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PREPARED FOR:	Republic of Namibia Ministry of Works & Transport ROADS AUTHORITY SAFE ROADS TO PROSPERITY TRINITAS CONSULTING ENGINEERS
PROJECT NAME:	ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF DR3469 MBEYA-ERAGO ACCESS ROAD (20.5 KM)
REGISTRATION NO:	APP-006883
DATE:	05 MARCH 2026
AUTHOR NAME:	RITTA KHIBA assisted by THANDIWE MUSAVENGANA
AUTHOR SIGNATURE:	

EXECUTIVE SUMMARY

Note: The initial submission referenced the Mbeyo–Erago road length as 18.3 km. The correct length is 20.5 km, which is used throughout this EIA.

This Environmental Impact Assessment (EIA) has been prepared for the proposed upgrade of the DR3469 Mbeyo–Erago gravel access road, extending approximately 20.5 km within the Ncamangoro Constituency of the Kavango West Region, Namibia. The existing track is characterised by deep Kalahari sands, severe rutting, poor drainage, and seasonal inaccessibility, which severely limits mobility, service delivery, and economic activities for surrounding communities.

The purpose of this EIA is to evaluate potential biophysical and socio-economic impacts associated with the proposed upgrade, ensure compliance with Namibia's Environmental Management Act (2007) and EIA Regulations (2012), and provide an Environmental Management Plan (EMP) to guide mitigation and monitoring throughout the project lifecycle.

Key anticipated benefits include:

- Year-round accessibility to Erago Primary School, Erago Clinic, agricultural fields, and dispersed homesteads.
- Enhanced emergency response capacity, reduced travel times, and improved mobility for vulnerable populations.
- Employment opportunities for local residents during construction and operation phases.
- Stimulation of small-scale trade and agricultural distribution, strengthening regional integration by linking rural communities to the B8 national road.

Potential negative impacts include: vegetation clearance, soil erosion, dust emissions, noise, waste mismanagement, safety risks, and minor habitat disturbance. These impacts are considered manageable through strict implementation of the EMP, proper supervision, and compliance monitoring.

Public participation was conducted in Mbeyo, Sihetekera, and Erago villages from 27–29 January 2026. Communities expressed strong support for the project, recognising its transformative potential, while raising important concerns. These included requests for fair and transparent recruitment (with priority for local households and youth), opportunities for small-scale businesses along the corridor, provision of water points and electricity, establishment of a communal garden

to offset agricultural land loss, and clarity on compensation or relocation for directly affected households. The Erago community also highlighted discrepancies between the alignment presented locally and the version submitted to the Governor's office, emphasising that a straight-line alternative would reduce accident risks and minimise land parcel loss.

The project team has committed to integrating these concerns into planning and implementation. Recruitment frameworks will prioritise local residents, designated trading areas will be established, household-level assessments will be conducted for compensation or relocation, and a technical review of alignment alternatives will be undertaken to ensure safety and minimise displacement. Requests for complementary infrastructure such as water and electricity will be documented and forwarded to relevant ministries.

In conclusion, the EIA finds that the proposed DR3469 Mbeyo–Erago road upgrade is environmentally feasible, socially beneficial, and technically justified. Approval is recommended subject to strict adherence to the EMP, ongoing community engagement, and transparent communication of alignment decisions.

Contents

List of Abbreviations

Abbreviation	Full Meaning
EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
RA	Roads Authority
RE	Resident Engineer
MEFT	Ministry of Environment, Forestry and Tourism
ECO	Environmental Compliance Officer
EAP	Environmental Assessment Practitioner
HSE	Health, Safety and Environment
I&APs	Interested and Affected Parties
UXO	Unexploded Ordnance
MWT	Ministry of Works and Transport
RKPC	Ritta Khiba Planning Consultants
BP	Borrow Pit
PPE	Personal Protective Equipment
B8	National Trunk Road B8 (Namibia)

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1. INTRODUCTION

It is hereby acknowledged that the initial submission to the EIA portal referenced the Mbeyo–Erago road length as 18.3 km. This was an inadvertent error. The correct road length is 20.5 km. All assessments, impact evaluations, and mitigation measures presented in this Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) are based on the accurate figure of 20.5 km.

This section outlines the background, purpose, and context of the Environmental Impact Assessment for the DR3469 Mbeyo–Erago road upgrade. The EIA has been initiated to ensure that environmental considerations are incorporated into planning and decision-making processes as required under national legislation. The project proponent seeks environmental authorization in order to implement the proposed upgrade and improve essential road infrastructure serving rural communities.

1.1 Purpose of the EIA

The purpose of the EIA is to systematically identify, predict, and evaluate environmental and social impacts associated with the proposed road upgrade, and to develop strategies to avoid, minimize, or mitigate adverse effects while enhancing project benefits.

1.2 Objectives

a) Establish the environmental and socio-economic baseline conditions of the project area.
b) Identify and assess potential impacts resulting from project activities.
c) Propose feasible mitigation measures to prevent or minimize negative impacts.
d) Evaluate alternatives to the proposed project.
e) Prepare an Environmental Management Plan (EMP) to guide implementation.
f) Facilitate compliance with national legislation and international best practices.

1.3 Scope of Assessment

The EIA assessment covers biophysical and socio-economic conditions along the road corridor, including vegetation, fauna, soils, hydrology, land use, cultural resources, and community infrastructure. It further evaluates construction activities, material sourcing, workforce requirements, operational impacts, safety considerations, and cumulative effects.

1.4 Terms of Reference

The Terms of Reference (ToR) guide the structure and focus of the EIA. Key ToR components include baseline studies, stakeholder engagement, alternatives assessment, impact analysis, and EMP formulation.

1.5 EIA Methodology

The methodology applied includes desktop review of technical data, field surveys, socio-economic assessments, stakeholder consultations, impact rating using significance matrices, and formulation of mitigation measures consistent with Roads Authority Environmental Roads Construction Manuals and MEFT requirements.

2. LEGAL AND POLICY FRAMEWORK

Namibia's environmental management framework is based on the Environmental Management Act (2007), which establishes principles for sustainable development and mandates EIAs for listed activities. The Environmental Impact Assessment Regulations (2012) outline procedural requirements including scoping, stakeholder consultation, impact assessment, and monitoring.

Several additional national laws apply to this project, including the Water Resources Management Act, Forest Act, Public Health Act, Roads Authority Act, Labour Act, National Heritage Act, and Pollution Control Regulations.

International conventions relevant to this project include the Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), and the Sustainable Development Goals (SDGs).

2.1 Core Legal Instruments

Table 1:Legal Policy and Framework

Legislation / Policy	Key Provision	Relevance to Project
Namibian Constitution (1990)	Mandates sustainable management of ecosystems and biodiversity for present and future generations	Provides overarching environmental protection principles
Environmental Management Act (No. 7 of 2007)	Requires environmental assessments for listed activities; promotes sustainable resource use	Legal basis for EIA and EMP; ECC required before project implementation
Environmental Assessment Policy (1995)	Ensures environmental consequences are considered in planning	Guides integration of biophysical, social, and economic impacts
EIA Regulations (2012)	Sets procedures for scoping, consultation, reporting, and submission	Governs preparation and approval of this EMP

2.2 Sectoral Legislation

Legislation	Key Provision	Relevance to Project
Water Resources Management Act (No. 11 of 2013)	Protects water resources; requires permits for abstraction/discharge	Ensures sustainable water use and borehole protection
Public Health Act (No. 36 of 1919)	Provides for sanitation, food safety, and disease control	Relevant for dust, noise, and waste management
Labour Act (No. 11 of 2007)	Establishes labour rights and workplace safety standards	Ensures fair recruitment and safe working conditions
Nature Conservation Ordinance (No. 4 of 1974)	Guides conservation and control of problem animals	Relevant for wildlife protection along the corridor
Nature Conservation Act (No. 5 of 1996)	Provides for sustainable wildlife management and conservancies	Ensures biodiversity protection
Forest Act (No. 12 of 2001)	Governs sustainable forestry and biodiversity conservation	Guides vegetation clearance and re-vegetation
National Heritage Act (No. 27 of 2004)	Protects heritage sites and objects	Ensures safeguarding of cultural/heritage features
Soil Conservation Act (No. 76 of 1969)	Provides for prevention and control of soil erosion	Relevant for borrow pit rehabilitation and erosion control
Hazardous Substances Ordinance (No. 14 of 1974)	Regulates handling and disposal of hazardous substances	Applies to fuel, oil, and chemical storage

2.3 Environmental and Resource Policies

Policy	Key Provision	Relevance to Project
Pollution Control & Waste Management Bill (1999)	Promotes integrated pollution prevention and control	Guides dust, noise, and waste management
National Waste Management Policy (2010)	Provides framework for integrated waste management	Ensures proper waste segregation and disposal
Draft Wetlands Policy (2004)	Promotes conservation and sustainable use of wetlands	Relevant for drainage and water resource protection
Community-Based Tourism Policy (1995)	Encourages community-run tourism enterprises	Supports socio-economic benefits linked to improved access

2.4 Roads Authority Manuals & Guidelines

Manual	Purpose
Procedures Manual (2014)	Standardised processes for road projects
Materials Manual (2014)	Specifications for construction materials
Structures Manual (2014)	Guidance on culverts, bridges, and drifts
Drainage Manual (2014)	Standards for side drains, mitre drains, culverts
Survey Manual (2014)	Surveying requirements for alignment and works
Geometrics Manual (2014)	Road design standards
Environmental Manual (2014)	Environmental safeguards during road projects
Construction Manual (2014)	Technical specifications for construction
Economic Evaluation Manual (2014)	Cost-benefit analysis framework
Standard Drawings Manual (2014)	Approved design drawings

3. PROJECT DESCRIPTION

The proposed upgrade of the DR3469 Mbeyo–Erago road aims to transform the existing deep-sand track into an engineered gravel road compliant with RA design standards. The project includes site clearance, earthworks, drainage installation, gravel wearing course placement, compaction, road finishing, and signage installation.

Construction will employ a combination of machinery and local labour, with strict adherence to environmental and safety regulations.

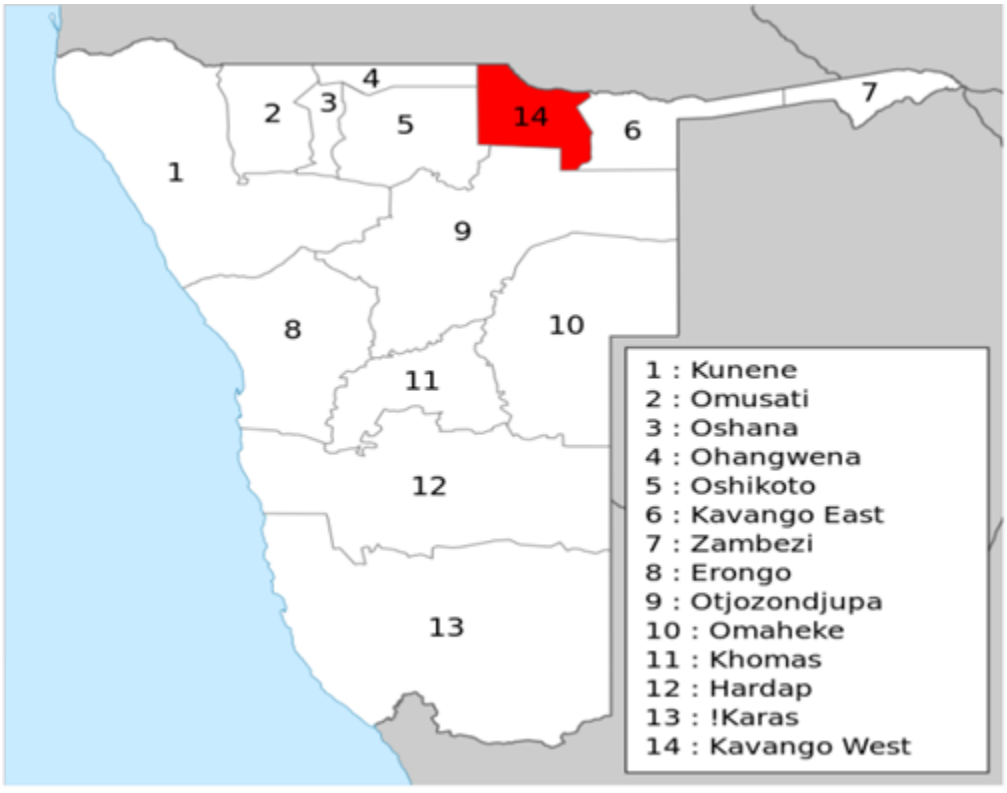


Figure 1: Namibia Map, Kavango West Region in red

3.1 Location

The proposed project is situated in the Ncamangoro Constituency of the Kavango West Region, Namibia, along the DR3469 alignment connecting Mbeyo settlement to Erago village. The road corridor currently exists as a deep sand track, accessible only by 4x4 vehicles, and is characterized by poor drainage, rutting, and seasonal inaccessibility. These conditions have long constrained mobility, service delivery, and economic activities for surrounding communities. The alignment follows an existing traditional track used by vehicles, livestock herders, and community members,

thereby minimizing the need for new land clearance and reducing potential environmental disturbance. The route traverses flat to gently undulating terrain typical of the Kalahari Basin, with sandy soils prone to erosion and seasonal flooding.

Key location details: Start Point (Mbeyo settlement, junction with B8 national road): Latitude -18.2709° (18° 16′ 15″ S), Longitude 19.41503° (19° 24′ 54″ E)

End Point (Erago Primary School and Clinic): Latitude -18.11626° (18° 11′ 38″ S), Longitude 19.16288° (19° 09′ 47″ E)

The project corridor passes through dispersed rural homesteads, communal grazing areas, and subsistence agricultural fields. Sensitive receptors along the alignment include Erago Primary School, Erago Clinic, and households located within 50–100 m of the road. The location is strategically important as it links rural communities to the B8 national trunk road, thereby enhancing regional integration and access to essential services.

Figure 2: Mbeyo-Erago route

3.2 Project Need and Justification

The road currently becomes impassable during rainy seasons, causing prolonged isolation, limiting access to healthcare, education, government services, and markets. The upgrade is essential to improving mobility, safety, and socio-economic development.

3.3 Technical Description

Key design elements will follow Roads Authority technical requirements, including formation width (typically 7–8 m), gravel wearing course thickness (around 150–200 mm), engineered side drains, mitre drains, culverts, and safe stopping sight distances appropriate to the design speed.

3.4 Construction Activities

Activities include survey and pegging, clearing and grubbing, cut-to-spoil and filling, gravel hauling, compaction, drainage installation, shaping, and finishing.

3.5 Workforce

The project will employ skilled and unskilled labour, with preference given to local residents. Occupational health and safety provisions will be mandatory.

3.6 Materials and Equipment

Key equipment includes graders, rollers, bulldozers, excavators, TLBs, water bowsers, and tipper trucks. Gravel will be sourced from approved borrow pits.

3.7 Traffic Management

A traffic management plan (TMP) will be implemented to ensure safety for workers, road users, and nearby communities. Signage, flag personnel, and controlled access will be employed.

3.8 Waste Management

Waste will be segregated into general and hazardous streams, stored appropriately, and disposed at authorized facilities to prevent pollution.

4. BASELINE ENVIRONMENT

This section provides a detailed description of the physical, biological, and socio-economic conditions within the project area. Information was collected through field surveys, consultations, and literature review.

4.1 Climate

The Kavango West Region experiences a semi-arid climate with summer rainfall ranging from 480 to 620 mm annually. Temperatures can exceed 34°C in summer, with high evaporation rates. Seasonal rainfall variability significantly affects road conditions and drainage behaviour.

4.2 Topography

Topography along the corridor is predominantly flat with gentle undulations typical of the Kalahari Basin. This terrain influences drainage patterns and soil stability.

4.3 Geology and Soils

The project area is underlain by deep Kalahari aeolian sands with low bearing capacity and high permeability. These soils are prone to wind and water erosion when vegetation is removed. Proper compaction and drainage are essential to prevent structural failures.

Figure 3: Soil condition and proposed route vegetation

4.4 Vegetation

Vegetation consists of northern Kalahari woodland, dominated by Terminalia sericea, Burkea africana, Pterocarpus angolensis, and various Acacia species. Grass cover is seasonal. No threatened or protected species were recorded along the road alignment. The Pterocarpus is a protected tree in terms of the Forest Act of 2001. Should the tree be removed, it should be done so with a specific permit from the Directorate of Forestry.

4.5 Fauna

Common fauna includes duikers, jackals, reptiles, and birds such as hornbills and guinea fowl. Livestock (cattle, goats, donkeys) frequently cross or move along the road alignment, posing safety concerns during construction and operation.

4.6 Hydrology

Surface hydrology is characterized by shallow ephemeral drainage channels that become active during heavy rainfall. Rapid infiltration occurs due to sandy soils, but pooling can develop in depressions, necessitating well-designed drainage structures.

4.7 Water Resources and Boreholes

At present, boreholes in the Mbeyo–Erago corridor are limited, and communities rely primarily on seasonal surface water and informal sources. As part of the project, new boreholes will be drilled to supply construction water. These boreholes will subsequently be donated to the communities, thereby improving long-term water security. Abstraction will be limited to approved points only, and strict protection measures will be applied during construction to prevent contamination. Safeguards include bunded fuel and oil storage, provision of spill kits, and weekly monitoring by the Contractor and Environmental Compliance Officer (ECO). These measures comply with the Water Resources Management Act (2013) and Roads Authority requirements.

4.8 Land Use

Land use is dominated by subsistence agriculture, including cultivation of maize, millet, and sorghum. Homesteads are dispersed, and communal grazing areas are widespread. Communities depend heavily on rural road access for livelihoods.

4.9 Socio-Economic Environment

The area is inhabited by rural households with limited access to electricity, piped water, and formal employment. The nearest service centres are Nkurenkuru and Rundu. Improved road access will directly enhance education, healthcare, trade, and mobility.

Figure 4: Settlements along the route

4.10 Cultural & Heritage

No significant cultural or archaeological resources were identified. A chance finds procedure must be implemented during construction to ensure compliance with the National Heritage Act.

4.11 Sensitive Receptors

Sensitive receptors include Erago Primary School, Erago Clinic, homesteads within 50–100 m of the road, livestock herding areas, and community pathways.

5. IMPACT ASSESSMENT

Impacts were assessed using a significance rating matrix based on likelihood, magnitude, extent, duration, and reversibility. Mitigation measures were developed accordingly.

Table 2:Impact Assessment

Criteria	Description / Basis of Assessment	Classification Scale
Nature of Impact	Describes whether the impact is positive, negative, or neutral, and the type of change caused by the project action.	Positive / Negative / Neutral
Extent (Spatial Influence)	Determines the geographic area affected by the impact.	**Local:** confined to the project footprint or immediate surroundings. **Regional:** affects the wider constituency or district. **National:** implications that extend beyond regional boundaries.
Duration	How long the impact will last.	**Short-term:** lasts for construction period only. **Medium-term:** extends into early operation (up to 5 years). **Long-term:** persists for life of the project or beyond.
Intensity (Magnitude or Severity)	Measures the degree of change to environmental or social conditions.	**Low:** slight deviation from baseline; environment continues to function normally.

Criteria	Description / Basis of Assessment	Classification Scale
		Medium: noticeable disruption; some system functions altered but recoverable. **High:** severe alteration; ecological/social system significantly affected.
Probability (Likelihood of Occurrence)	The likelihood that the impact will occur under project conditions.	**Unlikely:** rare but possible. **Possible:** could occur at some stage. **Likely:** expected to occur repeatedly or in most circumstances.
Reversibility	The potential for the system to return to its original state after the impact ceases.	**Reversible:** baseline can be restored through natural recovery or mitigation. **Partially Reversible:** some functions recover but not fully. **Irreversible:** permanent change to environmental components.
Significance (Overall Impact Rating)	The combined evaluation of extent, duration, intensity, and probability. This determines the overall importance of the impact for decision-making.	**Low Significance:** does not require major mitigation; within acceptable thresholds. **Moderate Significance:** requires specific mitigation and monitoring measures.

Criteria	Description / Basis of Assessment	Classification Scale
		High Significance: unacceptable without major mitigation; may influence project design or viability.

5.1 Methodology

Likelihood and consequence scales were combined to determine significance ratings: Low, Moderate, or High. Both unmitigated and mitigated impacts were assessed.

5.2 Construction Impacts

Potential impacts include vegetation clearance, dust generation, soil erosion, noise, waste mismanagement, safety risks, and minor habitat disturbance. With proper mitigation, most impacts can be reduced to low or moderate significance.

5.3 Operational Impacts

Positive impacts include improved accessibility, mobility, and economic activity. Negative impacts include dust emissions during dry seasons and potential livestock collisions.

5.4 Cumulative Impacts

Cumulative impacts may occur due to simultaneous development of regional road networks. These include landscape alteration, increased traffic, and resource extraction pressures. Positive cumulative effects include enhanced regional connectivity.

5.5 Residual Impacts

Residual impacts after mitigation are expected to be low, primarily relating to long-term erosion and dust generation. Regular maintenance will minimize such impacts.

6. ALTERNATIVES

Alternatives were assessed to determine the most environmentally and socially favorable option.

6.1 No-Go Alternative

The no-go option would result in continued inaccessibility, socio-economic isolation, and increased travel times. It is not preferred.

6.2 Alignment Alternatives

The selected alignment follows the existing track to minimise vegetation loss, resettlement risks, and construction costs.

6.3 Engineering Design Alternatives

Several gravel thickness options were evaluated. The chosen design balances durability with minimal environmental disturbance.

6.4 Construction Method Alternatives

A hybrid labour-and-machinery approach was selected to ensure quality while maximizing local employment opportunities.

7. PUBLIC PARTICIPATION

Public participation is a critical component of the Environmental Impact Assessment (EIA) process, ensuring transparency, inclusivity, and accountability in decision-making. For the proposed DR3469 Mbeyo–Erago road upgrade, consultations were conducted from 27–29 January 2026 in the villages of Mbeyo, Sihetekera, and Erago within the Ncamangoro Constituency, Kavango West Region. These meetings engaged traditional leaders, community members, youth, women, and directly affected households.

The consultations provided communities with an opportunity to raise expectations, concerns, and aspirations regarding the project. Attendance was strong, with over 400 participants across the three villages, reflecting the importance of the road development as the first major infrastructure project in the constituency since independence.

Stakeholders included traditional leaders, Erago and Mbeyo community members, school and clinic staff, farmers, youth groups, and government representatives. Photographic records of the consultations are provided in Appendix C

7.1 Stakeholders

Stakeholders engaged included:

a) Traditional Authorities (custodians of communal land and facilitators of community mobilisation).
b) Constituency leaders and Kavango West Regional Council representatives.
c) Erago Primary School and Erago Clinic staff (direct beneficiaries of improved access).
d) Village Development Committees (Mbeyo, Sihetekera, Erago) acting as liaisons for grassroots consultation and grievance resolution.
e) Local farmers, youth groups, and women's associations.
f) Households located along or near the proposed alignment.
g) Broader Interested and Affected Parties (I&APs), including NGOs and small-scale enterprises.

Table 1: Stakeholders Identified

Table 3:Stakeholders

Stakeholder	Role
Government of the Republic of Namibia	Funding Source
Ministry of Works and Transport (MWT)	The Client and primary implementing authority
Roads Authority (RA)	Technical oversight and quality assurance (as delegated by MWT)
Kavango West Regional Council (KWRC)	Facilitates regional coordination, planning integration, land access, and administrative support
Traditional Authorities	Custodians of communal land and key actors in community mobilization and land access facilitation
Erago Primary School	Direct project beneficiary and key stakeholder in access and road safety considerations
Local Community Representatives (Village Development Committees – VDCs)	Liaisons for grassroots consultation, grievance resolution, and local labour mobilisation
Community / General Public along the Route	Individuals and households directly or indirectly affected by the alignment and construction activities
All Interested and/or Affected Parties (IAPs)	Broader stakeholder group including NGOs, SMEs, and institutions concerned with project impacts and outcomes

7.2 Methods

Engagement methods included:

a) Open community meetings in each village.
b) Key informant interviews with traditional leaders
c) Household discussions with directly affected families.
d) Use of local languages to ensure inclusivity and avoid misunderstandings.
e) Documentation of attendance registers, minutes, and photographic records.

7.3 Issues Raised

Community members expressed both strong support for the project and specific concerns requiring mitigation. Key issues included:

a) **Employment & Recruitment**: Requests for household-based employment quotas, prioritisation of local residents, fair and transparent recruitment processes, and opportunities for youth. Concerns were raised about inclusivity, particularly for individuals without national documents or formal work experience.
b) **Business & Livelihoods**: Calls for designated trading areas, mobile vending opportunities, and facilities to support small-scale enterprises along the road corridor. Communities expressed interest in selling traditional foods and goods during construction and beyond.
c) **Infrastructure & Development Needs**: Requests for electricity supply, water points (particularly between Mbeyo and Erago), and a communal garden to offset agricultural land loss. While these are outside the direct scope of the road project, they were highlighted as essential for long-term development.
d) **Directly Affected Households**: Concerns about compensation and relocation for households impacted by the alignment. Communities requested clarity on procedures and assurance that livelihoods would not be disrupted.
e) **Road Alignment Concerns**: The Erago community highlighted discrepancies between the alignment presented locally and the version submitted to the Governor's office. They cautioned that the current alignment could increase accident risks and cause unnecessary loss of land parcels, while a straight-line alternative would avoid these challenges.

7.4 Responses and Mitigation Measures

Stakeholder Comment	Engineers (Trinitas Consulting Engineers) Response	Integration into EMP
Concern about road alignment discrepancies and risk of accidents; preference for a straight-line alternative to reduce land loss.	Alignment selected through consultations and approvals; chosen route improves access, accommodates future connectivity toward Matende, and enhances safety via controlled turning geometry. Straight-line option would compromise junction safety. Existing access roads remain operational.	EMP includes traffic safety measures (junction design, signage, speed reduction), access management provisions, and community engagement commitments.
Request for fair and transparent recruitment, prioritizing local households and youth.	Project team committed to prioritizing local residents in recruitment frameworks, with transparent processes.	EMP includes socio-economic mitigation measures: local hiring targets, fair recruitment procedures, and monitoring of labour practices.
Desire for opportunities for small-scale businesses along the corridor.	Designated trading areas will be established to support local enterprises.	EMP includes socio-economic enhancement measures: allocation of trading zones, monitoring of informal business development.
Request for provision of water points and	Requests documented and forwarded to relevant ministries; project scope	EMP includes liaison measures: documentation of requests, referral to ministries,

electricity along the road.	limited to road construction but coordination will be pursued.	and monitoring of community infrastructure needs.
Concern about agricultural land loss; request for communal garden to offset impacts.	Household-level assessments will be conducted for compensation or relocation; communal garden proposal noted for integration with regional development plans.	EMP includes land use mitigation: compensation/relocation procedures, support for alternative livelihood initiatives.
Concern about dust, noise, and waste mismanagement during construction.	Dust suppression, noise control, and waste management measures will be implemented per RA standards.	EMP includes dust suppression plan, noise monitoring, and waste management protocols.
Concern about safety hazards (livestock crossings, UXO risk).	Controlled junction design, signage, and UXO clearance protocols will be implemented.	EMP includes traffic safety measures, UXO clearance procedures, and community awareness campaigns.

Supporting documentation is attached:

- Annexure A: Attendance registers (Mbeyo, Sihetekera, Erago).
- Annexure B: Notices/invitations and any written submissions.
- Annexure C: Public participation report
- Annexure D: Meetings minutes

8. CONCLUSION AND RECOMMENDATION

The proposed upgrade of the DR3469 Mbeyo–Erago gravel access road, extending approximately 20.5 km within the Ncamangoro Constituency of the Kavango West Region, has been assessed in terms of its environmental, social, and technical feasibility. The assessment demonstrates that the project is both necessary and beneficial, addressing long-standing challenges of isolation, poor mobility, and limited access to essential services.

From a technical perspective, the road design incorporates engineered drainage structures, raised camber, and gravel compaction to ensure resilience against seasonal flooding and climate variability. Mitigation measures for erosion, dust suppression, vegetation clearance, and borrow pit rehabilitation have been clearly defined in the Environmental Management Plan (EMP). Occupational health and safety provisions, chance-find procedures, and UXO risk clearance further strengthen the project's compliance with national legislation and international best practice.

From a social perspective, the project is expected to deliver transformative benefits, including improved access to schools, clinics, and markets; reduced travel times; enhanced emergency response capacity; and stimulation of small-scale trade and agricultural distribution. Public participation conducted in Mbeyo, Sihetekera, and Erago villages confirmed strong community support, while also highlighting critical concerns. These included fair and transparent recruitment, livelihood opportunities, provision of water points and electricity, establishment of a communal garden, compensation and relocation for directly affected households, and alignment safety.

The project team has committed to integrating these concerns into implementation. Recruitment frameworks will prioritize local households and youth, designated trading areas will be established, household-level assessments will guide compensation or relocation, and a technical review of alignment alternatives will be undertaken to minimize accident risks and land parcel loss. Requests for complementary infrastructure such as water and electricity will be documented and forwarded to relevant ministries. A grievance redress mechanism will ensure continuous dialogue and accountability throughout construction and operation.

In conclusion, the EIA finds that the proposed DR3469 Mbeyo–Erago road upgrade is environmentally feasible, socially beneficial, and technically justified. Approval is recommended subject to strict adherence to the EMP, transparent communication of alignment decisions, and ongoing engagement with affected communities. With these safeguards in place, the project will

serve as a catalyst for socio-economic growth in Kavango West while safeguarding ecological integrity and community well-being.

a) Construction Phase Mitigation Table

Table 4:Mitigation Table

Impact	Mitigation Measure	Responsibility	Monitoring	Frequency
Dust emissions	Use water bowser twice daily; limit speed to 40 km/h	Contractor	Visual inspection	Daily
Vegetation loss	Restrict clearing to 8 m width; avoid mature trees	Contractor + ECO	Site inspection	Weekly
Soil erosion	Install mitre drains; stabilise embankments	Contractor	Drainage audit	Weekly

b) Monitoring Plan

Table 5:Monitoring Plan

Activity	Indicator	Responsible	Reporting
Drainage performance	Clear flow paths; no blockages	Site Engineer	Monthly
Waste management	No litter; proper disposal records	Contractor	Weekly

The EMP has been expanded to include detailed mitigation, monitoring, and performance indicators for each project phase. It defines responsibilities for the Contractor, Environmental Control Officer (ECO), Roads Authority, and community representatives.

Key operational components include:

a) Environmental Awareness and Induction: All workers must undergo training on waste management, safety, and protection of sensitive receptors.
b) Emergency Response Plan: Outlines procedures for fuel spills, accidents, and natural hazards. Spill kits must be available on-site at all times.
c) Rehabilitation Plan: Disturbed areas must be reshaped, re-vegetated, and stabilised. Borrow pits must be fenced, shaped, and drained post-use.
d) Reporting Structure: Weekly internal reports, monthly ECO reports, and quarterly submissions to MEFT.
e) Grievance Mechanism: A formal system for receiving, recording, and resolving complaints from community members.
f) Compliance Auditing: The ECO will conduct fortnightly audits to evaluate adherence to environmental standards.
g) Operational Phase Management: Includes dust management, signage maintenance, drainage clearing, and periodic resurfacing.

c) Impact Rating Matrix

Table 6:Impact Matrix

Likelihood / Consequence	Insignificant	Minor	Moderate	Major	Severe
Rare	Low	Low	Low	Moderate	High
Unlikely	Low	Low	Moderate	High	High
Possible	Low	Moderate	High	High	Very High
Likely	Moderate	High	High	Very High	Very High
Almost Certain	High	High	Very High	Very High	Critical

1. Physical Environment

Topography:

- Gently undulating Kalahari terrain with minimal elevation variability.
- Relief influences drainage dispersion, resulting in sheet flow rather than channelized runoff.
- Flat terrain simplifies alignment but requires engineered drainage structures to prevent water accumulation.

Hydrology:

- Predominantly sub-surface water movement; heavy storms create sheet floods.
- Culvert design must accommodate dispersed flow through multiple low-capacity structures.
- Surface ponding common in depressions; longitudinal drains and camber required.
- Groundwater is deep and unlikely to be impacted but borrow pits must be rehabilitated to avoid artificial ponds.

Climate Considerations:

- Extreme temperatures accelerate dust emissions and gravel loss.
- Increasing frequency of intense storms necessitates climate-resilient drainage (side drains, mitre drains, cross-fall).
- Dry season restricts vegetation recovery; construction schedules should align with favourable seasonal windows.

2. Sensitive Receptors

Human Settlements:

- Homesteads within 50–100 m of alignment.
- Erago Clinic (critical for emergency evacuations).
- Erago Primary School (daily pedestrian use by children).

Livestock and Wildlife:

- Free-range grazing patterns create movement corridors across the alignment.

- Risk of vehicle–animal collisions increase with higher travel speeds.
- Temporary fencing and signage required during construction.

3. Potential Impacts and Mitigation

3.1 Construction Phase:

- Dust emissions: schedule water bowser operations during school hours.
- Noise disturbance: limit noisy activities to daytime.
- Water usage: source from approved abstraction sites; protect community boreholes.
- Worker influx: enforce codes of conduct, liaison structures, and site controls.
- Borrow pits: rehabilitate through slope reduction, drainage control, and vegetation re-establishment.
- Chance-finds protocol: halt work, secure site, notify National Heritage Council.

3.2 Operational Phase:

- Dust emissions: periodic grading and dust suppression required.
- Increased travel speeds: install signage and speed-calming measures near settlements.
- Vehicle–animal collisions: rumble strips and awareness campaigns.
- Safety risks: community patrols and awareness programmes.
- Maintenance: reshape wearing course and clear drains to prevent corrugation.

4. Social and Economic Considerations

4.1 Accessibility:

- Upgraded road reduces transport poverty, especially during rainy seasons.
- Enhances service delivery (medical emergencies, education, market access).

4.2 Gender and Vulnerable Groups:

- Women benefit through improved access to clinics and water points.
- Youth gain safer access to schools.

4.3 Economic Development:

- Stimulates small-scale trade and agricultural distribution.
- Indirect employment opportunities in retail, transport, and marketing.

- Settlement densification near junctions and facilities requires monitoring to avoid sprawl.

4.4 Stakeholders:

- Traditional authorities, local government, youth and women's groups, subsistence farmers, school and health staff, transport operators, and adjacent residents.
- Traditional authorities guide alignment and borrow pit selection, ensuring cultural sensitivity.

5. Alternatives Considered

- **Labour-intensive methods:**
  - Dismissed due to inability to achieve required compaction.
- **Hybrid approaches:**
  - Recommended to maximise local employment while maintaining engineering integrity.
- **Machinery-only methods:**
  - Faster but less socially beneficial.

6. Conclusion and Recommendation

- The DR3469 Mbeyo–Erago road upgrade is environmentally feasible and socially justified.
- Impacts can be mitigated through strict adherence to the EMP.
- It is recommended that the Ministry of Environment, Forestry and Tourism issue an Environmental Clearance Certificate, subject to ongoing monitoring and compliance oversight.

Detailed EMP Components:

a) **Roles & Responsibilities:** The Contractor is responsible for day-to-day environmental compliance; the ECO conducts monitoring; RA oversees reporting; MEFT ensures external compliance auditing.

b) **Waste Management Plan**: Waste must be sorted, stored in designated areas, removed weekly, and disposed at approved sites. No burning or burial permitted.

c) **Traffic Safety Management**: Signage, flag personnel, temporary barriers, and clearly demarcated pedestrian routes required near settlements.

d) **Emergency Response Plan:** Procedures for spills, fires, medical incidents; spill kits must be located at fuel storage points; fire extinguishers inspected monthly.

e) **Rehabilitation & Closure Plan**: Borrow pits reshaped with gentle slopes, drainage restored, and indigenous vegetation re-established. Worksites cleaned before demobilization.

f) **Monitoring Framework**: ECO conducts weekly site audits; monthly reports submitted to RA; quarterly environmental compliance summaries sent to MEFT.

g) **Training & Awareness**: All workers must receive induction on safety, waste handling, emergency procedures, and cultural site protection.

9. ENVIRONMENTAL MANAGEMENT PLAN – DETAILED TABLES

a) Construction Phase Mitigation Plan

Table 7:Environmental Management Plan

Impact	Mitigation Measure	Responsible Party	Frequency
Soil Disturbance	Limit clearing, stabilize exposed areas	Contractor	Daily
Dust Emissions	Water bowser spraying near settlements	Contractor	Daily
Noise	Operate machinery only during daytime	Contractor	Daily
Waste	Segregate and dispose at approved sites	Contractor	Weekly

b) Operational Phase Mitigation Plan

Impact	Action	Responsible	Monitoring
Dust	Periodic grading & watering	RA	Quarterly
Road Safety	Speed signage near homesteads	RA	Quarterly
Livestock Collisions	Install warning signs	RA	Bi-annual

c) Monitoring Plan

Parameter	Indicator	Method	Frequency	Responsibility
Dust Levels	Visible dust reduction	Visual inspection	Weekly	ECO
Waste	Absence of litter	Site audit	Weekly	ECO
Drainage	No standing water	Inspection	Monthly	RA

d) Emergency Response Matrix

Emergency	Response Action	Responsible	Resources Required

Fuel Spill	Stop source, deploy spill kit	Contractor	Spill kit
Fire	Use extinguishers, call Fire Brigade	All staff	Fire extinguishers
Injury	First aid + transport to clinic	Safety Officer	First aid kit

e) Rehabilitation Plan

Location	**Rehabilitation Action**	**Responsible**	**Timeline**
Borrow Pits	Re-contour, drain, revegetate	Contractor	Post-construction
Laydown Areas	Remove waste & restore	Contractor	Post-construction

f) Waste Management Plan

Waste Type	**Handling Procedure**	**Disposal Site**	**Responsible**
General Waste	Segregate & store in bins	Local landfill	Contractor
Hazardous Waste	Store in sealed containers	Approved facility	Contractor

g) Risk Register

Hazard	**Likelihood**	**Consequence**	**Risk Level**	**Control Measures**
Machinery Accidents	Medium	High	High	Training, PPE
Fuel Spill	Low	High	Medium	Spill kits, training

Dust	High	Medium	High	Watering, speed control

h) Public Participation – Issues & Responses Matrix

Stakeholder Issue	**Response Provided**	**Responsible Entity**
Borrow pit safety	Borrow pits will be fenced & rehabilitated	Contractor/RA
Dust near homesteads	Regular watering will be implemented	Contractor
Employment	Local labour prioritised	Contractor

10. CLIMATE IMPACTS AND MITIGATION

Table 8:Climate Impacts Mitigation

Impact	Receptor(s)	Mitigation Measures	Responsible Party	Monitoring Indicator
Intense rainfall → gully erosion	Road embankment, drains	Climate-adapted drainage, camber adjustments, erosion protection	Contractor/ Engineer	Drainage inspections post-rainfall
Rising temperatures → dust	Settlements, road users	Regular compaction, watering, dust suppression near receptors	Contractor	Dust levels, community complaints
Vegetation stress	Roadside vegetation	Drought-resistant species, soil-binding plants, targeted rehabilitation	Contractor/ ECO	Vegetation survival rates
Climate variability	Road infrastructure	Periodic grading, seasonal inspections, erosion-control structures	Roads Authority	Maintenance logs, inspection reports

a) Soil Impacts and Mitigation

Impact	Receptor(s)	Mitigation Measures	Responsible Party	Monitoring Indicator
Poor bearing capacity	Road formation	Import gravel with 8–12% fines, proper compaction	Contractor	CBR test results
Borrow pit over-excavation	Local landscape	Staged extraction, topsoil preservation, recontouring	Contractor/ECO	Rehabilitation completion reports

Subsurface piping	Shoulders, culverts	Reinforced compaction, grass establishment, periodic inspections	Contractor	Shoulder stability, erosion checks

b) Fauna Impacts and Mitigation

Impact	Receptor(s)	Mitigation Measures	Responsible Party	Monitoring Indicator
Mammal crossings	Small antelopes, hares	Signage, speed calming, awareness campaigns	Contractor/RA	Collision records, signage presence
Bird collisions	Raptors, ground birds	Avoid reflective signage, buffer zones near bird activity	Contractor/ECO	Bird mortality monitoring
Reptile disturbance	Geckos, snakes	Worker training, reporting sightings, habitat protection	Contractor/ECO	ECO reports, worker compliance logs

c) Socio-Economic Impacts and Mitigation

Impact	Receptor(s)	Mitigation Measures	Responsible Party	Monitoring Indicator
Limited market access	Farmers, traders	Road upgrade improves mobility, reduces costs	Roads Authority	Market participation surveys
Safety risks (speed, collisions)	Pedestrians, livestock	Rumble strips, signage, public education campaigns	Contractor/RA	Accident statistics, signage checks
Dust emissions	Children, elderly	Regular grading, watering, surface stabilisation treatments	Contractor	Air quality monitoring, complaints

Worker influx	Local communities	Codes of conduct, liaison structures, site controls	Contractor/ECO	Community feedback, incident reports

d) Vegetation Impacts and Mitigation

Impact	Receptor(s)	Mitigation Measures	Responsible Party	Monitoring Indicator
Clearing of valuable species	Communities (firewood, medicine)	Pre-clearing inspections, selective retention	Contractor/ECO	Species inventory, ECO reports
Slow recovery post-disturbance	Roadside vegetation	Active rehabilitation (local grasses, mulch, contour furrows)	Contractor	Vegetation cover %
Drainage interception	Embankments, pans	Multiple culverts, shallow side drains, borrow pit reshaping	Engineer/Contractor	Drainage performance, erosion checks
Dust and noise	Homesteads, schools, clinics	Watering, reduced speeds, noise scheduling	Contractor	Dust/noise monitoring, complaints
Wildlife disturbance	Birds, amphibians	Culvert design for amphibians, buffer zones, shielded lighting	Contractor/ECO	Wildlife monitoring reports

APPENDIX A: Affected Parties

27 January 2026

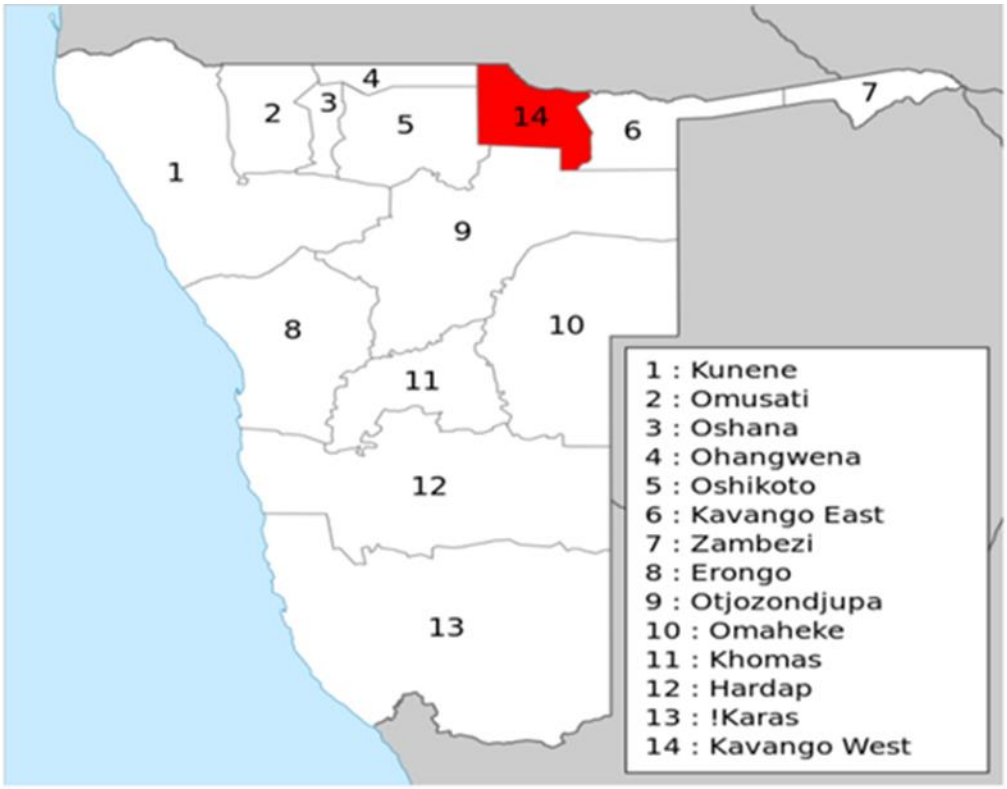
List of people affected by the Mbeyo-Erago road. Name of the Village: Mbeyo

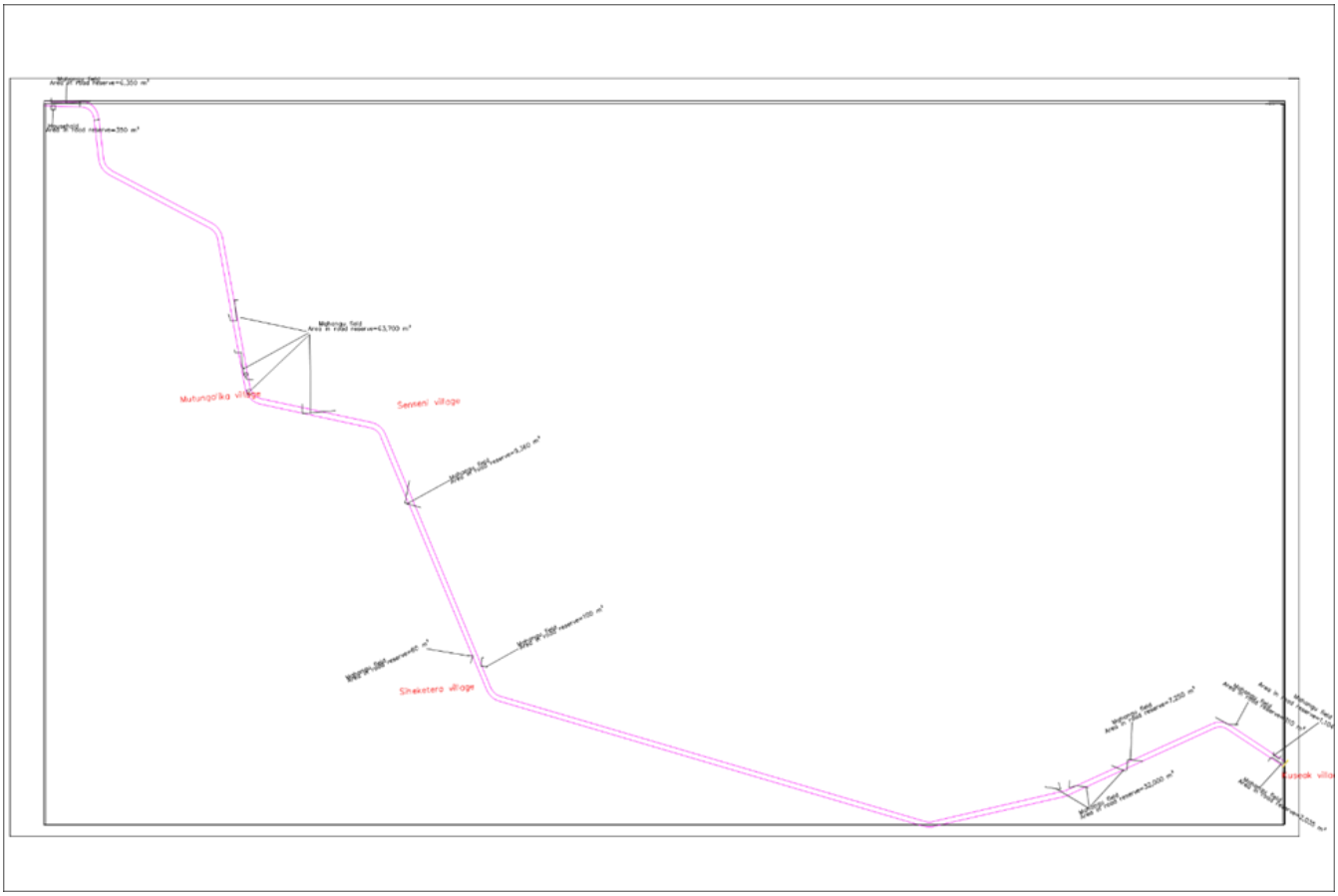
Headwomen: Mrs. Munango Hileni Ldc: Mr. Paulus Mende

	Name(s)	ID No / D.O.B	Contact Number
1	Viviya Johannes	8208151096	0813141450
2.	Likuwa Johannes	5601601220	N/A
3.	Kawoma Suze Ambere	420607 10022	0818583370
4	Mukuma Johannes N.	930927 00899	0817613179
5.	Sisenge Rebecca L.	810604 10648	0817288545
6.	Haingura Regina M.	300711 10038	0818394874
7.	Kambinda Manuel S.	670906 00327	0813536160
8.	Sisenge Evelina	780328 10277	0818710358
9.	Mupiri Elisabeth	770319 00050	0812902470
10	Munango Hileni	520701 00583	0812954061

Compiled by: Ldc Chairperson
Mr. Paulus Mende @ 0813125889
Checked by: Mrs Hileni Munango
Senior Headwoman @ 0812954061
Mbeyo village – Ncamacoro Constituency

APPENDIX B: Villages Map




Mutunga'ika village
Serweni village
Shekotera village

APPENDIX C: Road Conditions

APPENDIX D: Community Pictures

Mbeyo (first meeting)

"Over 160 community members joined the community meeting in Mbeyo, showing strong participation and engagement."

Sihetekera (second meeting)

"Sihetekera gathered with around 140 participants, reflecting great community interest."

Mbeyo (third meeting)

"Mbeyo gathered about 100 people, continuing the spirit of involvement and dance and singing."