)**
1	BILL No. 1: PRELIMINARIES	57,500,000/=
2	BILL No. 2: ROAD WORKS	553,125,000/=
2	BILL No. 2: DRAINAGE WORKS	50,800,000/=
	SUB TOTAL 1	661,425,000/=
4	ALLOW FOR: (a) Insurance Cover as per GCC Clause 16.1 and SCC Clause 8	4,500,000/=
	(b) Provide Surety bond as per GCC Clause 60.1 and SCC Clause 28	5,000,000/=
	SUB TOTAL 2	670,925,000/=
5	**ADD:** 18% VAT	120,766,500/=
	TOTAL COST CARRIED TO FORM OF TENDER (VAT INCLUSIVE)	791,691,500/=

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

FORMS OF TENDER

2. Form of Tender

08/12/2021
[date]

Conservation Commissioner, Ngorongoro Conservation Area Authority, P.O. box 1,
To: *[name and address of Employer]* Arusha - Tanzania.

DENIKO CONSTRUCTION LTD
AE/055/2021-22/HQ/TCRP/W/02.
We *[insert name of tenderer]*, offer to execute the *[name and identification number of contract]* in accordance with the Conditions of Contract accompanying this Tender
Rehabilitation of the olduvai to Naivi Road - 25kms.
for the Contract Price of *[amount in numbers], [amount in words] [name of currency].*
[TSHS. 791,691,500/=] [Say Hundred and Ninety One Millions Six Hundred and Ninety One Thousands and Five Hundred only].
The Contract shall be paid in the following currencies:
[VAT INCLUSIVE] [Say Tanzanian Shillings]

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

The advance payment required is:-

Amount	Currency
(a) 118,753,725/=	TSHS.
(b) —	—

We declare that our tendering price did not involve agreements with other tenderers for the purpose of tender suppression.

We hereby confirm *[insert the name of the Appointing Authority]*, National Construction Council (NCC) to be the Appointing Authority, to appoint the adjudicator in case of any arisen disputes in accordance with ITT 43.1 [Adjudicator]

We are not participating, as tenderers, in more than one Tender in this tendering process other than alternative tenders in accordance with the tendering documents.

We declare that, as tenderer(s) we do not have conflict of interest with reference to ITT 3.7 [Eligibility of Tenderers]

With reference to ITT 3.11 [Eligibility of Tenderers], it is our intention to subcontract approximately *[insert the percent]* N/A percentage of the Tender / Contract Price, details of which are provided herein.

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

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

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

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

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

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

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

We hereby confirm that this tender complies with the tender validity and Tender Security required by the tendering documents and specified in the Tender Data Sheet.

DENIKO CONSTRUCTION LTD
P.O. BOX 14819
ARUSHA
TANZANIA

Authorized Signature: ____________________

Name and Title of Signatory: CHRISTOPHER RICHARD/SITE ENGINEER

Name of Tenderer: DENIKO CONSTRUCTION LTD

Address: P.O. BOX 14819, ARUSHA.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

NEGOTIATION MINUTES

NGORONGORO CONSERVATION AREA AUTHORITY

MINUTES OF THE NEGOTIATION MEETING FOR TENDER NO. AE/055/2021-22/HQ/TCRP/W/02 FOR REHABILITATE OF THE OLDUVAI TO NASERA ROCK 25KM HELD ON THURSDAY 16TH DECEMBER, 2021 – NCAA HQ KAMYN ESTATE, NJIAPANDA-KARATU

ATTENDANCE

(a) Employer/Client's Team (Ngorongoro Conservation Area Authority-NCAA)

1. QS. Melissa Kahana - Chairperson
2. CPA. Thadeus Madawe - Secretary
3. Ms. Lilian Magoma - Member

(b) Bidder's M/s Deniko Construction Limited-Arusha

1. Mr. Allen Olotu - Managing Director
2. Eng. Christopher Richard - Engineer

AGENDA OF THE MEETING

1. Opening of the Meeting
2. Notice of the Meeting and Quorum
3. Adoption of the Agenda
4. Consideration of the tender price submitted by Tenderer
5. Closing of the Meeting

AGENDA NO.1	**OPENING OF THE MEETING** The Chairperson welcomed the team members and opened the meeting at 15:30 p.m.
AGENDA NO. 2	**NOTICE OF THE MEETING AND QUORUM**
MINUTE 2.1	Adequate notice had been given to all members and both parties were represented.
AGENDA NO. 3	**ADOPTION OF THE AGENDA**
MINUTE 3.1	The agenda items were adopted as proposed.
AGENDA NO. 4	**CONSIDERATION OF THE TENDER PRICE SUBMITTED BY THE TENDERER**
MINUTE 4.1	**NCAA Representative presented.**
MINUTE 4.1.1	During evaluation of the bid, NCAA observed that your tender price was higher compared to the budget set for the *Rehabilitate of the Olduvai to Nasera Rock Road 25km* Therefore NCAA invited your company for negotiation meeting, Pursuant to section 76(1) (3) of the Public Procurement Act (PPA) 2011 and its Regulation 308(1) of 2013 as amended through section 26 of the Public Procurement (Amendment) Act, 2016 which allows negotiation on price to be conducted before awarding the tender if deemed necessary.
MINUTE 4.1.2	**Requested:** NCAA representative requested the bidder on the following issues:- (a) NCAA team requested the bidder to clarify if has the ability to add another Water bowser vehicle. (b) NCAA team requested the bidder to submit evidence of compliance statement on specifications provided. (c) NCAA team requested the bidder to abide with completion period of four (4) months instead of six (6)

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months

(d) NCAA team requested the bidder to reduce bid price to meet the budget set for execution of this project.

MINUTE 4.2 **Bidders Response**

The bidder responded on the issues raised by NCAA negotiation team as follows: -

(a) The bidder's representative agreed to submit another one (1) water bowser vehicle with registration number: T 449 ALR as attached upon this minute to make a total of five (5) water bowser vehicle.

(b) During Negotiation the bidder submitted compliance statement on the specification provided in the bidding document as attached upon this minute.

(c) The Bidder's representative agreed to execute this project within a period of four (4) months.

(d) Finally, the bidder agreed to reduce price by TZS. 66,375,000.00 from the original price, thus price changed from TZS; 791,691,500.00 to TZS 725,316,500.00 (VAT inclusive) as detailed below: -

BOQ FOR REHABILITATION OF OLDUVAI MUSEUM TO NASERA ROAD -25KM

ITEM	DESCRIPTION	UNIT	QTY	ORIGINAL RATE	REVISED RATE
1.1	Allow for establishment on site including removal on completion of Works	LS	1	5,000,000.00	5,000,000.00
1.2	Mobilization/Demobilization of Equipment	LS	1	37,000,000.00	37,000,000.00
1.3	Allow for accomodation of traffic, road diversion and maintenance during the construction period.	LS	1	4,000,000.00	4,000,000.00

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1.4	Allow for sampling, transportation and testing of samples as directed by the Engineer.	PS	1	3,500,000.00	3,500,000.00
1.5	Provision of Project progress report and photos	LS	1	4,000,000.00	4,000,000.00
1.6	Provide and erect standard road sign as per Engineer or supervisor instruction and approval	No	1	4,000,000.00	4,000,000.00
	TOTAL PRELIMINARIES AND GENERAL ITEMS				
2.1	Excavate, Load, Haul up to 30km,spread,water,and compact gravel wearing course materials	m^3	18,750	25,000.00	22,000.00
2.2	Carry out gravel filling at locations as instructed by the site Engineer.	m^3	1,875	18,000.00	18,000.00
2.3	Overhaul fill and gravel	m^3.km	11,250	4,500.00	4,500.00
	TOTAL ROAD WORKS				
3.1	**Open Drains**				
a.	Excavation of catch water drains	Lm	8,000	5,000.00	5,000.00
b.	Excavation of mitre drains	Lm	2,400	4,500.00	4,500.00
	TOTAL DRAINAGE WORKS				

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	REHABILITATION OF OLDUVAI MUSEUM TO NASERA ROAD -25KM	
	REVISED GENERAL SUMMARY:	
ITEM	**DESCRIPTION**	**AMOUNT(Tsh)**
1	BILL No. 1: PRELIMINARIES	57,500,000.00
2	BILL No. 2: ROAD WORKS	496,875,000.00
2	BILL No. 2: DRAINAGE WORKS	50,800,000.00
	SUB TOTAL 1	
4	ALLOW FOR:	
	(a) Insurance Cover as per GCC Clause 16.1 and SCC Clause 8	4,500,000.00
	(b) Provide Surety bond as per GCC Clause 60.1 and SCC Clause 28	5,000,000.00
	SUB TOTAL 2	**614,675,000.00**
5	**ADD:** 18% VAT	110,641,500.00
	TOTAL COST CARRIED TO FORM OF TENDER (VAT INCLUSIVE)	**725,316,500.00**

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MINUTE S 4.3.1 **Discussed**

It was discussed and agreed that the *Rehabilitate of the Olduvai to Nasera Rock Road 25km* to be executed without compromising its quality.

MINUTE 4.4.1 **Agreed**

The parties resolved that,

- Tender price is **TZS. 725,316,500.00** VAT inclusive work to be executed within four (4) months from the date of signing the contract.

AGENDA NO. 5 **CLOSURE OF THE MEETING**

MINUTE 5.1 The Chairperson thanked member and closed the meeting at 16.30 p.m

QS. Melissa Kahana	Eng. Christopher Richard	CPA. Thadeus Madawe
NCAA CHAIRPERSON	**M/s DENIKO CONS. LTD**	**NCAA (SECRETARY**

NGORONGORO CONSERVATION AREA AUTHORITY
P.O.BOX 1,
NGORONGORO
CRATER
TANZANIA

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

DENIKO
CONSTRUCTION LTD
Civil Works & Building Contractors

Ref. No. DCL/0578/21

Date: 15th December, 2021

Conservation Commissioner,
Ngorongoro Conservation Area Authority,
P.O. Box 1
Ngorongoro Crater
Email: cc@ncaa.go.tz

RE: TENDER NO. AE/055/2021-22/HQ/TCRP/W/02 FOR REHABILITATION OF OLDUVAI TO NASERA ROCK ROAD (25KM)

SUB: STATEMENT OF COMPLIANCE TO BID SPECIFICATIONS

Refer to the above subject matter.

We write to state that we, DENIKO CONSTRUCTION LTD, agree to comply with ALL the bid specifications as contained in the bid document.

This letter therefore serves as our confirmation of compliance to all the specification.

Thank for your valuable cooperation

Kind Regards,

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

Allen P. Olotu
MANAGING DIRECTOR

TANZANIA REVENUE AUTHORITY

MOTOR VEHICLE REGISTRATION CARD

First Registered: 31/03/2006

Vehicle Control Number: 232352

NO: 8006512

Registration Number: T449ALR

Owner Details:

ID Number: 104722604
Category: Company
Name: DENIKO CONSTRUCTION LIMITED
Postal Address: 14819
ARUSHA

Title Holder Details:

ID Number: 104722504
Category: Company
Name: DENIKO CONSTRUCTION LIMITED
Postal Address: 14819
ARUSHA

Certified True Copy of the Original

NEEMA [illegible]

N[illegible] 16/12/2021

Vehicle Details:

Make: Leyland
Model: CLYDESDALE
Model Number: 4016L
Body Type: Truck
Colour: Multicolour
Class: Heavy Load Vehicle(GVM > 3500Kg)
Year of Manufacture: 1982
Chassis No: 92796C
Engine No: 4023202227946755
Engine Capacity: 6571
Fuel Used: Diesel
Number of Axles: 2
Axle Distance:
Seating Capacity: 2
Tare Weight: 6850
Gross Weight: 10000
Imported From: N/A

Number of Previous Owner(s): 1

Vehicle Usage: Private or Normal

Previous Registration Number:

Dec. Year: Office: Agent Tin: Dec Ref. No: Item:

☐ **NOTIFICATION OF CHANGE OF OWNERSHIP OR TITLE HOLDER**
{Tick here, fill in owner particulars and sign declaration below
NB Current owner must declare his/her stamp Duty Status}

☐ **NOTIFICATION OF TRANSFER OF TITLE TO CURRENT OWNER**
{Tick here and sign declaration below}

New Owner Category

☐ Citizen of Tanzania
☐ Parastatal
☐ Company
☐ Expatriate
☐ Other Agencies/Associations/Clubs
☐ Partnership
☐ Sole Proprietor
☐ Financial Institution
☐ Local Government
☐ Other Government Organisation
☐ Diplomat/Foreign Mission
☐ International Organisation
☐ Cooperative Society
☐ Religious Organisation

TIN No or other No :

Current Owner's Stamp Duty Status

VAT or Stamp Duty Composition Number: ....

Stamp Duty Receipt Number: ....

☐ Not Applicable

Reason for Change of Ownership : ☐ Sold ☐ Repossessed ☐ Deceased Estate ☐ Within company or family ☐ Other

USE BLOCK LETTERS :
New Owner's Name: ....
New Owner's Postal Address: .... Age: ....
Town/Place: ....

REASON FOR CHANGE OF PARTICULARS & USE: ☐ Roadworthiness ☐ Stolen ☐ Scrapped ☐ Repossessed ☐ Reconstructed

New: ☐ Body Type: ☐ Propelled by: ☐ Gross Weight: ☐ Engine No: ☐ Fuel Type: ☐ Colour: ☐ Engine Capacity: ☐ Tare Weight: ☐ Seating Capacity:

Please Enclose Police Inspection Report

New use: ☐ Private ☐ Commercial ☐ Donar Funded ☐ Taxi ☐ Emergency

DECLARATION

☐ I, the Title Holder, sign and declare that the Title has been transferred to the Owner or to a new Title Holder ....

☐ I, the owner, sign and declare that the changes reported by me are true and correct: ....

☐ We, the owner and the new owner, sign and declare that the vehicle was disposed to the new owner on the ...... day of .... 20....
at the Sales Price Tsh: .... Owner .... New Owner ....

RECEIPT
TANZANIA REVENUE AUTHORITY

Received From: DENIKO CONSTRUCTION LIMITED

Particulars:		Amount:
StampDuty	TZS	40,000
Registration card	TZS	10,000
TransferTax	TZS	50,000
Penalty	TZS	12,500
Total Amount:	TZS	112,500

Registration No: T449ALR
Mode of Payment: Mobile 19395466
Receipt No: 6511479
Issuing Officer ID: 10002494
Issuing Office: SAMORA

Reason : Change Of Ownership

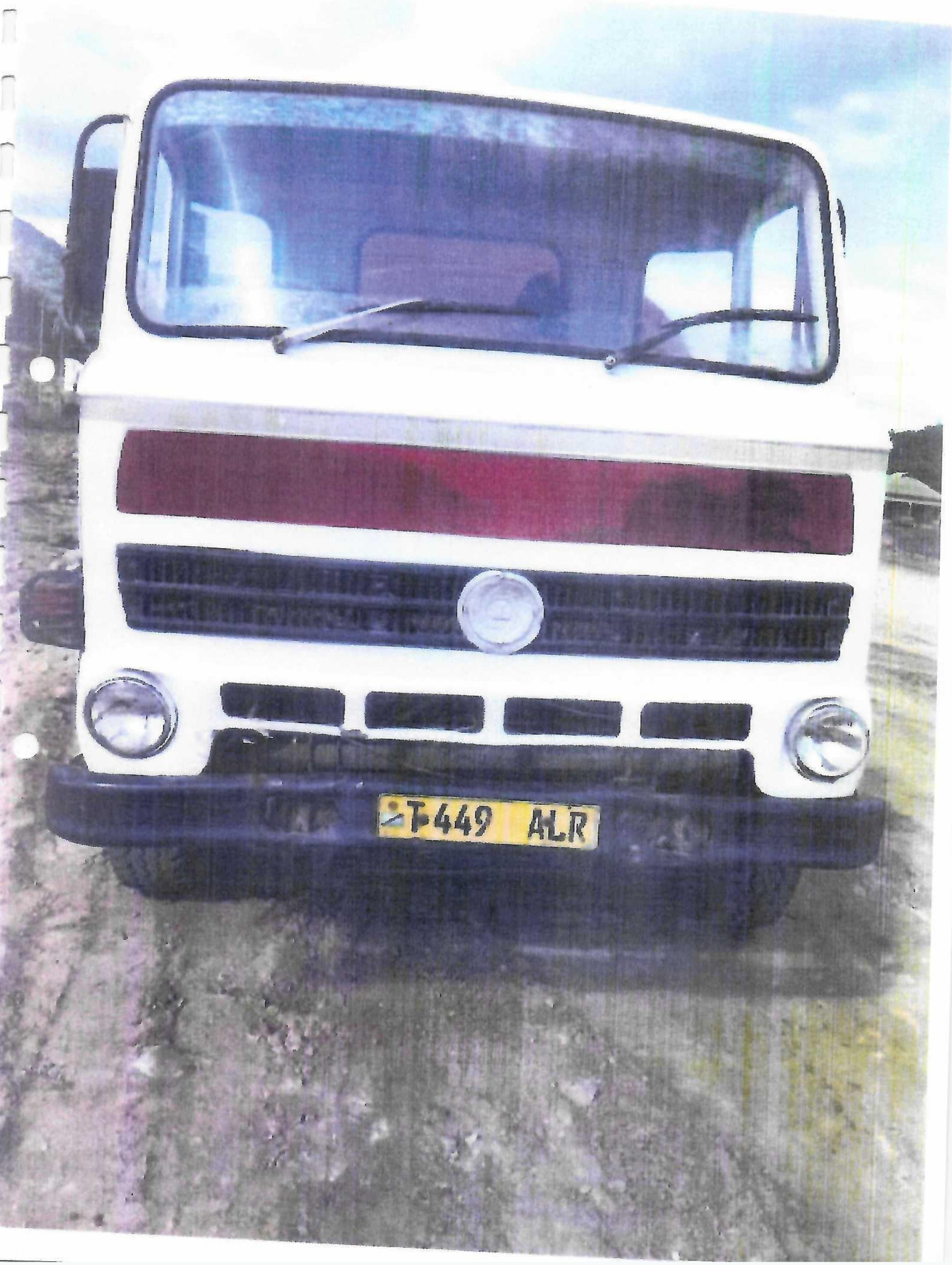
DENIKO CONSTRUCTION LTD
P.O. BOX 14819
ARUSHA
TANZANIA

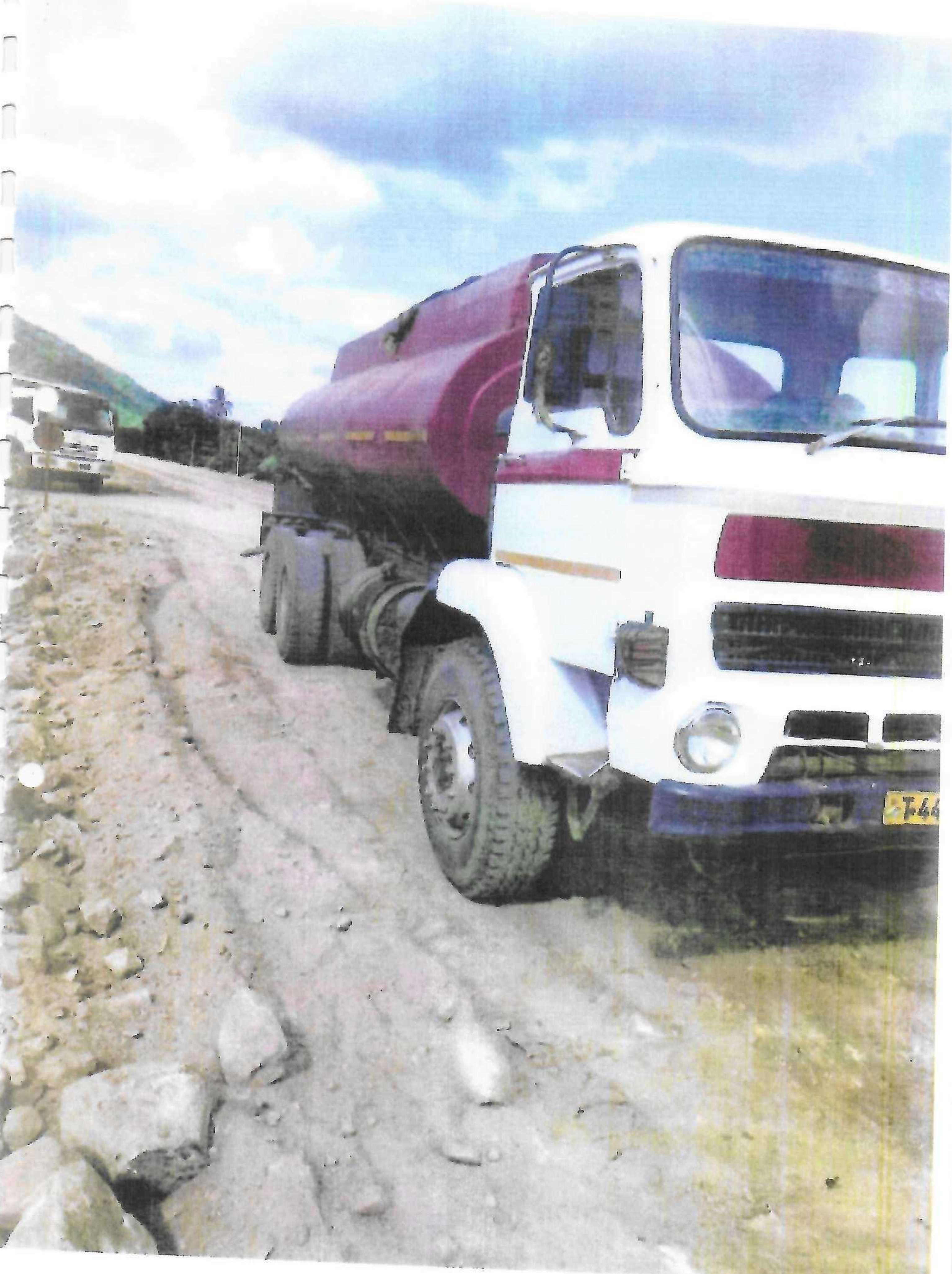
Date: 28/02/19

11166731-3

11166731-3


T 449
ALR


T 449 ALR



INSURANCE COVER;

To be submitted by the contractor after contract signing and before commencement of the works

PERFORMANCE BOND;

To be submitted by the contractor after contract signing and before commencement of the works

CERTIFIED POWER OF ATTORNEY;

3. Standard Power of Attorney

TO ALL IT MAY CONCERN

THAT BY THIS POWER OF ATTORNEY given on the *[insert date, month and year]* 08 /12/2021, WE the undersigned *[insert name of the company/donor]* DENIKO CONSTRUCTION LTD of *[insert address of the company/donor]*, by virtue of authority conferred to us by the Board Resolution No....... of 08th DECEMBER day of 2021 *[insert year]*, do hereby ordain nominate and appoint *[insert name of donee]* or *[insert address of the donee]* to be our true lawful Attorney and Agent, with full power and authority, for us and in our names, and for our accounts and benefits, to do any, or all of the following acts, in the execution of tender No. *[insert tender number]* AE/055/2021-22/HQ/TCRP/W/02 that is to say;

> To act for the company and do any other thing or things incidental for *[insert tender Number]* AE/055/2021-22/HQ/TCRP/W/02 of *[insert description of procurement]* for the *[insert name of the procuring entity]*,

AND provided always that this Power of Attorney shall not revoke or in any manner affect any future power of attorney given to any other person or persons for such other power or powers shall remain and be of the same force and affect as if this deed has not been executed.

AND we hereby undertake to ratify everything, which our Attorney or any substitute or substitutes or agent or agents appointed by him under this power on his behalf herein before contained shall do or purport to do in virtue of this Power of Attorney.

SEALED with the common seal of the said *[insert name of the company]* DENIKO CONSTRUCTION LTD and delivered in the presence of us this *[insert date]* 08th day of *[insert month]* DECEMBER *[insert year]* 2021.

IN WITNESS whereof we have signed this deed on this *[insert date]* 08th day of *[insert month]* DECEMBER *[insert year]* 2021 at *[insert region]* ARUSHA for and on behalf of *[insert name of the company]* DENIKO CONSTRUCTION ....LTD.................................

SEALED and **DELIVERED** by the Common Seal of *[insert name of the donor/coy]* DENIKO CONSTRUCTION LTD
This *[insert date, month and year]* 08th DECEMBER 2021

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA
....
DONOR

ISMAEL JOHN AYO
ADVOCATE
NOTARY PUBLIC
&
COMMISSIONER
FOR
OATHS
BOX 31, USA-RIVER, ARUSHA

BEFORE ME:

....
COMMISSIONER FOR OATHS

Acknowledgement

I [*insert name of donee*] CHRISTOPHER RICHARD doth hereby acknowledge and accept to be Attorney of the said [*insert name of the company/donor*] DENIKO CONSTRUCTION LTD under the terms and conditions contained in this POWER OF ATTORNEY and I promise to perform and discharge my duties as the lawfully appointed Attorney faithfully and honestly.

SIGNED AND DELIVERED by the said
[*insert name of donee*] CHRISTOPHER RICHARD Identified to me
by [*insert name*] CHRISTOPHER RICHARD
The latter known to me personally
This [*insert date, month and year*],
02th DECEMBER, 2021

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

....
DONEE

BEFORE ME

ISMAEL JOHN AYO
ADVOCATE
NOTARY PUBLIC
&
COMMISSIONER
FOR
OATHS
P.O. BOX 31, USA-RIVER, ARUSHA

....
COMMISSIONER FOR OATHS

ENVIRONMENTAL, HEALTH AND SAFETY POLICY;

CODE OF CONDUCT (ESHS)

ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY

MANAGEMENT PLANS

Plans will include procedures, (including roles and responsibilities), monitoring (including key performance indicators) and reporting requirements

DENIKO CONSTRUCTION LTD
P.O. BOX 14819
ARUSHA
TANZANIA

ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY MANAGEMENT PLANS

The **DENIKO CONSTRUCTION LTD** Environment, Social, Health and Safety (ESHS) Management System is a comprehensive system of policies, procedures, and industry standards that has been developed and implemented to manage ESHS hazards and risks related to the development of the Project. Therefore, the ESHS covers all activities related to the management of the operation phase of the project.

A. ENVIRONMENT POLICY

At the **DENIKO CONSTRUCTION LTD** we are committed to protecting the environment in which we operate and take pride in conducting our works in a safe and responsible manner. We recognize and accept our responsibility to develop our resources with awareness of the environmental, economic and social needs and expectations of stakeholders. Our commitment is embodied in the following statement of **DENIKO'S** environmental policy.

Environmental Management

We will:

- Integrate environmental integrity, social equity and economic viability into our construction works.
- Provide staff with the resources to make environmentally sound decisions and providing monthly environmental awareness training.
- Promote innovative thinking in the development and implementation of new ideas relating to the environmental integrity.
- Assess the potential environmental impacts of our activities and propose mitigation, where appropriate.
- Conduct our operations in a manner intended to prevent pollution, conserve resources and deal responsibly with all environmental issues.
- Minimizing air pollution and environmental destruction also nuisance to nearby dwellers during execution of our construction activities.
- Ensure preparedness with an effective emergency response program.

Communication

We will:

- Respond to the concerns and views of stakeholders in a timely and open fashion.
- Engage interested parties, when necessary, to discuss our works operations and their relationship to affected communities and the environment.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

B. COMMUNITY RELATIONS POLICY

The **DENIKO CONSTRUCTION LTD** is committed to conducting works at the highest social performance standards in a manner that respects the environment, culture and customs of the communities within the area of direct influence of the project.

The **DENIKO CONSTRUCTION LTD** builds a legacy of trust by carrying out their activities with environmental and social responsibility and by implementing development that are sustainable and that consider a balance between the economic viability of the project and the needs of the communities in the direct area of influence.

The **DENIKO CONSTRUCTION LTD** commitments are based on the following community relations principles:

- Conduct operations with high standards for personal integrity and ethical behavior.
- Respect the laws and regulations of the government with whom we work and the beliefs and values of communities.
- Respect the commitments in international labor and human rights conventions endorsed by Haiti.
- Promote equal opportunity for employment regardless of gender.
- Provide a means for open exchange of information that is clear and relevant among communities, leaders, affected parties and the DENIKO CONSTRUCTION LTD.
- Implement Corporate Social Responsibility programs that directly benefit the local communities; and
- Routinely review the effectiveness of our community relations programs.

C. HEALTH AND SAFETY POLICY

At the **DENIKO CONSTRUCTION LTD** we are committed to conducting works safely and continually improving our policies and practices for the future. Our aim is to create a workplace culture to integrate safety into all activities, every day. We strive to maintain our corporate goal of an accident-free workplace and will continue our pursuit of excellence in health and safety through the following practices.

Health and Safety Management

We will:

- Conduct our operations in a manner that protects the health and safety of our employees, the public and the surrounding communities.
- Require employees from all levels of the organization to participate in our Health and Safety Program and both individually and collectively take responsibility to work safely.
- Provide our employees with the required job-related training and safety-related education.
- Seek compliance with all applicable legal and regulatory requirements.
- Investigate incidents and accidents to determine root cause.

DENIKO CONSTRUCTION LTD
P.O. BOX 14819
ARUSHA
TANZANIA

• Employ regular audits to enhance successful accident prevention programs as well as to identify, if possible, areas for further improvement.

• Maintain safety statistics for both employees to track improvement.

• Monthly review the overall Health and Safety Program to ensure its on-going effectiveness.

- In a very important manner to give education to all workers and surrounded communities on how to protect themselves against **CORONA** also educate them on the importance of getting Vaccinated to prevent new infections and also we will ensure the presence of enough masks on our working sites and imposing by-laws on the negligence of employees.

Communication

We will:

• Ensure all employees, are aware of their right to refuse work that they determine to be unsafe.

• Inform employees of potential safety hazards on a continual basis.

• Encourage all employees to report immediately and, where appropriate, remediate any unsafe work conditions or activities.

• Openly communicate hazards and emergency response plans throughout the **DENIKO CONSTRUCTION LTD** employees' and to affected communities and other stakeholders.

• Conduct general safety meetings and job-specific safety meetings as required.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

DENIKO
CONSTRUCTION LTD
Civil Works & Building Contractors

Ref. No: DCL/0569/21

Date: 08th December, 2021

Conservation Commissioner,
Ngorongoro Conservation Area Authority,
P.O. Box 1
ARUSHA –TANZANIA

RE: TENDER NO. AE/055/2021-22/HQ/TCRP/W/02 FOR REHABILITATION OF THE OLDUVAI TO NASERA ROCK ROAD - 25KM

SUB: COMPANY'S POLICY ON OCCUPATIONAL HEALTH AND SAFETY STANDARDS

Reference is made to the above mentioned subject matter.

We hereby declare that we have never had any accident nor injuries to our staff or workmen in the course of executing our various projects.

We would also wish to confirm that we have a Company's Policy on Occupational Health and Safety Standards in place and do always adhere to the safety standards by ensuring that all our personnel wear protective gear like helmets, gloves and gum boots. Other measures include minimizing the number of migrant workers at all our Sites by employing local skilled and unskilled laborers [30% of whom should be women] from within the nearby villages/towns where our Sites are located, providing free male and female condoms to all our staff and laborers at Sites, nominating a nearby Government Hospital to treat our staff and laborers of opportunistic infections as well as their families, providing access to voluntary counseling and testing [VCT] including education on the prevention of the spread of HIV and AIDS.

Apart from the above stated measures, we do also have first aid kits at all of our Sites. Toilet facilities and safe drinking water are always provided at all our Sites.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

Christopher Richard
SITE ENGINEER

THE UNITED REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE
LABOUR, YOUTH, EMPLOYMENT AND PEOPLE WITH DISABILITY
OCCUPATIONAL SAFETY AND HEALTH AUTHORITY
THE OCCUPATIONAL HEALTH AND SAFETY ACT NO.5 OF 2003

OSHA

CERTIFICATE OF REGISTRATION OF A FACTORY/ WORKPLACE

NO. OF REG. CERTIFICATE: ARS/1049 NO: 1670/16/17

DATE OF ISSUE: 23-Jan-2017

I hereby certify that the workplace named below has been duly registered in pursuance of section 17(2) of The occupational Heath and Safety Act.5 of 2003.

Name of the Occupier / Owner: DENIKO CONSTRUCTION LTD.

Address of Factory/Workplace:: P.O. BOX 14819, ARUSHA

Location of Factory/ Workplace: PLOT NO.36/37, BUILDING NGULELO, ARUSHA CITY

Nature of Work: CIVIL WORKS

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

DR. A.V. KAYUMBA
CHIEF INSPECTOR

Note

1. This certificate is valid only in respect of the occupier and workplace name above.
2. This certificate is issued under, and solely for the purpose of, the Occupational Health and safety Act, and without prejudice to the requirements of any other legislation relating to the occupation of premised for industry purposes.
3. This certificate should be attached to the General Register.

WORK PROGRAM

DENIKO CONSTRUCTION LTD

REHABILITATION OF OLDUVAI MUSEUM TO NASERA ROCK ROAD-25KMS

TENDER NO: AE/055/2021-22/HQ/TCRP/W/02

CONSTRUCTION WORKING SCHEDULE

S/N.	DESCRIPTION OF WORKS	DURATION IN WEEKS OF MONTHS																							
		1				2				3				4				5				6			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	MOBILIZATION OF EQUIPMENT AND PLANTS																								
2	SITE ESTABLISHMENT/REMOVAL																								
3	GRAVELLING																								
4	FILL MATERIALS																								
5	EXCAVATION OF MITRE/CATCHWATER DRAINS																								
6	DEMOBILIZATION AND SITE HANDING OVER																								

DURATION IS 6 MONTHS ONLY.

DENIKO CONSTRUCTION LTD.
P.O. BOX 14819
ARUSHA
TANZANIA

DENIKO CONSTRUCTION LTD

RE: TENDER NO. AE/055/2021 - 22/HQ/TCRP/W/02 FOR REHABILITATION OF THE OLDUVAI TO NASERA ROCK ROAD - 25KM

SUB: <u>METHOD STATEMENT</u>

A. MOBILIZATION

This very first activity to be executed and it involves movement to the site of the following works items:

- Plants such as the motor grader, vibrating roller, and excavator will be transported to the site by the use of a low loader from our company yard located on plots No. 36/37 Ngulelo area in Arusha. Other equipments such as water pump will be transported to the site by the use of trucks, finally the remaining vehicles such as supervision vehicles, water bowser, and dump trucks will be transported to the site.

- Another activity under the mobilization will be the establishment of a temporary settlement. This includes temporary shelters, office, store and other necessary structures like toilets etc.

B.ALLOW ROAD/ TRAFFIC DIVERSION

This activity will be done as a diversion to accommodate traffics during construction of Pipe culverts & Drifts.

C.SAFETY

The issue of Safety during the Implementation of the Project will be handled as follows:-

(1.) Safety to workmen at the site

- Safety gear to all workmen will be provided i.e Crush helmets, gloves, heavy duty shoes, goggles for steel workers, reflective vests.
- Regular training to all workmen on safety procedures in case of accidents and injuries.
- Provision of first and kits at the site.

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(2.) SAFETY TO ROAD USERS

- There will be a diversion which that will divert road users away from the site and this will be properly maintained and sprinkled with water on a daily basis in order to mitigate dust pollution.
- Barriers and diversion signs will be installed in order to direct the road users.
- Flag men will be deployed in order to control traffic from both sides of the project area.

D. EXCAVATION FOR MITRE & CATCHWATER DRAINS

This process is done by the use of excavator after aligning the points to where the water is going to be collected throughout the road sides.

QUALITY CONTROL

In order to ensure good quality and effective working of mitre/catch water, the catch water/mitre drains should be excavated in such a depth that all collected is sufficient accommodated without overflow and the soil excavated is piled on one side of catch water to prevent water flowing in the road.

E. FILL MATERIALS

This process will be done by the use of selected fill materials to all gullies along road sides or road sections proposed by the Engineer.

F. GRAVELLING

This activity is carried out through excavator, dumping trucks motor grader, water bowsers and compacting roller. The excavator has to excavate the gravel materials, load to the trucks and then transport to the construction site. The Motor grader is therefore used to spread and mix the gravels with water. Finally the compacting roller compact the gravels to the required standard stated in the specification.

Quality control

In order to ensure good quality of the work, water should be mixed to optimum moisture content and gravel mixed thoroughly then maximum number of passes being done by compacting roller. Degree of compaction is determined by soil laboratory staffs.

G. DEMOBILIZATION

The process of demobilizing will begin once the works are completed and handed over. This will involve the transportation of all equipment back our head office, demolishing of all the temporary structures that were erected at the site and general cleaning and tiding up of the whole site.

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INTEGRITY FORM

IMPORTANT NOTICE

COMPANY'S ANTI BRIBERY POLICY

This is to inform you that the Governing Board of Directors meeting that was held on 08th December, 2021 gave a resolution on Anti Bribery Policy to be guided, adhered and complied by all owners, users/staff and shareholders of effective from the date indicated above as hereunder:-

1. All Directors, Staff, Sub - Contractors or Agents are strictly prohibited to exercise given or promise any bribe to any Government and Non-Government and officials for any purpose in the course of tendering, acquisition or execution of any Contract/Project.

2. Directors, Staff, Sub-Contractors or Agents shall not offer or facilitate, directly or indirectly, any improper inducement or reward to any Public Officer, Government Agents, Consultants, their relations or business Associates in connection with any Bid or its subsequent performance of any Contract once it is successful.

3. All Directors, Staff, Sub-Contractor or Agents shall comply with the Directives in clause [1] and [2] above.

   a) If any Director, Staff, Sub-Contractor or Agents in the course of their duty do not comply with the aforementioned clauses, the Company will take immediate stern measures against them including forfeiting all their shares/salaries/dues and open bribery case in a Court of Law.

   b) If any Staff, Sub-Contractor or Agents are found not to comply with aforementioned clauses, the Company will terminate their services ~~and open a bribery~~ case in a Court of Law.

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Christopher Richard
SITE ENGINEER