Government of the Republic of Malawi

AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT

Accelerating Malawi's Economic Growth

ROADS AUTHORITY

NACALA ROAD CORRIDOR DEVELOPMENT PROJECT PHASE V-

REHABILITATION OF NSIPE LIWONDE ROAD

TERMS OF REFERENCE

Technical Audit for the Rehabilitation of a 55 km road between Nsipe and Liwonde

September 2023

Contents

1. Background

The Government of Malawi is implementing the Multinational Nacala Road Corridor Development Project Phase V with funding from the African Development Bank (AfDB) and the European Union (EU). The project will involve Rehabilitation of a 55 km road between Nsipe and Liwonde and construction of a one-stop border post (OSBP) between Malawi and Mozambique at Chiponde. The project shall be implemented from July 2019 to December 2026.

The development objective of the project is to contribute to regional integration and trade facilitation for Malawi, northern Mozambique, and Zambia. The Nacala Road Corridor is the shortest route to the seaport for Malawi, northern Mozambique, and Zambia. The catchment area of the Nacala Road Corridor extends from Lusaka in Zambia, through Malawi, and northern Mozambique to Nacala Port. The beneficiaries include an estimated population of over two million people who use the Nacala Road Corridor for personal travel and economic activities. Other beneficiaries include import and export firms in Malawi, Zambia, and northern Mozambique; as well as tourists who use the corridor to reach desired sites in the three countries. In addition to the above, the Nacala Road Corridor will be an important alternative route to the seaport for Malawi and Zambia while the transport infrastructure along the Beira Corridor that was damaged during Cyclone Idai is being repaired.

2. Objective of the Assignment

2.1. Overall Objective(s) of the Assignment

The overall objective is to provide a factual report including findings, with regard to technical aspects and results achieved during the rehabilitation of the Nsipe- Liwonde road project (55 Km).

2.2. Specific Objective

The specific objective is to provide to the Roads Authority (RA), Government of Malawi (GoM) and AfDB recommendations to remedy errors that could have occurred, or which can lead to improvements in implementation and results of the project. The Auditor will assess whether the project (preparation & implementation phases) is being and or has been implemented in conformity with applicable regulations, conditions, and specifications.

The services are intended to mitigate the design shortfalls, material quality challenges, project management challenges and financial estimation challenges.

The Roads Authority therefore wishes to engage a qualified Technical Auditor Firm to perform Stage 1, stage 2, stage 3, and Stage 4 of the Botswana guideline No. 7 Technical Auditing of Road Projects.

3. Scope and Specific Tasks

The Technical Auditor shall be responsible for the proper conduct of the entire assignment, oversight of road design, project management, construction management and financial management.

3.1 The Technical Auditor will examine and assess the following aspects of the preparation phase.

3.1.1 Whether the tender documents for the works are of acceptable quality. Checks shall focus in particular on:

a) The quality of the design including drawings, feasibility study, detailed engineering designs and other technical documents available. The Consultant shall in particular assess the technical and financial adequacy of the proposed solution (s).

b) The accuracy of the bill(s) of quantities. The Consultant shall verify that the quantities reported in the Bill(s) are correct and in line with the works to be carried out. The experts will also check whether arithmetical errors have been made,

c) The quality of the tender document. In particular, the Consultants shall verify that the tender document is compliant with the rules and procedures in place and has been prepared in accordance with the sector best practices.

d) Whether design review was undertaken during the processing of the project to minimize cost over runs

3.2 The Consultant will examine and assess the following aspects of the implementation phase:

3.2.1 The Conformity and quality of the contractual documents (works and supervision contracts). Checks shall focus in particular on:

a) The consistency of the contractual documents,

b) The existence and compliance with the relevant procedures of contractual documents, such as: Administrative Orders, Addendums, Variation Orders, works programmes, etc.

c) Works or services have been executed in accordance with the contractual basis including Administrative Orders, Addendums, Variation Orders, etc.

d) The Consultant will assess whether the supervision consultant has put in place a mechanism for the collection of baseline data (disaggregated by gender) at the beginning, mid and project completion in relation to: -

(i). trade data between Malawi and Mozambique along the border.

(ii). costs and travel time for specific types of vehicles and trips.

(iii). transport fares and freight charges.

(iv). accessibility index.

(v). road accidents (fatalities per 10,000 vehicles).

(vi). jobs created in construction and maintenance with gender deferential in roles and responsibilities.

(vii). HIV/AIDS prevalence.

(viii). utilization of health facilities by expectant women.

(ix). girls' secondary school attendance.

(x). implementation of the ESMP; and

(xi). income /poverty indicators.

to enable the evaluation of achievement of Project Key Performance Indicators

3.2.2 Perform site visits, during which the experts will in particular examine:

a) The resources deployed on sites by the contractor and the supervising consultant (human resources, equipment, means of control, etc.). In particular, the experts will perform sample checks in order to verify that the equipment used by the contractor's is/was adequate and in relation to the approved programmes of work,

b) The physical progress of the works has to be compared with the contractual programmes of works, in order to uncover possible delays. In particular, the experts will pay attention to the daily/weekly/monthly construction progress records in order to identify potential problems resulting in slow progress.

c) The reality and the quality of the works in conformity with the contract's technical specifications.

d) The projects management documents such as: works register, including the list of equipment used daily, relevant measurement books, calculation fiches and as built drawings approved by the supervision team, minutes of site meetings, works planning, the topographical, geotechnical and every other intermediary tasks' acceptance reports, progress reports of the supervising consultant, any other contractual documents and administrative orders, site correspondence and all correspondences between the contractors, the supervising consultant and the administration,

e) The site management aspects such as: quality and efficiency of the topographical and geotechnical terms deliveries, laboratory testing and also adequacy and availability of equipment etc. In particular, the Consultant should inspect the laboratory equipment for calibration and check test procedures methodology for compliance with the project specifications.

f) Remaining works to be executed and financial forecast of the project,

g) Whether there are any pre-dispute situations which are likely to result in a claim from the contractor or a site shut shutdown (the Consultant is not, however, a substitute for the claim experts of the supervising consultants.

The checks and verifications to be performed by the Consultant will be carried using appropriate methods and techniques including but not limited to site surveys, measurements, photographs, and calculations to verify quantities on the basis of statements and documents produced by the contractors and supervising consultant.

3.2.3 The Consultant will examine and assess, through appropriate audit methods and techniques, the correctness of the statements, payment certificates (including requests for advance payments) issued by the works contractors, approved by the Supervising Consultant and the implementing agency. Checks shall focus in particular on:

a) The measurements were performed in accordance with the works contracts Special and General Conditions. In particular the Consultant will examine whether the works carried out and all materials used on site are measured jointly by the supervising consultant and the contractors using mutually agreed methods.
b) The consistency of the quantities approved by the supervising consultant in the interim payment certificates with the approved drawings and the quantities actually measured on site.
c) The works carried out under "day work" checked by the supervising consultant in daily record.
d) The quality & quantity of works in the various supervision's reports and the actual situation on site complies with the contract technical specifications.
e) The build-up of the new unit prices approved during implementation of the works, on the basis of a detailed price breakdown.
f) The application of financial penalties in accordance with contract special and general conditions

3.2.4 The Consultant will examine and asses whether the contractor has prepared a Construction Environmental and Social Management Plan (CESMP) linking environmental and social activities for the road works in line with ESMP developed during the studies and guidance issued by the RA in accordance with the financing agreement including: -

a) Timeliness and fairness of compensation payments to the Project Affected Households.

b) Presence and effectiveness of mitigation measures against the spread of HIV/AIDS and social tensions due to the influx of construction workers from other towns;

c) Existence and effectiveness of measures of controlling soil erosion from the hilly terrain.

d) Appropriateness of the location and rehabilitation of borrow pits and quarries and disposal of spoil material from the road works,

as some of the concerns raised by the community during the project appraisal.

3.2.5 The Consultant will also aassess the effectiveness and adequacy of the Environmental and Social Management and Monitoring mitigation measures which include: -

a) Establish whether cconstruction work at all rivers, streams and wetlands was preceded by production of methods statement.

b) Ascertain whether stockpiling of construction materials is/was in 200-300m of a watercourse or wetland.

c) Borrow sites and quarry sites are/were restored and rehabilitated after use.

d) Assess whether dust is suppressed by watering the diversions and haulage routes; and whether there's suppression of dust in the crushers by installing sprinkler system (and or sunk boreholes for easy access of water) and maintaining equipment to manufacturer's standards.

e) Establish whether bridges and culverts are constructed during the dry season and whether there's provision of protection measures for streams to limit sediment transport into watercourses.

f) Determine whether clearance of vegetation is limited to areas where it is absolutely necessary.

g) Assess whether there is/was re-vegetation of degraded areas upon completion.

h) Evaluate the effectiveness of implementation of a waste management plan.

i) Assess the effectiveness of the implementation of the RAP.

j) Establish whether sensitization campaigns on HIV/AIDs were undertaken along the project during construction.

3.2.6 The project has a component of capacity building/knowledge management: The Consultant will assess whether the supervising consultant has developed a comprehensive training program and whether the training program is in accordance with the project appraisal report.

3.2.7 The Consultant will examine and assess, through appropriate audit methods and techniques, whether works supervision is/was carried out in accordance with the terms of reference of the supervision contracts and following standard works supervision procedures. Checks shall focus on:

a) The consultant's management information system put in place provides an appropriate basis to inform all parties concerned in a transparent and concise way about the progress of work, the financial situation of the project and about possible difficulties encountered.

b) Any defects to the works are/were properly documented by the consultant (site record, administrative order, etc…) and appropriate measures are/were taken in order to remedy them.

c) The contractual delays (to reply to the contractor's queries or assess a claim, to perform joint measurement upon the contractor's request, to issue the interim payment certificates, etc…) are/were inspected.

d) The claims submitted by the contractor during the course of the works are/were evaluated by the supervising consultant in a timely manner and appropriate advice is given to the supervisor on their validity.

3.2.8 The Consultant will examine and assess implementation and adequacy of mitigation measures in relation to enhanced resilience and adaptation to impacts of climate change to the project including slope failure, landslides, and flood episodes on the most vulnerable sections.

3.2.9 Gender, the Consultant will examine and assess whether: -

a) the Contractors have prepared a gender management plan in accordance with the project appraisal report.

b) there is effective supervision and monitoring of gender.

c) In addition, the Consultant will ascertain the percentage of economically empowered women through allocation of jobs in the project area.

3.2.10 The project has a component of complementary initiatives aimed at boosting the economic status of the communities and improve their wellbeing. The Technical Auditor will examine and assess whether the complimentary initiatives were incorporated in the project designs including.

a) Roadside Markets where local communities will store and sell produce and merchandise, and whether there was community involvement in the design, identification of market locations, construction of the markets since operation and care shall be the responsibility of the local authorities. Also examine whether the facilities such as solid waste disposal pits, latrines, potable water supply, and that the facilities are secured off the road to improve road safety of sellers and buyers.

b) Design of provision of water supply to communities along the road with particular attention to public institutions such as schools, health facilities and marketplaces that may not be served by clean water system.

c) Schools and health facilities where the road traverses, are protected from noise, dust, emission, and in case of schools, disruption to classes. That there are mitigation measures to be implemented such as construction of screens for those schools and health facilities too close to the road. Assess whether there are deliberate initiatives of including school and clinic heads in site specific works management and monitoring of implementation of mitigation measures such as frequency of watering to prevent dust; road safety measures, water provision and simple maintenance to the structures especially windows, if broken.

d) Road Safety Measures and Awareness Campaigns

e) HIV/AIDS and TB Awareness Campaigns

f) Occupational Health and Safety (OHS)

3.2.11 The experts will examine and assess, through appropriate audit methods and techniques, the correctness of the invoice issued by the consultant responsible for supervision of the works by virtue of its/their own contract and approved by the supervisor and the contracting authority. Checks shall focus in particular on:

a) Verifying that the supervising consultant's services are/were actually performed.

b) The actual situation on site (consultant's organization, offices, laboratory, etc..) is compliant with the contract requirements and consultant's tender offer,

c) The application of financial penalties, if applicable, is/was in accordance with the contracts' special and general conditions.

The Consultant is expected to propose, after the assignment carried out during the project implementation, corrective measures that could affect positively the quality of the works and inform as soon as possible the contracting authority and or ADB of any anomalies detected.

For purposes of knowledge transfer, the Roads Authority will assign one Project Engineer to occasionally work with the Technical Auditor.

The Technical Audit shall be conducted at 4 Stages of the project: Stage 1, Stage 2, Stage 3, and Stage 4.

4. The Technical Audit Stages

4.1. Stage 1 – Project Familiarization

During this stage the Technical Auditor should clearly understand the scope and complexities of the project by reviewing all contract documentation including the designs reports, drawings, specifications, materials reports, and conditions of contract. The tender documents and price submitted by the Contractor, the tender evaluation report and the Contractor's proposed programme as well as their resources should also be carefully studied.

This will probably require consultation between the Technical Auditor and the Client. This Stage should be carried out immediately after the Technical Auditor has been appointed and within two weeks of award of the construction contract. The Technical Auditor must visit the project site during this phase to acquaint themselves with the ground conditions.

Please refer to Botswana guideline No. 7 Technical Auditing of Road Projects Part A and D, for details.

4.2. Stage 2 – Initial Technical Audit

This Stage should be carried out as soon as the Contractor is properly established but preferably within the first three months or 20 per cent of the contract period, whichever is earlier. This Stage should be carried out after construction has commenced so that all the correct procedures can be established from the beginning of the project.

The specific tasks of the Technical Auditor under Stage 2 will include, but not limited to: -

- Review of the supervising consultant's proactivity in project control and approval procedures.
- Review of the adequacy of the materials laboratory.
- Review of project staff Qualifications i.e Consultant's staff and contractor's staff.

The Technical Auditor shall also verify that the assessment of the Contractor has been done satisfactorily by the Engineer.

At this Stage 2, all team members must visit together the project site.

Please refer to Botswana guideline No. 7 Technical Auditing of Road Projects Part B and D, for details.

4.3. Stage 3 - Intermediate Technical Audit

The Technical Auditor should carry out an Intermediate Technical Audit that concentrates on conformance with the specification and matters of effectiveness and ensures that the procedures set up initially are running correctly. This Audit will be carried out at a time approximately halfway through the project but not more than six months after completion of an Initial Technical Audit.

On large projects it may be necessary to carry out more than one Intermediate Audit and the timing and frequency of these should be specified in the Terms of

Reference for appointment of the Technical Auditor.

- The specific tasks of the Technical Auditor under stage 2 will include, but not limited to: -
- Review the Initial Audit and the subsequent actions by the Resident Engineer and contractor resulting from the Initial Audit.
- Review adherence to contract Specifications
- Review progress of works against the program of works.
- Check the current estimate against the tendered price using both the
- Engineers and the Contractors management systems

Please refer to Botswana guideline No. 7 Technical Auditing of Road Projects Part C and D, for details.

4.4. Stage 4 – Final Technical Audit:

This should commence at least four weeks before issuance of the substantial completion certificate and should be completed before the site staff is completely demobilized from site. The Employer may instruct an earlier starting time for the Final Technical Audit provided there would be no disruptions to the project.

The purpose of the Final Technical Audit is to determine conformance with all aspects of the Contract summarizing any further testing considered necessary and indicating any contractual obligations that have not been fulfilled by either the Engineer or the Contractor or any other outstanding matters.

Please refer to Botswana guideline No. 7 Technical Auditing of Road Projects Part C and D, for details.

5. Qualifications of the Technical Auditor

The Technical Audit firm should be a consultancy firm registered with the National Construction Industry Council or similar body. The firm should have undertaken at least two technical audit assignments of development projects and have at least five years general experience in Engineering work.

The Technical Audit firm shall provide qualified key personnel for the assignment, and shall prepare a work program, and a corresponding manning schedule, showing the timing of activities and the corresponding staff input required for execution of the services.

The firm should have key personnel with the following qualifications.

(i) Highway Engineer/Team Leader

a. A Team Leader with a minimum of a Bachelor's Degree in Civil Engineering or equivalent qualification. The person must have at least (15) years post qualification experience in road design and construction works and be a Registered Engineer

b. Minimum 5 years' experience in Technical Audit of road projects. The person must have served in a similar capacity on at least two (2) Technical Audit assignments in the past 10 years. Working experience in Sub-Sahara Africa will be an advantage. Fluency in written and spoken English is mandatory.

c. A Postgraduate qualification in Highway Engineering or equivalent will be an added advantage.

(ii) Civil Engineer

a. The Civil Engineer with a minimum of a Bachelor's Degree in Civil Engineering or equivalent qualification. The person must have at least (10) years post qualification experience in road design and construction works.

b. Minimum 5 years' experience in Technical Audit of road projects. The person must have served in a similar capacity on at least two (2) Technical Audit assignments in the past 10 years. Working experience in Sub-Sahara Africa will be an advantage. Fluency in written and spoken English is mandatory.

c. A Postgraduate qualification in Highway Engineering or equivalent will be an added advantage.

(iii) Materials/Pavement Engineer

a. The Materials/ Pavement Engineer should be a registered/chartered engineer with a minimum of a bachelor's degree in civil engineering and at least 12 years' experience in pavement design, materials testing and investigations.

b. At least 10 years of combined international post-qualification experience in road pavement design, construction compliance and performance testing/assessment techniques is mandatory.

c. Must have proven experience and extensive working knowledge of latest analytical asphaltic pavement design procedures and laboratory testing. Conversant with Superpave asphalt concrete and Marshalls mix design procedures. Practical experience and competence with use of Falling Weight Deflectometer, Benkelman Beam and Bump Integrator equipment, including equipment calibration, evaluation, and interpretation of results.

(iv) Environmental Expert

a) The Environmental Expert should have a minimum of a Bachelor's Degree in Environmental Science or equivalent qualification. The person must have at least (5) years post qualification experience in environmental services.

b) The person must have served in a similar capacity on at least two (2) assignments in the past 10 years. Working experience in Sub-Sahara Africa will be an advantage. Fluency in written and spoken English is mandatory.

c) A Postgraduate qualification in Environmental Sciences or equivalent will be an added advantage.

(v) Social Expert

a. The Environmental Expert should have a minimum of a Bachelor's Degree in Social Science or equivalent qualification. The person must have at least (5) years post qualification experience in environmental services.

b. The person must have served in a similar capacity on at least two (2) assignments in the past 10 years. Working experience in Sub-Sahara Africa will be an advantage. Fluency in written and spoken English is mandatory.

c. A Postgraduate qualification in Environmental Sciences or equivalent will be an added advantage.

6. Time frame for the proposed Assignment

The assignment is expected to take a period of two (2) Months spread over a period of three (3) years. On the basis of this proposed time schedule, the consultant will prepare a work plan and include it in his offer. The work plan should set out the consultant's approach to the main activities to be carried out during the assessments, design, and preparation of tender documents.

Item No.	Activity	Frequency
1	Site visits and compilation of reports during Stage 1	2
2	Site visits and compilation of reports during Stage 2, 3 and 4	6
Total		8

The Consultant shall provide the following minimum key professional personnel to fulfil the objectives of the services and for which he will receive remuneration as specified in the contract document.

Item	Description	Man-Months
1	Team Leader	2
2	Civil Engineer	2
3	Environmental Expert	2
4	Social Expert	2

7. Evaluation Criteria

The Technical Audit firm will be selected based on the firm's experience and their personnel qualifications and experience for the assignment. The firm will be selected through comparison of qualifications among those who will express interest in the assignment and meeting the minimum qualifications prescribed under item 5 above.

8. Obligation of the Employer

The obligations are detailed in the Contract.

9. Obligation of the Consultant

The obligations are detailed in the Contract.

10. Budget

Remuneration will be negotiated and contained in the contract.

11. Assistance by the Employer

The Employer will provide an office on site with all the necessary furniture and equipment through the works contract.

The Employer will also provide a project vehicle through the works contract for use by the Technical Auditor.

12. Reporting

12.1. Inception Report

The Technical Auditor should submit an acceptable report bringing out clearly deficiencies in design, tendering and other documentation.

The Technical Auditor should show clear understanding of the scope and complexity of the project by reviewing all contract documentation including drawings, specifications, materials reports, conditions of contract and the tender documents and price submitted by the Contractor. The Technical Auditor should also show understanding of the tender evaluation report, Contractors proposed programme as well as the contractor's resources.

12.2. Initial Technical Audit Report

The Initial Technical Audit Report should include details of any critical issues that the Auditor considers could have a possible influence on the successful completion of the project. The suggested actions of the Employer must be clearly highlighted and prioritized, with summaries of the possible implications of the issue not being rectified.

The report shall be submitted within the first three months or at 20% of the contract period, whichever is earlier.

12.3. Intermediate Technical Audit Report

In this report, emphasis should be placed on the material and construction techniques and whether all the issues identified in the Initial Technical audit report have been addressed. Emphasis should also be on the adherence of the project to social and environmental issues.

The report shall be submitted every six months after commencement date of the assignment.

12.4. Final Technical Audit Report

This report should summarize the total project and make recommendations for any further testing considered necessary and indicating any contractual obligations that have not been fulfilled by either the Engineer or the Contractor or any other outstanding matters. Emphasis should also be on the adherence of the project to social and environmental issues.

Failure to submit the above reports whether at intermediate stages or overall, on specified time periods may result to imposition of liquidated damages equal to 1/1000th (one thousandth) of the value of the report concerned payable per day of delay up to 15% (fifteen percent) of the said value.

13. Reporting Requirements and Time Schedule for Deliverables

The assignment is expected to take a period of two (2) Months spread over a period of three (3) years. On the basis of this proposed time schedule, the consultant will prepare a work plan and include it in his offer. The work plan should set out the consultant's approach to the main activities to be carried out during the assessments, design, and preparation of tender documents.

14. Client's Input and Counterpart Personnel

(a). The Consultant shall be responsible for the proper and efficient performance of his staff, their office and residential accommodation; office supplies, furnishings and equipment as may be required for the efficient execution of his assignments; Drafting, typing, and editing of all documents; Printing and delivery to RA of study reports and documents.

(b). Professional and support counterpart personnel to be assigned by the Client to the Consultant's team will be nominated upon commencement of the assignment.

(c). The Client will provide the consultant with the following: -

- All relevant reports, drafts, notes, and comments relating to the project roads.

- Liaison and assistance for any information or documents required from other government agencies and which the consultant considers essential for the execution of this assignment.

15. Deliverables

No.	Report/Document Title	Time Frame	No. of Copies
1	Inception Report	2 weeks from commencement	5 hard and 02 soft copies
2	Initial Technical Report	4 weeks from commencement	5 hard and 02 soft copies
3	Intermediate Technical Report	6 weeks from commencement	5 hard and 02 soft copies
4	Final Technical Audit Report	16 Weeks from commencement	5 hard and 02 soft copies

The reports shall be submitted to the following address.

The Chief Executive Officer,
Roads Authority,
Private Bag B346,
Lilongwe 3

16. Proposed Payment Terms

No.	Percentage	Deliverables
	20%	Upon submission of the Inception Report
	20%	Upon submission of the Initial Technical Report
	30%	Upon submission of the Intermediate Technical Report
	30%	Upon submission of the Final Technical Audit Report