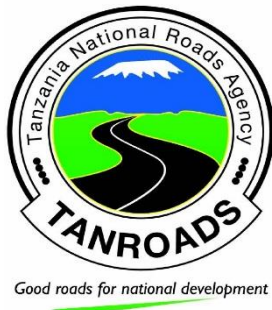


THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WORKS



TANZANIA TRANSPORT INTEGRATION PROJECT (TanTIP)

TERMS OF REFERENCE

FOR

**ENGAGEMENT OF INDIVIDUAL CONSULTANT FOR MONITORING OF
NOISE MANAGEMENT FOR CONSTRUCTION OF IRINGA, TANGA AND
LAKE MANYARA AIRPORTS UNDER TANZANIA TRANSPORT
INTEGRATION PROJECT (TanTIP)**

AUGUST 2026

1.0 INTRODUCTION

The Tanzania National Roads Agency (TANROADS) is an Executive Agency under the Ministry of Works (MoW), established by Section 3(1) of the Executive Agencies Act (Cap. 245), and became operational in July 2000. The Agency is mandated to manage the development and maintenance of Tanzania Mainland's classified trunk and regional road network, as well as selected regional airports.

In addition to its road infrastructure mandate, TANROADS is also given tasks to implement the airports infrastructure component under the Tanzania Transport Integration Project (TanTIP), financed by the International Development Association (IDA).

The Government of the United Republic of Tanzania through TANROADS has secured financing from the (IDA) - under Credit No. 7117-TZ to implement the Tanzania Transport Integration Project (TanTIP).

One of the core components of this project is the upgrading and rehabilitation of three regional airports; Lake Manyara, Tanga, and Iringa. These airports have been identified based on technical feasibility, climate vulnerability, and their strategic roles in enhancing regional connectivity, tourism access, and economic development. The planned works include improvements to runways, taxiways, aprons, terminal buildings, navigational aids, and associated support infrastructure.

The objective of this component is to enhance the operational capacity, safety, and climate resilience of the airports to meet growing air traffic demand over a 20-year design life. As part of the project, the infrastructure works will include airside and landside improvements, terminal upgrades, air navigation systems, and related facilities, all aligned with national and international standards.

In compliance with national environmental regulations and the World Bank Environmental and Social Framework (ESF) as well as the Environmental and Social Commitment Plan (ESCP) agreed with the World Bank, TANROADS is required to ensure that potential environmental impacts particularly those related to noise abatement are properly assessed, monitored, and managed which is a key concern in airport development and operations. To fulfil this requirement, TANROADS intends to engage Individual Consultant to carry out comprehensive baseline studies for Noise quality and noise (including modelling), both prior to and during the construction phase of the airport projects.

The assignment will involve monitoring of construction noise as well as undertake baseline noise conditions at sensitive receptors from different noise sources including taking off and landing air crafts during project undertaking. The Noise baseline data collection will be part of the Noise Management Plan (NMP) during the operation of the airport, therefore the measurements will be taken prior to the operation of the project ensure that representative baseline data is available and environmental performance is continuously monitored, and mitigation measures are guided by data-driven analysis. The output of this assignment will provide a scientifically robust environmental baseline support, compliance with Tanzanian and World Bank standards, and guide effective mitigation and monitoring throughout project implementation.

These Terms of Reference provide the framework for the assignment, outlining the objectives, scope, methodology, expected deliverables, and institutional arrangements to guide the execution of this important environmental task.

2.0 Project Description

The Government of the United Republic of Tanzania, through the Tanzania National Roads Agency (TANROADS), is implementing the Tanzania Transport Integration Project (TanTIP) with financial support from the International Development Association (IDA). One of the core components of TanTIP is the upgrading and rehabilitation of priority regional airports to enhance climate resilience, operational capacity, and compliance with international safety and environmental standards.

Under this component, three airports namely, Lake Manyara, Iringa, and Tanga have been selected for rehabilitation based on technical feasibility studies, projected air traffic demand, climate risk exposure, and their strategic importance to tourism, regional trade, and connectivity. These airport upgrades are part of a broader initiative to ensure that Tanzania's transport infrastructure meets both current and future needs while integrating sustainability and resilience principles.

The proposed works at each airport involve a combination of airside and landside infrastructure upgrades, including extension and strengthening of runways and taxiways, expansion of aprons, improvement of terminal buildings, drainage enhancements, installation of air navigation and safety systems, and implementation of energy efficiency measures.

Prior to the commencement of construction, detailed environmental baseline assessments specifically focused noise baseline data collection and assessment are required to establish reference conditions, support environmental compliance monitoring, and inform the design and implementation of mitigation measures during operation phase.

i. Lake Manyara Airport

Lake Manyara Airport is located in the Arusha Region in northern Tanzania, serving as a critical gateway for tourism to the Lake Manyara National Park and the greater northern safari circuit. The airport primarily supports charter flights, tourism operators, and small commercial services.

The proposed upgrading works include resurfacing and strengthening of the existing runway, upgrading the apron and taxiway surfaces, and expanding the terminal facilities. Given its proximity to sensitive ecological zones and protected areas, special attention will be paid to minimizing construction-related emissions, noise disturbances, and long-term operational impacts on surrounding wildlife and communities.

The airport is particularly vulnerable to climate-related risks, including seasonal flooding and drainage failures. Therefore, climate-resilient design elements, such as improved surface water management systems and robust pavement structures, will be integrated into the upgrade.

ii. Iringa Airport

Iringa Airport is situated in the Southern Highlands of Tanzania, serving the regional capital of Iringa and surrounding districts. It plays a strategic role in supporting regional development, facilitating medical and educational access, and connecting agricultural and industrial sectors to larger markets.

The proposed project will involve the rehabilitation and extension of the runway, expansion of the apron, construction of a new terminal building, and upgrading of ancillary airport systems. Iringa experiences relatively low baseline air pollution and noise levels; therefore, the introduction of construction equipment and increased aircraft traffic may result in notable environmental changes that require careful baseline documentation and monitoring.

Due to its elevation and inland climatic conditions, Iringa Airport also requires consideration of dust dispersion, wind-driven pollutant transport, and noise propagation in semi-rural settings.

iii. Tanga Airport

Tanga Airport is located along the northeastern coast of Tanzania and serves as an important regional hub for the Tanga Region. It provides both passenger and cargo services and is expected to grow in importance due to the expanding economic and industrial activity in the Tanga corridor, including port development and cross-border trade.

The scope of works at Tanga Airport includes major rehabilitation of the runway, apron, and taxiways, installation of new navigational aids, and modernization of terminal and support facilities. As an airport located near the urban fringe, there is potential for increased air and noise emissions to affect adjacent residential areas and public institutions. Baseline studies will therefore focus on capturing the current environmental conditions in these zones and modelling potential changes due to project activities.

In addition, the coastal climatic environment characterized by high humidity, sea breezes, and temperature fluctuations may influence air pollutant dispersion patterns and acoustic transmission, requiring site-specific analysis during the baseline and modelling phases.

3.0 Objective of the Assignment

The primary objective of this assignment is to undertake a scientifically robust Noise Baseline Study to identify the noise receptors around the airport for incorporating advanced monitoring and predictive modelling techniques for project during construction and operation phases. The study will establish accurate noise baseline data, model the potential dispersion and propagation of noise prior to operation of the project, and provide technical guidance for the operation and compliance monitoring.

Specifically, the assignment seeks to achieve the following objectives:

- I. **Establish comprehensive baseline conditions** of acoustic environment at and around the three airport project sites through systematic field monitoring, using internationally recognized methodologies such as those outlined by the World Health Organization (WHO), World Bank Group (WBG), and the Tanzanian Environmental Management (Air Quality and Noise Standards) Regulations.

- II. **Conduct detailed noise monitoring and modelling** to determine existing sound pressure levels (in dB(A)) and to simulate potential future noise exposure contours during air craft taking off and landing and other airport operations. Modelling will be calibrated using baseline monitoring data and will use tools such as Integrated Noise Model (INM) or equivalent, based on projected aircraft movements, flight paths, and operational characteristics.
- III. **Identify sensitive noise receptors** (residential areas, schools, hospitals, wildlife habitats, and cultural sites) within predicted impact zones and assess potential exposure risks related to air and noise pollution. The ESIAs of the airports have already identified some of those receptors. Those receptors will be considered by this task which could add to them as needed according to the baseline conditions.
- IV. **Provide scientifically based mitigation and management recommendations**, including engineering controls, operational adjustments, and environmental buffer zones, to minimize noise impacts during project operation. Those measures will build on those identified in the ESIAs and may add/adjust them based on the monitoring/modelling exercise.
- V. **Design a monitoring framework** with technically sound indicators, measurement frequency, and sampling locations to enable continuous tracking of noise quality during operation, ensuring compliance with both national environmental regulations and World Bank Environmental and Social Framework (ESF) requirements, particularly ESS1 (Assessment and Management of Environmental and Social Risks and Impacts) and ESS3 (Resource Efficiency and Pollution Prevention and Management).
- VI. **Produce Reports** to produce inception, baseline and final reports incorporating the findings on each stage of the project execution.

4.0 Scope of Work

The scope of this assignment is to carry out scientifically rigorous environmental baseline assessments and modelling for noise abatement at three regional airports: (Lake Manyara, Iringa, and Tanga). The studies shall provide essential baseline data, enable predictive modelling of future scenarios, and establish a foundation for informed environmental decision-making, mitigation design, and regulatory compliance during project implementation. The assignment shall be undertaken in accordance with the Environmental Management Act (Cap. 191), the Environmental Impact Assessment and Audit (amendment) Regulations (2018), Tanzanian ambient air and noise standards, and the World Bank's Environmental and Social Framework (ESF), particularly ESS1 and ESS3.

The individual Consultant shall carry out the following tasks:

Task 1: Inception and Methodological Framework

- Review available project documentation, including feasibility studies, engineering designs, ESIAs, and World Bank ESF instruments (e.g., ESMF, ESCP, ESIAs, RAPs) and the Noise Management Plan for airports that was prepared for the project.
- Identify regulatory thresholds and performance standards, referencing national guidelines and international benchmarks (e.g., WHO air quality guidelines, World Bank Group General EHS Guidelines, and World Bank Group EHS Guidelines for Airports).
- Prepare a detailed Inception Report outlining the monitoring methodology, modelling approach, data quality assurance/quality control (QA/QC) protocols, equipment to be used

(including model specifications and calibration certificates), and geospatial coverage for each site.

- Define site-specific monitoring and modelling objectives based on the engineering scope, anticipated construction timelines, and receptor sensitivities.

Task 2: Ambient Noise Monitoring

- Conduct continuous sound level monitoring at key receptor points (e.g., schools, hospitals, residential areas, and park boundaries) using Type 1 Sound Level Meters (SLM) compliant with IEC 61672 standards. Minimum monitoring points will be the sensitive receptors identified in the ESIs.
- Measure parameters including equivalent continuous sound level (LAeq), maximum sound level (Lmax), percentile noise levels (L10, L90), and peak levels over a 24-hour period.
- Monitoring shall be conducted under representative operational conditions (weekday/weekend, day/night) and consider background noise sources.
- The monitoring shall be both continuous monitoring for full 24-hours during different representative days, and specific noise measurements of the noise impacts during the taking off and landing aircraft at each of the sensitive receptors. This should record the type of each taking off/landing aircraft and its specifications related to noise emissions.
- All instruments must be pre-calibrated and field-calibrated before and after each measurement campaign.

Task 3: Noise Propagation Modelling and Scenario Analysis

- Use a predictive noise modelling software such as INM, AEDT, or CadnaA to simulate future noise contours associated with forecasted aircraft movements, construction activities, and support equipment.
- Input data shall include aircraft type and engine configurations, flight tracks, number of operations (hourly and daily), altitude profiles, and terrain elevation data (DTM or DSM).
- Assess operational noise impacts under different aircraft movement projections and during various construction phases.
- The modelling will build on the modelling exercise carried out as part of the ESIA, and will be calibrated by the results of noise monitoring in Task 2.
- Output deliverables shall include:
 - Day and night-time noise contours (dB(A)) as per WBG and Tanzanian thresholds
 - Identification of exposed receptors exceeding the 55 dB(A) residential limit or project-specific trigger levels.
 - Estimation of affected population (population noise exposure analysis using GIS overlays).

Task 6: Receptor Sensitivity and Risk Characterization

- Conduct a vulnerability assessment of potentially affected receptors, including population exposure, land use compatibility, ecological features, and institutional sensitivity (e.g., schools, health facilities, protected areas).
- Estimate cumulative exposure using dose–response relationships where applicable (e.g., for noise-induced annoyance).
- Provide a risk matrix linking predicted environmental concentrations to exposure thresholds and health or nuisance outcomes.

Task 7: Mitigation and Environmental Management Recommendations

- Propose location-specific and source-specific mitigation measures informed by baseline data and model outputs building on the NMP of the ESIAs. This may include among others:
 - Management of aircraft approach to airports
 - Management of aircraft maintenance operations
 - Scheduling restrictions (e.g., night-time construction bans)
 - Land use planning inputs to guide spatial separation between airport operations and sensitive receptors.

Task 8: Monitoring Plan and Compliance Protocol

- Design a noise monitoring plan for the operation phase, including:
 - Monitoring locations and frequency
 - Sampling durations
 - Equipment and calibration requirements
 - Reporting formats and thresholds
- Develop action thresholds (e.g., exceedance response protocols) and institutional roles for monitoring enforcement
- Propose capacity-building needs for TANROADS or TAA to undertake or supervise future environmental monitoring.

Task 9: Reporting and Deliverables

The Consultant shall submit the following deliverables:

- i. Inception Report (including methodology, sampling plan, QA/QC protocols)***
- ii. Draft Baseline Environmental Report (one report for the 3 airports)***
- iii. Quarterly Environmental Monitoring Reports***
- iv. Final Noise Management Plan Study Reports in hard copy and soft copy with:***
 - Field monitoring data (tabulated and georeferenced) includes;
 - Model setup, assumptions, and validation results
 - Modelling outputs (maps, contours, exceedance zones)
 - Risk assessment and mitigation plan
 - Monitoring framework

All reports must be prepared and submitted in soft as well as hard copies and presentation of all data in English language. Detailed information for this task is presented in section 5.0 below.

5.0 Reporting

The Noise Consultant shall be responsible for delivering scientifically sound and verifiable reports that document the results of baseline monitoring, modelling outputs, exposure assessments, and environmental performance during the pre-operation phase of the airport projects. The reporting process shall ensure that all findings are communicated in a timely, clear, and structured manner to support environmental compliance, risk management, and informed decision-making by TANROADS, TAA, relevant regulatory authorities, and the World Bank.

The assignment shall span a period of **Twelve (12) months**, across the three project sites: **Lake Manyara, Iringa, and Tanga Airports**. During this period, the Consultant will be required to visit all the projects for data collection, preparation and submit inception report; baseline report, quarter reports and final report providing updates on environmental conditions, trends, and any observed deviations from expected baselines. A comprehensive final report shall be submitted at the end of the assignment.

The reporting framework shall include the following:

5.1 Inception Report (3-hard copies for each sub-project).

To be submitted within the first 14 calendar days after contract signing. The report shall present the finalized methodology, sampling plan, QA/QC procedures, equipment specifications, geospatial coverage, team structure, and a detailed implementation schedule (for details refer Task No. 1 above – scope of works). This report will be subject to review and approval by TANROADS.

5.2 Noise Baseline Data report around the airports (3-hard copies) for each sub-project).

The baseline Noise report shall be submitted 45 Calendar days after signing of the contract. This report shall present the results of the first round of noise monitoring and modelling for each of the three airport sites. It will serve as the environmental reference point for all subsequent assessments and mitigation planning. The report should consider noise modelling that was conducted earlier, and review of available data for comparison with the new findings for a better reporting.

5.3 Quarterly Noise Monitoring Reports (3-hard copies for each sub project).

The Consultant shall prepare and submit for each sub-project progress reports every three (3) months for the entire 12-month duration. a total of four (4) reports. These reports shall present:

- i. Ongoing monitoring results of noise;
- ii. Updated modelling outputs where significant changes occur;
- iii. Any observed exceedances of environmental thresholds;
- iv. Recommendations for corrective measures or operational improvements;
- v. Photographic evidence and site observations; and
- vi. Summary of stakeholder feedback or complaints. if any

Each report shall be submitted within 7 days after the end of the reporting period and shall be site-specific, allowing for comparative analysis across the three airports.

5.4 Final Noise Monitoring Report (3-hard copies) for each project)

At the end of the 12-month period, the Consultant shall prepare a consolidated final report covering the entire duration of the assignment. This report shall synthesize:

- i. Temporal trends in noise conditions across all sites;
- ii. Evaluation of the accuracy and reliability of model predictions;
- iii. Assessment of environmental risks and effectiveness of mitigation measures;
- iv. Recommendations for pre-operation environmental monitoring and management; and
- v. Lessons learned and guidance for future airport environmental assessments.

The final report shall be submitted during pre-operation phase. It must be comprehensive, validated, and professional that cover each of the airport project. The report shall be submitted to TANROADS for review and approval.

5.5 Data and Technical Annexes

All reports shall be accompanied by technical annexes containing:

- i. Raw and processed monitoring data; (in Excel or CSV format)
- ii. GIS shapefiles of sampling locations and modelled contours;
- iii. Modelling input files and summary output tables;
- iv. Calibration certificates and QA/QC documentation; and
- v. Stakeholder engagement records where applicable.

5.6 Submission Format

Each report shall be submitted in both hard copy and soft copy (editable and PDF formats) for references and records. All digital data must be submitted in standard, non-proprietary formats. TANROADS may require presentations to relevant stakeholders upon completion of key reports.

6.0 Consultant Qualifications and Experience Required

2: Noise Management Expert and Team Leader.

Education:

- He/She must have a university degree in Environmental Science, bachelor degree on Acoustic, Mechanical engineering, Physics, Environmental Engineering, or a related field.
- Having a Master's degree in related field will be mandatory requirement.

Working Experience:

- i. He/She must have cumulative of eight (8) years of professional experience in leading multi-site environmental assessments, using spatial data and digital mapping for Noise assessment, monitoring and modelling in transport sector.
- ii. He/She must have undertaking 3 similar projects for pollutant dispersion modelling, noise monitoring and meteorological data interpretation in transport projects within past 5 years. Demonstrate in using software such as INM, AEDT, or Cadna A is required, along with knowledge of ISO noise measurement standards; and knowledge in GIS science; spatial data and digital mapping.
- iii. He/She must have a demonstrated experience of using ArcGIS, QGIS, or equivalent tools. The specialist will process spatial data, generate impact maps, manage coordinate systems, and support spatial exposure analysis of receptors. The analyst will support both air and noise modelling teams in spatial data.
- iv. She/he must have at least 3 years working experience in sub-Saharan Africa.
- v. She/he must be fluently in speaking English and Swahili language.

c. Equipment and Working Materials, the Consultant shall express competence in appropriate equipment and working materials that are capable to accomplish the exercise timely. For the details of the required specifications refer **Appendix 1C**.

8.0 Work Plan and Deliverables Table

The Consultant shall develop and follow a detailed work plan that aligns with the project implementation schedule and ensures timely delivery of all required outputs. The plan must allow sufficient time for stakeholder consultations, internal quality control, data analysis, and incorporation of feedback from TANROADS, TAA, TCAA, and the World Bank.

The proposed work plan should be reviewed and validated during the inception phase and updated as necessary to reflect evolving project conditions. The work plan shall also provide flexibility for additional site visits or repeat monitoring, should data quality issues or threshold exceedances be detected.

The table below outlines the key deliverables and their corresponding timelines throughout the 12-month assignment:

Deliverable	Description	Timeline	Responsible Team Member(s)
Inception Report (All 3 Airports)	Final methodology, QA/QC plan, monitoring schedule, team deployment, and site layout.	Within 14 days of contract signing	Consultant
Initial Baseline Study Report (All 3 Airports)	First full assessment of ambient air and noise, including initial modelling outputs.	Within 45 days After signing Contract	Consultant
Quarterly Environmental Monitoring Reports (3 total) (All 3 Airports)	Continuous monitoring and assessment updates every 3 months; analysis of trends, mitigation status.	Every 3 months	Consultant
Updated Modelling Reports (as needed)	Revisions based on construction progress or major design changes.	If triggered by conditions	Consultant
Final Environmental Monitoring Report	Consolidated analysis and summary of trends, impacts, effectiveness of mitigation measures.	At month 12	Consultant
Raw Data Submissions	Full datasets for each monitoring round, in editable formats (Excel/CSV), with	Alongside baseline report	Consultant

Deliverable	Description	Timeline	Responsible Team Member(s)
GIS Layers and Maps	calibration logs Shapefiles and maps of monitoring points, impact zones, receptor buffers, noise contours.	Included in each main and report baseline report	Consultant
Presentation to Stakeholders	Technical presentation of key findings, submitted reports, and recommendations	After submission of baseline data	Consultant

All reports and deliverables shall be submitted in English, in both hardcopy and electronic formats. All the reports must incorporate feedback received from TANROADS, TAA, TCAA, and the World Bank during review periods.

The Consultant shall maintain an internal tracking system for deadlines, quality assurance milestones, and stakeholder inputs, and shall report any potential delays to TANROADS immediately with proposed mitigation measures.

9.0 PAYMENTS UNDER THE CONTRACT

Payment to the Consultant shall be made upon submission of acceptable deliverables including execution of planned field works and submission of acceptable reports, as follows:

- 15% of the Accepted Contract Amount upon submission of acceptable Inception report.
- 20% of the Accepted Contract Amount upon submission of the Noise Baseline report.
- 50% of the Accepted Contract Amount upon submission of four (4) payments with each acceptable quarterly monitoring report and support evidence for execution of progress field activity calculated at 12% of the Contract amount; and
- 15% of the Accepted Contract Amount upon submission of acceptable Final Report.

Payments will be made on condition that the Consultant has executed field activities planned for the respective stage, as per approved work program, and submission of an acceptable stage monitoring report documenting field activities executed during the stage. Documentation of the field activities shall include information such as georeferenced photographs of major events, minutes of meetings, attendance list signed by consulted, etc. (refer section 5.0 above).

10.0 OBLIGATIONS OF THE CLIENT

10.1 The Client shall provide the Consultant with introductory letter to the site and stakeholders on site, copies of the previous and existing project studies, available project data and performance reports available and considered relevant to the execution of the Consultant's services.

10.2 The Client shall facilitate liaison with other institutions in order to facilitate smooth undertaking of the Consultancy services. The Consultant shall be fully responsible for project data collection and

information gathering including that from relevant stakeholders around the airports and other agencies, undertaking the assignment in close follow up with TanTIP E&S staff. Organizing and facilitating meetings between the consultant and relevant stakeholders including TAA, TCAA, TMA.

11.0 Institutional Arrangements and Coordination

Effective coordination among the implementing agency, regulatory authorities, is essential for the successful execution of this assignment. This section outlines the institutional framework and the reporting relationships that will guide implementation of the Environmental Baseline Study for air quality and noise across the three airport sites.

12.0 Compliance with World Bank Policies

As the assignment is part of a World Bank-financed project, the Consultant is required to comply with all relevant World Bank policies, including those on anti-corruption, fraud, environmental safeguards, and grievance redress. Any breaches or suspected misconduct must be reported to TANROADS and, where applicable, to the appropriate World Bank channels.

APPENDICES:

Appendix 1A: Environmental Baseline Data Collection Checklist

For Air Quality and Noise Monitoring and Modelling at Regional Airports

This checklist outlines the **minimum environmental baseline data requirements** to be collected, measured, or modelled by the Consultant. It supports the scope of work defined in the ToR and ensures consistency with Tanzanian regulations, NEMC guidelines, and World Bank Environmental and Social Standards (ESS1 and ESS3).

A. General Site Information

- GPS coordinates of monitoring locations
- Description of surrounding land use (urban, rural, protected areas, etc.)
- Identification of nearby sensitive receptors (residential areas, schools, hospitals, wildlife areas)
- Meteorological context (wind speed/direction, temperature, humidity, atmospheric stability class)
- QA/QC procedures used during field measurements

B. Noise Baseline Data

- LAeq (Equivalent Continuous Sound Level) – Daytime (07:00–22:00)
- LAeq – Night-time (22:00–07:00)
- Lmax, L10, L90 (as per ISO/IEC noise measurement standards)
- Noise contour maps or zoning (if applicable to surroundings)
- Identification of background sources of noise (e.g., traffic, generators)
- Locations of measurement relative to receptors and construction footprint

- Instrument type and calibration history
- Measurement durations (minimum 24-hour cycle)

D. Modelling Inputs and Outputs

- Source characteristics (e.g., machinery specs, emission factors, aircraft movement estimates)
- Use of INM, AEDT, or CadnaA for noise simulation
- Meteorological data source and years of reference
- Output in form of concentration or noise contour maps with receptor overlays
- Comparison of predicted levels against Tanzanian, WHO, and WBG standards

E. Reporting and Documentation

- Raw and processed datasets (CSV, Excel)
- GIS shapefiles for sampling points and modelled impact areas
- Photographs of monitoring locations and surroundings
- Data validation and summary of anomalies or limitations
- Brief description of community or stakeholder concerns (if encountered).

Appendix 1B: Proposed Monitoring Schedule Template

This template is provided to guide the Noise management Consultant in preparing a detailed, time-bound monitoring plan during the Inception **Phase** of the assignment. The schedule must align with the project phasing and construction timelines for Lake Manyara, Iringa, and Tanga Airports and should reflect both **pre-construction baseline** and **construction-phase monitoring** requirements.

Monitoring Schedule Template

Site	Parameter	Location Coordinates	Monitoring Frequency	Sampling Duration	Start Date	End Date	Responsible Team Member
Lake Manyara	Noise (LAeq, Lmax, etc.)	Lat: _____ Long: _____	Baseline: Once Construction: Quarterly	24 hrs (day/night)	DD/MM/YYYY	DD/MM/YYYY	Consultant
Iringa	Noise	Lat: _____ Long: _____	Baseline: Once Construction: Quarterly	24 hrs	DD/MM/YYYY	DD/MM/YYYY	Consultant
Tanga	Noise	Lat: _____ Long: _____	Baseline: Once Construction: Quarterly	24 hrs	DD/MM/YYYY	DD/MM/YYYY	Consultant

Notes:

- Sampling must follow local and internationally accepted standards (e.g., TBS, WHO, IFC, ISO).
- For noise, locations must cover both high-activity zones and nearby sensitive receptors. Minimum sampling points are sensitive receptors identified in the ESIAs.
- The schedule must be updated as needed to reflect changes in construction sequencing or access.

Appendix 1C: Minimum Equipment Specifications and Standards

This appendix provides minimum technical requirements for instruments and software to be used by the Noise Consultant in conducting noise baseline monitoring and modelling for Lake Manyara, Iringa, and Tanga Airports. The aim is to ensure data integrity, scientific defensibility, and alignment with both Tanzanian regulations and international standards (e.g., TBS, WHO, ISO, and IFC).

The Consultant shall ensure that all equipment is calibrated, traceable to certified standards, and operated by qualified personnel. Use of substandard or uncalibrated instruments will be grounds for data rejection.

B. Environmental Noise Monitoring Equipment

Parameter	Minimum Specification
Sound Level	Class 1 Integrating Sound Level Meter (ISO 61672-1); Frequency range: 20 Hz – 20 kHz; Dynamic range ≥ 100 dB
Measured Values	LAeq, Lmax, Lmin, L10, L50, L90; Logging intervals ≥ 1 minute
Calibration	Field Calibrator (Class 1); Pre- and post-measurement calibration traceable to national/international standards
Recording	24-hour continuous measurement capability with secure data storage
Weather Shield	Wind screen/microphone cover to minimize wind-induced error during outdoor monitoring

C. Modelling Software Requirements

Model	Use	Minimum Requirements
INM / AEDT / CadnaA	Airport or transport noise modelling	ICAO or ISO-recognized; able to simulate aircraft movement scenarios; receptor-based noise contouring
GIS (ArcGIS or QGIS)	Mapping and spatial analysis	Ability to process shapefiles, overlay modelled contours, receptors, and baseline data

Quality Control Note:

All instruments must be accompanied by valid calibration certificates (dated within 12 months) and conform to the manufacturer's recommended maintenance and operational standards.

Appendix 1D: Reporting Format Guidelines

To ensure consistency, transparency, and technical rigor, the noise consultant shall adhere to the following reporting structure for all deliverables submitted under this assignment. Reports must be professionally written in English and aligned with the expectations of TANROADS, NEMC, and the World Bank.

All reports shall include executive summaries, be submitted in both editable (Word, Excel, GIS formats) and non-editable (PDF) versions, and must clearly state data sources, methods, assumptions, and limitations.

A. Inception Report

To be submitted within the first month of contract effectiveness.

Recommended Structure:

1. Introduction and Objectives
2. Understanding of Scope
3. Detailed Methodology
 - Monitoring locations and justification
 - Sampling frequency and duration
 - Instrumentation and standards
4. Team Composition and Work Plan
5. Preliminary Stakeholder Contact Plan
6. Quality Assurance/Quality Control Procedures
7. Updated Schedule of Deliverables

B. Baseline Monitoring Reports (Site-Specific)

To be submitted after initial round of pre-construction monitoring.

Recommended Structure:

1. Executive Summary
2. Introduction and Background
3. Site Description and Sensitivity Context
4. Monitoring Methodology
 - Parameters measured

- Equipment used and calibration records
- Locations and duration
- 5. Data Presentation
 - Tables, graphs, geospatial maps
 - Comparison with national, WHO, and IFC thresholds
- 6. Discussion of Results
 - Key trends and observations
 - Potential implications for construction phase
- 7. Conclusions and Recommendations
- 8. Appendices
 - Raw data tables
 - Site photos and GPS coordinates
 - Calibration certificates
 - GIS shapefiles and model inputs/outputs

C. Quarterly Environmental Monitoring Reports

Submitted every three months during construction.

Recommended Structure:

1. Executive Summary
2. Introduction
3. Summary of Monitoring Activities
4. Results and Trend Analysis
5. Discussion of Changes Relative to Baseline
6. Observed or Anticipated Impacts
7. Mitigation Effectiveness (if applicable)
8. Corrective Actions or Recommendations
9. Appendices (as per baseline reports)

D. Final Environmental Monitoring Report

To be submitted at the end of the 12-month period.

Recommended Structure:

Same as **Quarterly reports**, with emphasis on:

- Consolidated analysis of trends over time
- Evaluation of mitigation effectiveness
- Recommendations for operational phase monitoring (if applicable)