Environmental and Social Impact Assessment for the proposed rehabilitation of Kamuzu International Airport (KIA) turn-off to Mzimba Section of the M1 Road over a distance of 234 km

FINAL DRAFT

Report Prepared by

The Roads Authority

Report Number 490005/2

August, 2019

ACKNOWLEDGEMENT

The consultant is very grateful for the support rendered by the Client, District Councils (Dowa, Kasungu and Mzimba) and all the stakeholders consulted during the preparation of this Environmental and Social Impact Assessment. A list of those consulted is attached as Appendix of this report.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AC	Asphalt Concrete
ACV	Aggregate Crushing Value
ADB	African Development Bank
ADC	Area Development Committee
BoQ	Bill of Quantities
CBO	Community Based Organisation
COMESA	Common Market for East and Southern Africa
DC	District Commissioner
DNPW	Department of National Parks and Wildlife
EAD	Environmental Affairs Department
EIA	Environmental ImpacAssessment
EMA	Environment Management Act
ESMP	Environmental and Social Management Plan
ESCOM	Electricity Supply Commission of Malawi
ESIA	Environmental and Social Impact Assessment
GoM	Government of Malawi
HIV/	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
Km	Kilometre
KIA	Kamuzu International Airport
MDHS	Malawi Demographic and Health Survey
MoAWD	Ministry of Agriculture and Water Development
MoH	Ministry of Health
MoLMD	Ministry of Labour and Manpower Development
MSDS	Material Safety Data Sheet
NAC	National Aids Commission
NGO	Non-Governmental Organisation
NMT	Non-Motorised Transport
NSO	National Statistical Office
PAP	Project Affected Parties/ People
PDR	Preliminary Design Report
RA	Roads Authority
RAP	Resettlement Action Plan
RoW	Right of Way
SADC	Southern Africa Development Community
SATCC	Southern Africa Transport and Communications Commission
SHE	Safety, Health and Environment
STIs	Sexually Transmitted Infections
TA	Traditional Authorities
TSS	Total Suspended Solids

ToR	Terms of Reference

KEY DEFINITIONS

Audit A verification process that is used to obtain information regarding the implementation of the ESMP. It is an objective tool used to make improvements at the workplace.

Berm A barrier that is designed to divert surface water flow. Berms will primarily be used along roads/tracks to prevent to concentrated flow of water over particular areas, thereby reducing erosion of roads.

Bunding An impervious containment system for potential spillages from tanks / containers stored on site. The bunded area shall have a capacity greater than 110% of the total tankage contained. The bunding shall be constructed of a material impermeable and resistant to the stored material.

Construction camp The area allocated for the establishment of equipment, repair area, ablution facilities, lay down and rest areas, etc. It also serves as the central point for the storage of fuel and construction material.

Environmental Management Programme (ESMP). The ESMP for the project sets out general instructions that will be included in a contract document for the construction phase of the project. The ESMP will ensure the construction activities are conducted and managed in an environmentally sound and responsible manner. The ESMP also details the organisational structure required to ensure the effective implementation of the ESMP and measures to monitor and improve the application of the ESMP.

Environmental Specifications Instructions and guidelines for specific construction activities designed to help prevent, reduce and/or control the potential environmental implications of these construction activities.

Fauna Any and all animals identified within or outside of the construction area. Animals may not be harmed in any way.

General Waste Domestic, commercial, non-hazardous waste and builders rubble e.g. paper, plastics, food, tins, etc.

Hazardous substance Any substance that is of risk to health and safety, property or the environment. Hazardous substances have been classified under the SABS Code 0288: 'The Identification and Classification of Dangerous Goods and Substances'.

Hazardous Waste Any inorganic or organic element or compound that because of its toxicological, physical, chemical or persisting properties, may exercise detrimental acute or chronic impacts on human health or development.

Method Statement A written submission by the Contractor to the Project Manager in response to the Specification setting out the plant, materials, labour, timing and method the Contractor proposes using to carry out an activity. The Method Statement shall cover applicable details with regard to:

- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/material will be moved while on site
- How and where material will be stored The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or solid material that may occur
- Timing and location of activities
- Compliance/non-compliance with the Specifications
- Any other information deemed necessary by the PM.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was before disruption, or to an improved state.

Servitude A servitude is a right to access which allows a local authority access to a property for inspection or installation of roads, pipes, sewerage lines and electricity cables, etc. It is registered against the title deed.

Solid Waste Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste, e.g. plastic packets and wrappers.

Topsoil The layer of soil covering the ground that allows for the successful germination of seeds, water penetration and is a source of microorganisms and plant nutrient.

Watercourse A natural channel in which water flows regularly or intermittent

EXECUTIVE SUMMARY

1.0 BACKGROUND INFORMATION

The Government of Malawi, through the Roads Authority (RA) with funds from the Common Market for East and Southern Africa (COMESA), intends to rehabilitate and upgrade a section of the M1 national road starting from the Kamuzu International Airport (KIA) turn-off to the Mzimba over a distance of 234 km. The project is estimated at USD 120 Million and is estimated to commence from March 2020 and will be for ……years. The total estimated work force is over 1000 workers in all the three phases of the project. The M1 is the backbone of Malawi's road network and it facilitates regional trade and tourism with Mozambique and with other neighbouring countries such as Zambia and Tanzania. The upgrade will provide national benefits as it is a major route from Lilongwe northwards and carries significant local traffic serving district administrative centres and trading centres along its route.

Various forms of traffic make use of the project road including heavy and light duty goods vehicles, buses, pick-ups, mini-buses, passenger cars and non-motorised traffic (NMT), mainly bicycles and pedestrians. Animal drawn carts are also known to use the road. The cyclists and pedestrians must share the road with fast moving vehicles because the road does not have sealed shoulders for most of its length. This results in dangerous situations, which will be alleviated through the proposed rehabilitation and upgrading of the M1 road.

2.0 SCOPE AND NATURE OF THE PROJECT

The proposed design standards have taken into account the road environment, road conditions, traffic characteristics and driver behaviour with the aim of providing a road with an alignment and cross-section that are not only the best compromise between operational efficiency, safety and economy but also minimises any adverse environmental and social and cultural impacts.

The existing road conditions were assessed by the project engineers to determine the necessary upgrade and rehabilitation measures and inform the preliminary design. Based on the prevalence of the defects and traffic volumes, the project road has been divided into three sections: Section 1 runs from KIA to Kasungu (102 km long); Section 2 runs from Kasungu to Jenda (83 km long); and Section 3 runs from Jenda to the Mzimba turn-off (49 km long).

The investigations undertaken by the project engineers found that in general, the paved width is too narrow to safely accommodate the mix of traffic using the road, particularly between the KIA turn-off and Kasungu (Section 1). Further, it was found that sections of the road, particularly in Section 1, have achieved their design life and require rehabilitation. It is proposed that the carriageway be widened and the shoulders sealed. To improve the riding quality of the road, all of Section 1 and parts of Section 2 should receive a minimum of 100 mm crushed stone overlay or an asphalt concrete (AC) overlay. The horizontal road alignment will remain mainly unchanged. The design speed of 100 km/h was applied throughout the horizontal alignment except for in the trading centres where the road design speed is 60 km/h.

Traffic calming measures are recommended in the trading centres. Works proposed in the main trading centres include widening of the road to 11 m surfaced width, use of rumble strips, speed humps and centre islands; raised pedestrian walkways; concrete-lined side drains; and bus stops and truck lay-by's. Three preliminary design options have been considered, namely Option A - 'do

nothing' option or construct and rehabilitate the road to either a 15-year design life (Option B) or to a 20-year design life (Option C). The proposed period for completion of the works varies with each rehabilitation option.

Workers will be formally employed by the Contractor during the construction phase and employment opportunities will further be created through spin-off activities such as informal caterers, informal transport services, etc

There are ten bridges between the KIA turn-off and the Mzimba turn-off, as well as 220 minor culverts and 20 major box and pipe culverts. None of the bridges or major culverts show significant distress but they will all need to be widened to accommodate the proposed wider cross-section of the road and ensure safe passage of NMT. Pedestrian access and safety will be improved by providing kerbs between the carriageway and the shoulder on the bridges that are in trading centres. Other improvements associated with the upgrade of the 10 bridges include the implementation of erosion control measures, repair of drainage chutes and formalising footpaths with concrete staircases on the side of the road embankment. Other ancillary upgrade activities include replacing road signs, upgrading safety barriers and cleaning culverts and side drains.

The road upgrade and construction activities will require water and the extraction of source materials such as sand, stone and gravel. The materials investigation has identified the location of material deposits, quarry sources and water sources along the M1 road from KIA to the Mzimba spurs: 13 potential water sources for construction purposes; 45 potential borrow pits; and four existing quarries and two potential quarries have been identified. The borrow pits and quarries will be subjected to tests by the road engineer during the detailed design phase to determine the volumes and suitability of the material for use during construction.

Where possible, existing borrow areas and quarries will be used by the Contractor rather than opening new greenfield areas. Rehabilitation and reinstatement measures for borrow pits and quarries are included in the Environmental Management Plan (ESMP) and the approach for compensation required to land owners is described in the RAP. An inventory of the utilities that may be affected by road construction activities was carried out and the potential impact on existing utilities was discussed with the relevant agencies.

The road construction and upgrade project will use different types of equipment and machinery including earth moving equipment, compactors, other lighter equipment and heavy excavators. The location of construction camps and laydown areas is not known at this time. It is likely that the Contractor will use sites from previous road construction activities. Guidelines for site selection and management are recommended in the ESMP.

There will be temporary disruptions to traffic and to the local population in these settlements during the upgrade and establishment of side roads, drains, pavements, bus shelters, etc. Traffic will be managed during the construction phase through the establishment of diversion roads or by using half-width construction methods. The diversion roads will be approximately 7 m wide and mostly, if not all, within the 60 m road reserve.

The baseline environmental and social investigations indicate that land use is mainly subsistence in the form of arable land and pasture on agricultural soils of moderate quality with a very good economic potential and the existing soil type is predominantly laterite. Major rivers that cross the M1 project road include the Bua River (km 77.0) and Dwangwa River (km 124.0) in the Kasungu District and the South Rukuru River (near town of Jenda) in the Mzimba District. The project area is located in an ecoregion that is categorised by the World Wildlife Fund (WWF) as the Central Zambezian Miombo woodlands ecoregion. The vegetation of the project area has been almost totally transformed by subsistence agricultural activities with a range of crops being grown including maize and tobacco.

The proposed road passes through customary land controlled by Traditional Authorities in all four districts. In the trading centres and larger towns such as Dowa, Mponela and Kasungu, the land is owned by the councils, private institutions and individuals. The dead are buried in small graveyards, thirteen of which were noted along the M1 road. Where these graves are located within the 30 m road reserve, the Contractor will be instructed not to disturb them in any way. Measures to avoid disturbing the graves will be provided in the ESMP and these will include identifying each grave and graveyard as a no-go area.

3.0 JUSTIFICATION FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

It is anticipated that the planned project activities will generate positive and negative environmental and social impacts. Construction activities for the proposed road works are likely to impact the environment and social activities around the proposed project sites.

The need to undertake an environmental and social impact assessment for the proposed road construction works emanates from the following legislative requirements. The Environment Management Act (EMA) of 1996 and the Guidelines for ESIA in Malawi (1997) require that an Environmental and Social Impact Assessment (ESIA) is undertaken for certain projects such as construction and rehabilitation of roads prior to them being implemented. As the proposed road upgrade may result in economic and involuntarily displacement of stakeholders, a Resettlement Action Plan (RAP) will be prepared. Under section 24 (1) of the Environmental Management Act (EMA), 1996 and the Guidelines for Environmental Impact Assessment 1997 (List A, page 25), the proposed project falls under the prescribed projects for which an environmental impact assessment is mandatory.

4.0 APPROACH TO PREPARATION OF THE ESIA REPORT

Preparation of this ESIA report was through field investigations, stakeholder consultations and interviews of representatives from key stakeholder institutions. Preparation of this report also involved review of relevant literature, reference to the relevant legislation which governs preparation of Environmental and Social Impact Assessments (ESIAs) in Malawi. The consultant's experience in similar works played a major role in the assignment.

5.0 SUMMARY OF POTENTIAL POSITIVE AND NEGATIVE IMPACTS AND THEIR ENHANCEMENT AND MITIGATION MEASURES

The rehabilitation of the section of the M1 Road from KIA turn-off to the Mzimba turn-off will have both positive and negative impacts on the surrounding environment. The significance of potential impacts arising from the road upgrade activities were assessed for biophysical, social and cultural heritage aspects. The sub-section below provides a summary of potential positive and negative impacts and their enhancement and mitigation measures;

5.1 POTENTIAL POSITIVE AND THEIR ENHANCEMENT

a. Reduction in Travel Time and Costs

The rehabilitation of the road will give result in a reduction in travel time and costs.

Enhancement Measures

- Support socio-economic development in the project districts, the region and neighbouring countries such as Tanzania, Mozambique and Zambia;
- Open up previously untapped tourism areas, thus affording local communities business opportunities, tourism opportunities through enhanced access;

- Enhance local and regional trade;

b. Reduction in Travel Time and Costs

The rehabilitation of the road will give result in a reduction in travel time and costs.

Enhancement Measures

- Improve linkage to markets, hospitals and other social amenities;
- The upgraded road will reduce the costs associated with wear and tear on vehicles;
- Road safety will be improved because the road will be wide enough to allow for other road users such as cyclists and pedestrians;

- The upgrading of the M1 Road will result in reduced travel time as vehicles will be able to move faster, covering longer distance is shorter time periods

c. Employment Opportunities for Local Community Members including Women

Road construction activities are a source of employment both for the local community and the specialised service sectors. This gives rise to both direct and indirect positive impacts.

Enhancement Measures

- Employment of work force mainly from the locality where the construction work is on-going;
- Employment of women and provision of training for women in the different skills; and
- Employment, wage system, and other administrative measures for the local workforce should be in line with Malawian legislation.

d. Creation of Income-Generating Activities

The Project impact areas will benefit from increased business opportunities as a result of the construction works throughout the entire length of the M1 Road. The people at the campsites and the entire Project labour force will require a lot of food items such as vegetables and maize. This will create a market for the community and will contribute towards poverty alleviation in the project impact areas.

Enhancement Measures

- Creation of jobs by hiring direct and indirect labour;
- Employ people from surrounding communities
- Increased transfer of competencies related to the mobilization of temporary staff (Qualification and training);
- Increase in indirect multiplier effects on the local economy (including procurement of goods, money spent in the area by workers), resulting from the acquisition of equipment, material and services;
- Stimulation of local and regional economy, related to mobilization of temporary staff with the payment of wages and the demand for services and local and regional suppliers; and
- Increased direct effects on the economy (market) for the acquisition of material, goods and services.

5.2 POTENTIAL NEGATIVE IMPACTS AND THEIR MITIGATION MEASURES

a. Damage to local cultural heritage features such as graves archaeological, historical, religious and cultural value;

- Identify and prioritise cultural heritage sites prior to construction activities;
- Avoid any road alignment that cuts through known cultural heritage sites;
- Prepare a 'chance-find' procedure and ensure Contractor is familiar with proposed procedures to be followed in the event of a 'chance-find';

- Incorporate additional clauses in the contract document with respect to any extra works that may be required for protection and preservation of cultural heritage sites;
- Prior to any construction activities commencing in an area, the Contractor's community liaison officer to discuss location of known cultural heritage artefacts in the immediate construction area

b. Traffic congestion and disruption during construction caused by increase in construction vehicle traffic transporting equipment and personnel;

- Minimizing accidents with implementation of proper traffic operation and regulations;
- Ensure that the road is clearly marked for cyclists and pedestrians;
  Design and install road safety signage and speed limit signs during construction and operation.

c. **Safety risks to pedestrians and general public due to the transportation of materials and construction equipment;**

- Install road safety signs and speed limits especially when the road is passing through trading centres and close to schools;
- Enforce road safety rules;
- Intensify road safety campaign for all road users
- Set aside funds for road maintenance

d. **Health-related Impacts such as increase in Spread of HIV and AIDS, increase in pregnancies among young women;**

- Mainstream HIV and AIDS in the road upgrade activities by:
- Raising awareness and providing education to workers and the surrounding community;
- Supply condoms to workers at no cost;
- Facilitate workers being allowed to visit their families, e.g. month end long weekends;
- Provide guidance on good nutrition for HIV and AIDS infected workers

e. Disrupt farming and commercial activities;

- Minimize splitting of a community by taking into account local movements during design stage;
- Provide for improved crossings during the design stage;
- Ensure communities are made aware of the short-term nature of the project
- Provide alternative arrangements for local traffic movements, *e.g*. signals, service roads, etc;
- Roads Authority (RA) to provide service areas adjacent to upgraded / widened road sections and encourage local businesses to make use of new opportunities provided.

f. Labour influx ;

- Employ more people from surrounding communities

g. Damage to properties due to clearing of land and earthworks

- Ensure communities are made aware of the short-term nature of the project
- Provide for improved crossings during the design stage;

h. The demand for water during the construction phase will exert pressure on the existing water supply sources

- Abstraction of water for construction purposes shall take into consideration the requirements for local potable water supplies and the riparian rights of the people downstream

i. Generation of solid waste and hazardous waste, *e.g.* chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil

- The Contractor to prepare and implement a Waste Management Plan; and
- Dispose of debris and other wastes at appropriate places as designated by the relevant councils

j. Borrow pit impact

- Where sufficient fill material is available, borrow sites are to be backfilled with topsoil and revegetated to return the ground surface to its original landform;
- Backfilled material shall be adequately compacted to prevent erosion of surface materials and to avoid settlement and creation of depressions in which water will collect

k. Loss of biodiversity along the road corridor

- Only vegetation falling directly in the demarcated access routes will be removed where necessary after consultation with the appointed Environmental Control Officer
- Retain existing vegetation and ground cover where possible to limit areas of exposed soils, which may be transported to watercourses through overland flow;
- Restrict vehicle or equipment access to paved or surfaced areas to minimize disruption of existing site vegetative cover;

l. Vehicular movement may cause a localised increase in dust levels leading to an increase in particulate matter

- Application of dust control products to reduce the dust levels during the construction phase;
- Prepare environmental specifications for contractors;
- Enforce existing regulations for air quality control; and
- Avoid application of dust control chemicals to road surfaces near watercourses or over watercourse crossings

6.0 CONCLUSION AND RECOMMENDATIONS

The ESMP and Monitoring Plan have been prepeared and summarizes the potential environmental and social impacts identified and provides details on the measures, responsibilities and scheduling to mitigate these impacts, costs of mitigation and monitoring and supervision. The following aspects among others are included in the ESMP:

- Summary of impacts;
- Description of mitigation measures;
- Monitoring programme including objectives and indicators;
- Legal requirements;
- Implementation schedule;
- Reporting; and
- Cost estimates

The ESMP includes the monitoring objectives and specifies the type of monitoring required. It also describes environmental performance indicators, which provide linkages between impacts and mitigation measures identified in the ESIA report.

In conclusion, the sustainable improvement of the transport system is one of the Malawian government's declared development-policy goals. Besides energy supply, the lack and poor quality of roads place a major constraint on national socio-economic development. By rehabilitating a major stretch of the M1 road, the project will make an important contribution to improving the national transport system. Further, the road rehabilitation will improve access to social and economic infrastructure and with that make a contribution to growth and poverty reduction. The upgraded road will assist to provide quicker access for the transportation of agricultural inputs and produce and access to health, school, markets and other social amenities.

The community members and traditional leaders welcomed the proposed project and it was envisaged that it will generate a number of positive impacts. The stakeholders requested the authorities to speed up the upgrade and rehabilitation of the M1 Road.

The following recommendations are made:

Contractor to update (as necessary) and implement the proposed ESMP and monitoring plan;

- The project tender and construction contract must include appropriate environmental clauses and ensure independent environmental supervision through recruitment of Environmental Manager and Community Liaison Officer with RAP expertise as part of the supervision consulting service for effective implementation of proposed mitigation management and monitoring measures; and
- The Roads Agency to ensure that the RAP is implemented.

It is recommended that the project road should be upgraded and rehabilitated provided the ESMP is implemented and that strict monitoring measures are instituted both from engineering and environmental standpoints, considering the need to protect the environment while achieving economic development.

CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

1.1.1 Background and Rationale for Project

The Government of Malawi, through the Roads Authority (RA) with funds from the Common Market for East and Southern Africa (COMESA), intends to rehabilitate and upgrade a section of the M1 national road (Figure 1) starting from the Kamuzu International Airport (KIA) turn-off to the Mzimba turn-off over a distance of 234 km. The project is estimated at USD 120Million and is estimated to commence from March, 2020. The total estimated work force is over 1000 workers in all the three phases of the project.

The M1 is the backbone of Malawi's road network and it facilitates regional trade and tourism with Mozambique and with other neighbouring countries such as Zambia and Tanzania. The M1 through Malawi offers the shortest import/export route to Dares Salaam for Zambia's agriculturally important Eastern Province. The road thus forms an important link for the importation and exportation of strategic goods. Fuel is the main product handled but the road also provides for the import of goods to the mining activities along the road corridor. The regional location map (Figure 2) shows the importance of this link with respect to the Main Corridors of the COMESA North South Corridor Network. Lilongwe is a strategic junction city as it joins the North South Corridor to the Nacala Road Corridor.

The upgrade will provide national benefits as it is a major route from Lilongwe northwards and carries significant local traffic serving district administrative centres and trading centres along its route.

Various forms of traffic make use of the project road. This includes heavy and light duty goods vehicles, buses, pick-ups, mini buses, passenger cars and non-motorised traffic (NMT), mainly bicycles and pedestrians (Plate 1). Animal drawn carts are also known to use the road. The cyclists and pedestrians must share the road with fast moving vehicles because the road does not have sealed shoulders for most of its length. This results in dangerous situations, which will be alleviated through the proposed rehabilitation and upgrading of the M1 road.

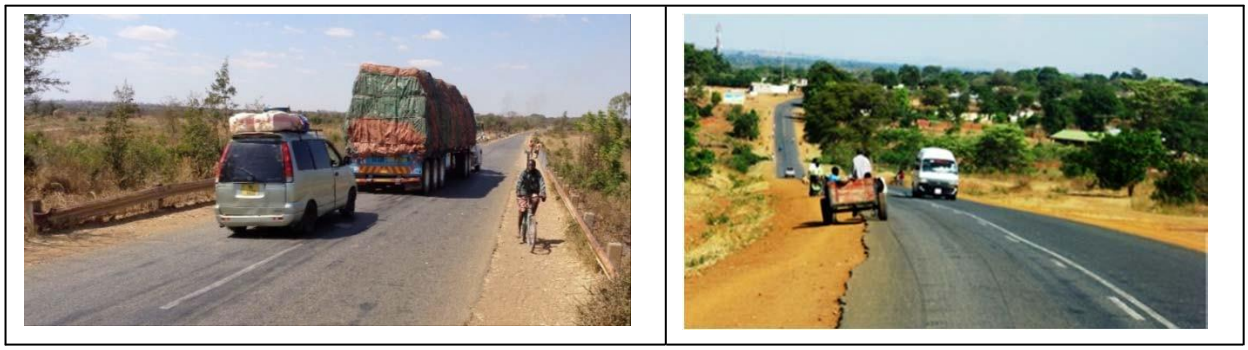


Plate 1: Typical Traffic on the Road

The Environment Management Act (EMA) of 1996 requires that prescribed projects such as construction of roads undergo an Environmental and Social Impact Assessment (ESIA) before they are implemented. The Guidelines for ESIA in Malawi (1997) indicate that the rehabilitation and

upgrade of the section of the M1 national road requires an ESIA. As the proposed road upgrade may result in economic and involuntarily displacement of stakeholders, a Resettlement Action Plan (RAP) will be prepared.

COMESA through the Malawi RA awarded Roughton International Ltd (United Kingdom) in association with Wataya Consulting Engineers Ltd (Malawi) and African Economic Group (Malawi) the contract to conduct the Feasibility Study and Detailed Engineering Design of the 234 km road from the KIA turn-off to Mzimba turn-off crossings including three high level bridges. North of the Kachinda turn-off, the terrain becomes hilly and the road passes through the Kaning'ina Forest Reserve before reaching Jenda (Figure 1).

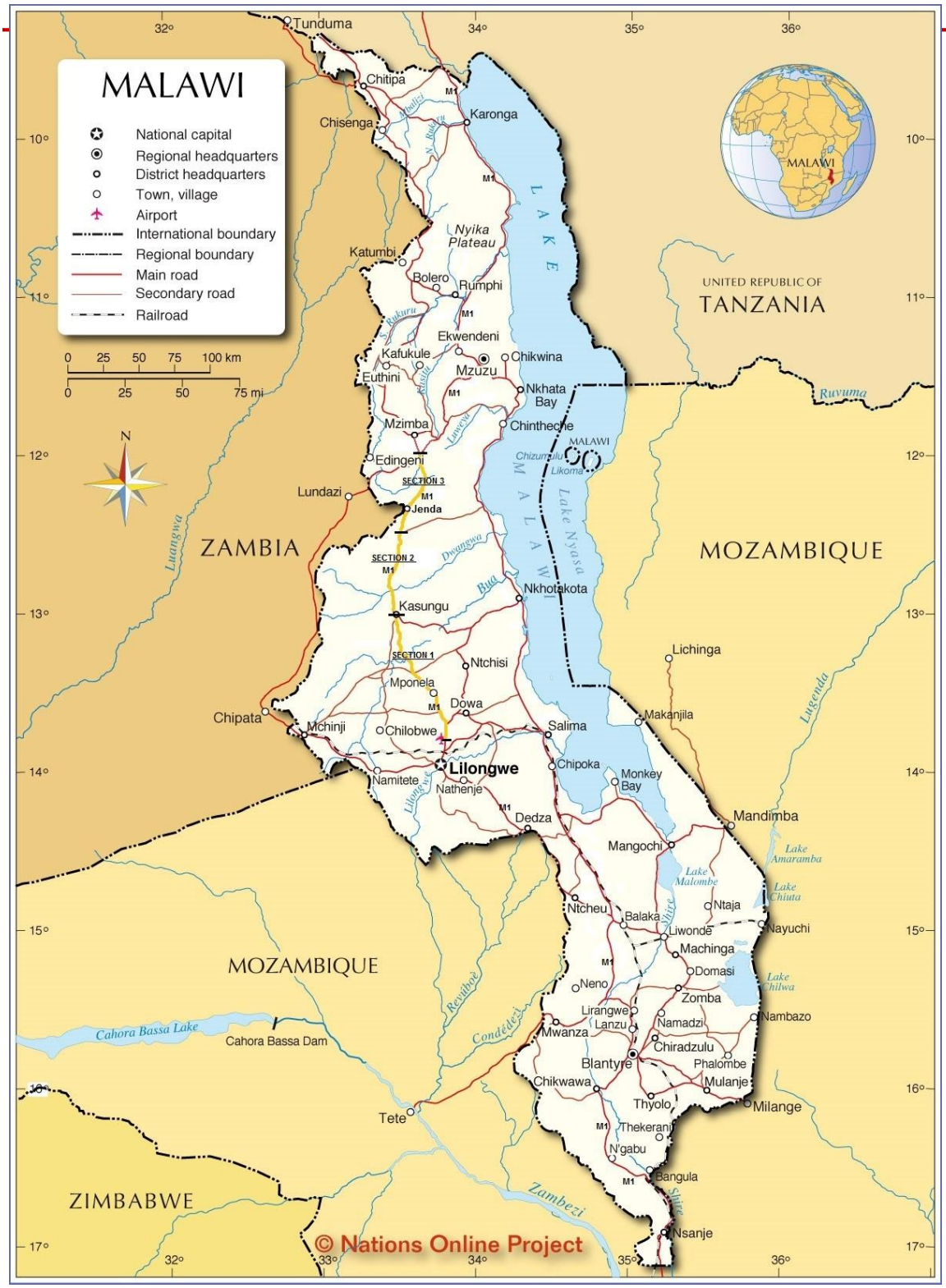


Figure 1: Location of the Project Road indicating three proposed sections (yellow line)

North of Jenda there are fewer trading centres and settlements with far fewer people were noted on the road relative to the area south of the Kachinda turn-off. The road passes through the Perekezi Forest Reserve before reaching the turn-off to Mzimba.

1.2 PROJECT PROPONENT AND ESIA CONSULTANT

Details of the project proponent are as follows:

Proponent Name:	Roads Authority
Postal Address:	Private Bag B 346, Lilongwe 3, Malawi
Physical Address:	Functional Building, Off-Paul Kagame Road, Lilongwe
Contact Person:	The Chief Executive\

Roughton International Ltd (United Kingdom) in association with Wataya Consulting Engineers Ltd (Malawi) and African Economic Group (Malawi) was awarded the Feasibility Study and Detailed Engineering Design project. The details of the ESIA Consultant are as follows:

Roughton Consultants
A2 Omega Park
Electron Way
Chandlers Ford, Hampshire
SO53 4SE, United Kingdom
Email: info@roughton.com / melissa@africanlitany.co.za

The team which carried out the ESIA and key positions are listed below and relevant CVs are included in Annexure A.

Melissa Moffett	ESIA Specialist
Rex Kanjedza	Social and Public Consultation Specialist
Robert Geddes	Project Engineer and Feasibility Study Team Leader
Kingsley Wataya	Project Engineer

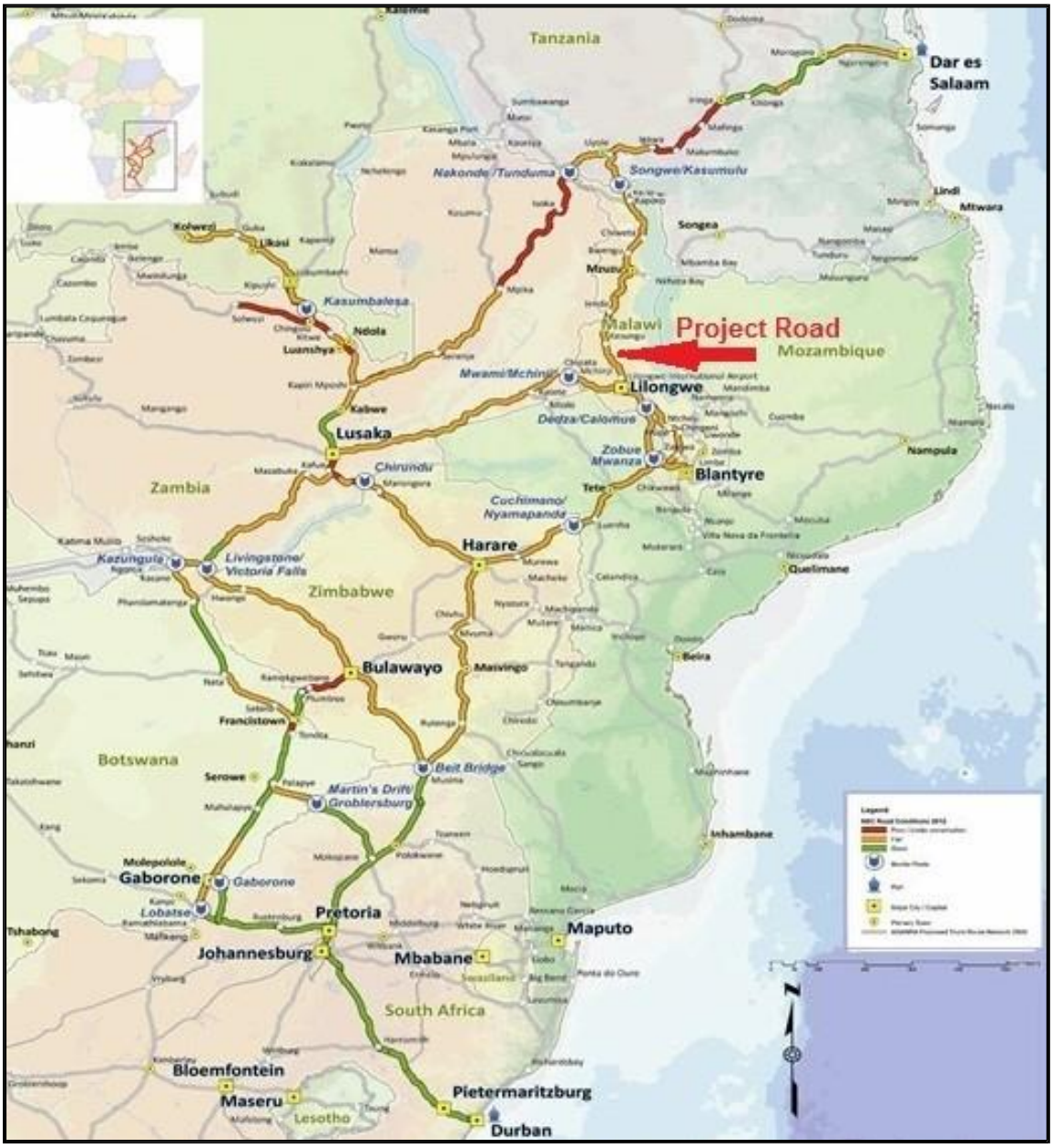


Figure 2: Regional location map showing the main corridors with respect to Project Road

1.3 PROJECT LOCATION

The specific project location is as presented on the attached maps.

1.4 APPROACH AND METHODOLOGY

The EIA process involves several stages as shown in Figure 3. Roughton, in keeping with the requirements of the EMA of 1996, prepared and submitted a Project Brief and an ESIA terms of reference (ToR) to the Director of the Environment Affairs Department (EAD).

The Project Brief contained a description of the project, listed the project activities to be undertaken to implement the project, the likely impact of those activities on the environment and the segments of the environment likely to be affected by the road upgrade project. The ESIA ToR covered the issues to be addressed in the ESIA study. Correspondence was received from the EAD in response to the Project Brief and ToR (attached as Annexure A) whereby Roughton was requested to proceed and undertake an ESIA.

The approach and methodology for conducting the ESIA included using secondary data sources to review documents such as study reports, policies, legislations, and national strategies, regional and global protocols related to road construction projects.

The approach and methods used and structure of the ESIA report are briefly outlined below:

a. Preparation of the ESIA began with the projects revision and description at the preliminary design stage (Chapter 1). Reference was made to the preliminary design and other relevant reports prepared by the project engineers to obtain relevant information.
b. This is followed by the legislation and regulatory framework the environmental planning and design (Chapter 2). This chapter includes a discussion of the environmental planning that has gone into the project. The issues that have been taken into account for avoiding and minimising impacts, for capturing potential benefits, for compensating residual impacts and for impact management are discussed.
c. The baseline environment / environmental setting (Chapter 3) was determined using a number of methods including: Review of existing information, field surveys, national and international database searches (literature reviews), meetings with relevant stakeholders and institutions, maps and aerial imagery, site visits where the existing condition of the physical, biological and social environments in the project area was noted, as well as trends and the anticipated future environmental conditions should the project not go ahead, and identifying environmentally sensitive areas of special biophysical, socio-economic or cultural value.
d. Public consultation is mandatory when undertaking an ESIA and the methods and results of these consultations are to be included in Chapter 4). In line with the EIA Guidelines and the Resettlement Management Framework, the team ensured that stakeholders in the project area, particularly the communities in the project area, were consulted to give their views on the project with consultations being conducted in all the trading centres and selected villages along the road. In addition, the ESIA team held consultations with traditional leaders and government officials in the 4 district headquarters, *i.e*. Lilongwe, Dowa, Kasungu and Mzimba District. Meetings were also held with communities in a number of trading centres in each district. The issues and concerns raised regarding the proposed project are summarised in Table 20 and have been incorporated in the ESIA.
e. After field visits to the project area and conducting stakeholder consultations, the team systematically analysed the information and data collected. The potential environmental and social impacts were identified, justified and assessed to pre-defined evaluation criteria (Chapter 6). This involved the identification of the environmental, social and cultural impacts associated with the project, focusing on both positive and negative impacts on biophysical, chemical, ecological, social, economic and cultural components of the environment.
f. Mitigation and monitoring needs were then listed and Environmental and Social Management and Monitoring Plans were prepared (Chapter 7). This chapter includes proposed feasible and cost-effective measures and procedures to prevent and mitigate significant negative impacts and to enhance benefits. Operational and management procedures are listed and guidelines for monitoring plans are included. The responsibilities and roles for the Developer, Consultant, Contractor(s), public agencies and stakeholders in environmental management are listed.
g. The overall assessment and key conclusions and recommendations are presented in Chapter 8.

A draft ESIA, ESMP and RAP are now submitted to the RA for their comments. Upon receipt of the comments, the consulting team will produce final draft reports and submit these to the RA for onward submission to the EAD.

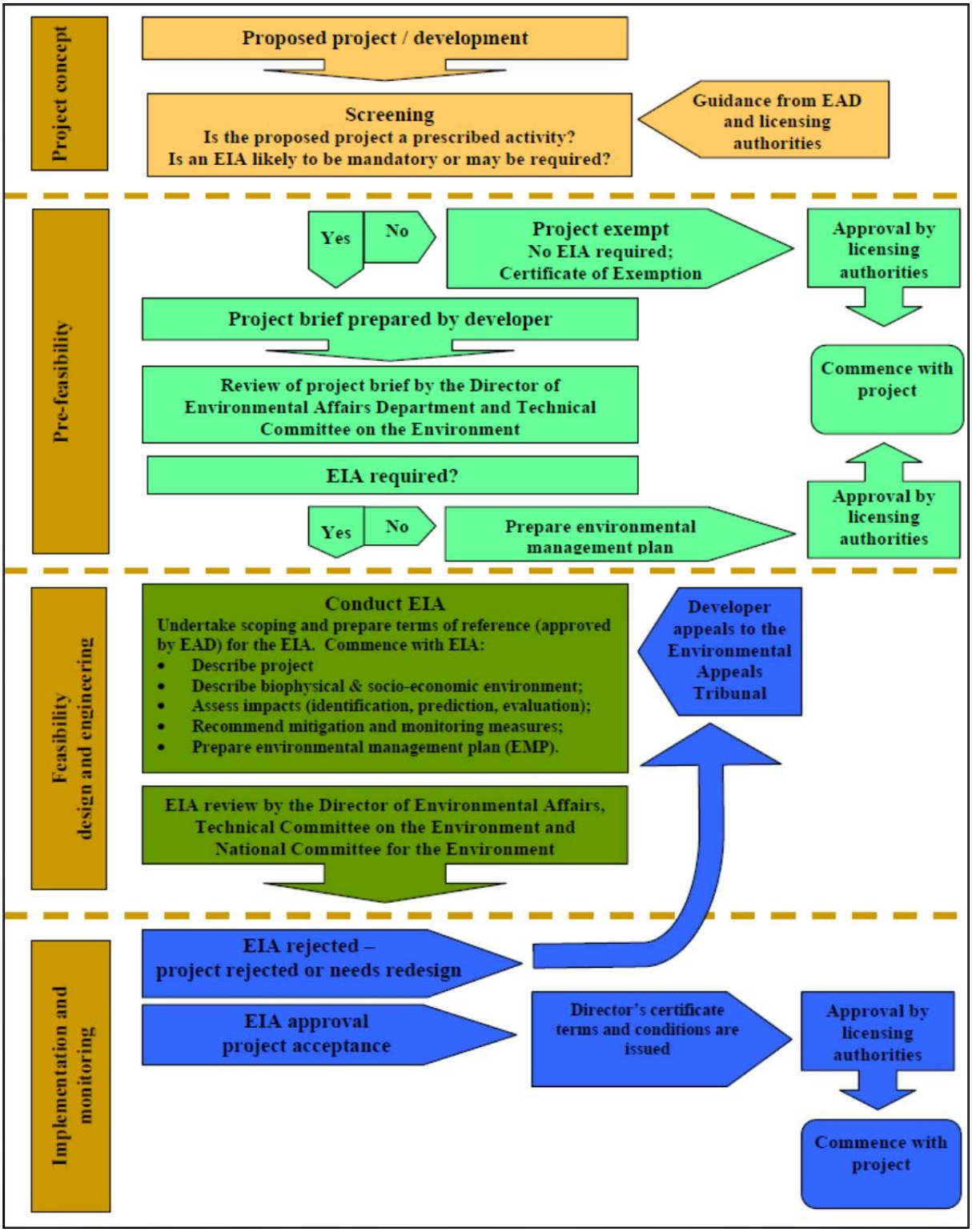


Figure 2: ESIA Process in Malawi

CHAPTER TWO: PROJECT DESCRIPTION

This section provides a description of the proposed road upgrade and rehabilitation activities and of the geometric road design. It also indicates the extent of the environment that may be affected by the proposed upgrade activities that includes the 60 m right of way (RoW); the location of the proposed materials (quarries and borrow pits) and water sources; and the trading centres, etc.

The layout of the road as described in this section has been designed to meet the specific needs of road users and involves the selection of suitable road widths and horizontal and vertical alignments in accordance with appropriately prescribed standards, *i.e.* Southern Africa Transport and Communications Commission (SATCC) of 2001 as required by COMESA.

2.1 PROJECT DESIGN

The proposed design standards have taken into account the road environment, road conditions, traffic characteristics and driver behaviour with the aim of providing a road with an alignment and cross-section that are not only the best compromise between operational efficiency, safety and economy but also minimises any adverse environmental and social and cultural impacts. This required the project team to obtain a thorough knowledge of the local road environment as this affects every aspect of the design process. This section describes the following aspects in detail:

- Existing road and traffic conditions;
- Preliminary design options;
- Sources of road materials (quarries, borrow pits and water supply);
- Accommodation of traffic during construction phase;
- Construction period; and
- Preliminary construction cost estimates.

The road design options proposed in this section are based on the terms of reference (TORs) issued by the Client, on the initial findings of the site visits undertaken by the project team and on discussion with various stakeholders including the Client (Roads Authority).

2.1.1 Existing Road Conditions

The existing road conditions were assessed to determine the necessary upgrade and rehabilitation measures and inform the preliminary design. The road conditions from the start to end of the route are illustrated in the photographs below (Figure 3).

	
Reconstructed gravel on the shoulders	Old Road Surface with Potholes
	
Severe Crocodile Cracking and Patches	
	
Rumble strips leading to bridge	Non- Motorized Vehicle in the carriageway

Figure 3: Typical Road Conditions (Source: Roughton Preliminary Design Report, 2016)

The project road is divided into three sections based on the prevalence of the defects in each area. The first section runs from KIA to Kasungu (102 km long), the second section runs from Kasungu to Jenda (83 km long) and the third section runs from Jenda to the Mzimba turn-off (49 km long):

Section 1: KIA – Kasungu (Km 0 – Km 102)

- There is an existing gravel shoulder on both sides of the carriageway with a minimum width of 1.5m. This shoulder is in fair condition but it was noticed that pedestrians often choose to walk on the carriageway causing conflict with traffic. In the few areas where a paved shoulder exists, this problem is alleviated. In some locations there is a step down from the carriageway due to erosion of the shoulder and gravel loss.
- There is a significant amount of edge break throughout Section 1 causing unsafe driving conditions. The problems with edge break have been partly dealt with by patching the edge of the carriageway. However, in many instances, this patching is itself beginning to crack and fail and, consequently, further patching is required.
- Large potholes have frequently formed across the carriageway. These are being repaired in a reactive manner by the RA. During the survey many sizeable, open potholes were encountered, which create a danger to the travelling public, particularly at night when they are not visible. There was evidence of many pothole repairs over the life of the road.
- Cracking was observed on about 40 % of the length of the section.
- Surface texture has reduced considerably along this section of the project road. Polishing has occurred in the wheel tracks and the surface is bleeding in places. This has compromised safety by reducing the skid resistance of the road.
- There are several 100 m kerbed bus stops along the project road. Where present these seem to be well used and to be effective at removing stationary traffic from the road, improving safety. The condition of these bus stops is generally good. However the joint between the bus stop and the carriageway surfacing is often damaged and should be repaired.

Section 2: Kasungu – Jenda (Km 102 – Km 187)

- After Kasungu, the condition of the project road improves. The section between the KIA turn-off to Jenda was constructed in the early 1980s and a portion of this section between Chatoloma and Jenda was resealed in 2005.
- There is an existing gravel shoulder on both sides of the carriageway with a width of 1.5m. This shoulder is generally in good condition. However, it was noticed that pedestrians often choose to walk in the carriageway causing conflict with traffic. In the few areas where a paved shoulder exists, this problem is alleviated.
- While edge break is a problem throughout this section, the degree is much less severe than Section 1. There are isolated areas where the degree of edge break is severe, for example at Km 119 and Km 139+300.
- There are fewer potholes than in Section 1.
- Some cracking was recorded but it affects less than 10 % of the length of the section.
- There are several 100 m kerbed bus stops along the project road. They seem to be well used and to be effective at keeping stationary vehicles off the carriageway, improving safety. The condition of these bus stops is generally good. However, the joint between the bus stop and the carriageway is often damaged and should be repaired.

Section 3: Jenda – Mzimba turn-off (Km 187 – Km 234)

- Generally, the condition of the road between Jenda and the Mzimba turn off is substantially better than Section 1 and 2.

- The gravel shoulder has an average width of 1.0m throughout this section.
- Section 3 passes through hilly terrain with high fills and some cuttings.
- The section has less motorised and NMT than the preceding two sections.
- In general, there are no problems with edge break throughout this section.
- Metal safety barriers (mounted on concrete posts) were originally constructed on some sharp, high bends. However, in almost all cases the metal safety barrier is missing, (presumably stolen), and so the dangerous bends have been left unprotected.
- The surface texture is better than that found in sections 1 and 2 and the skid resistance is better in this section.
- Very few potholes were recorded, few patches were noted and very little cracking was evident.
- There are several 100 m kerbed bus stops along the project road. They seem to be well used and to be effective at removing stationary traffic from the road, improving safety. The condition of these bus stops is generally good. The joints between the bus stop and the carriageway also appear to be in good condition throughout this section although they would still benefit from some basic maintenance.
- Section 3 passes through hilly terrain and has lower design standards including narrower shoulders and steeper side slopes (Plate 4).

Figure 4: Steep side slope north of Jenda

2.1.2 Preliminary Road Design

The regional SATCC trunk road standards (SATCC, 2001) recommended by COMESA have been adopted, where economically justified, for the design of this road upgrade. These include a roadway of 11 m (rural areas) made up of 2 x 3.5 m lanes and 2 x 2.0 m shoulders (Table 1).

Table 1: SATCC Trunk Road Standards (SATCC, 2001)

Road Section	Carriageway Width	Sealed Shoulders	Raised kerbed
Rural section	3.5 m	2 m	-
Settlements	3.5 m	1 m	2 m

The right of way (RoW) is 60 m, namely 30 m either side of existing centre line. However, this is not always available in settlements due to existing encroachment.

The investigations undertaken by Roughton International found that in general, the paved width is too narrow to safely accommodate the mix of traffic using the road, particularly between the KIA turn-off and Kasungu (Section 1, see Figure 1). Further, it was found that sections of the road, particularly Section 1, have achieved their design life and require rehabilitation.

The carriageway will therefore be widened and the shoulders will be sealed, requiring the top layer of such sections to be reworked. To improve the riding quality of the road, all of Section 1 and parts of Section 2 should receive a minimum of 100 mm crushed stone overlay or an asphalt concrete (AC) overlay.

The horizontal road alignment will remain mainly unchanged. The design speed of 100 km/h was applied throughout the horizontal alignment except for in the trading centres where the road design speed is 60 km/h.

Traffic calming measures are recommended in the trading centres using rumble strips, speed humps and centre islands. Provision has been made in the cost estimates for following works in the main trading centres:

- Widening of the road to 11 m surfaced width;
- Raised pedestrian walkways;
- Concrete-lined side drains;
- Centre islands;
- Bus stops and truck lay-by's; and
- Rumble strips and speed humps.

Three preliminary design options have been proposed for consideration by the RA:

- Option A is a 'do-nothing' option;
- Option B is based on a 15-year design life (Table 2 and Table 3); and
- Option C is based on a 20-year design life (Table 2 and Table 3).

The road widths assumed for the three preliminary design options are summarised in Table 2.

Table 2: Recommended Road Width Options for Preliminary Design

Section	Option A		Option B		Option C	
	Carriagewa	Shoulders	Carriagewa	Shoulders	Carriagewa	Shoulders
Section 1 Km 0 – km 102	6.7m	1.5m (unsealed)	7m	2 x 2m (sealed)	7m	2 x 2m (sealed)
Section 2						
Km 102 - km 121	6.7m	1.5m (unsealed)	7m	2 x 2m (sealed)	7m	2 x 2m (sealed)
Km 121 – km 137	6.7 m	1.5 m	6.7 m	2 x 1.5m (sealed)	7m	2 x 2m (sealed)
Km 137 – km 145	6.7m	1.5m (unsealed)	7m	2 x 2m (sealed)	7m	2 x 2m (sealed)
Km 145 – km 185	6.7 m	1.5 m	6.7 m	2 x 1.5m (sealed)	7m	2 x 2m (sealed)
Section 3 Km 185 – km 234	6.7m	1.0m (unsealed)	6.7m	2 x 1.0m (sealed)	7m	2 x 2m (sealed)

The recommended rehabilitation options considered the need for widening of the existing carriageway and shoulders. On Section 2 and Section 3 the traffic volumes are low (less than about 600 vehicles per day). Therefore, a surface dressing is recommended, except between km 203 and km 223 where an AC overlay is required for strength purposes.

The proposed rehabilitation options for the three road sections are summarised in Table 3 that indicates the carriageway has to be widened and lists the recommended designs for 20 and 15-year design life.

Table 3: Summary of Road Rehabilitation Options for Section 1, Section 2 and Section 3

Section	Option A	Option B	Option C
Section 1 Km 0 – km 102	Do nothing (continue to maintain the road)	• Widen existing base as sub- base and overlay with crushed stone to 11 m wide whole length of road • 50 mm AC surfacing/overlay	• Widen existing base as sub- base and overlay with crushed stone to 11 m wide whole length of road • 50 mm AC surfacing
Section 2 Km 102 – km 187	Do nothing (continue to maintain the road)	• Seal existing shoulders 1.5 m • Retain existing carriageway 3.35 • Widening to 11 m in trading centres Mphomwe, Chatoloma, Nkhamenya and Jenda • Widening to 11m from Km 102 to Km 121 and Km 137 to Km 145 with granular overlay • Widening designed to SATCC 15-year design life • Double surface dressing.	• Widen existing base to 11m entire length of section • Widening designed to SATCC 20-year design life • Granular overlay Km 102 to Km 110 and Km 116 to Km121 • Double surface dressing
Section 3 Km 187 – km 234	Do nothing (continue to maintain the road)	• Seal existing shoulders 1.0 m • Retain existing carriageway 3.35 m • Allow for 2 km widening in trading centres to 11 m	• Widen existing base to 11 m entire length of section • Widening designed to 20-year design life • Double surface dressing • 50 mm AC overlay Km 203

2.1.3 Employment Opportunities

It is estimated that the following number of workers will be employed by the road Contractor(s) during the construction phase:

- Section 1: 600 people (Option 2 and Option 3)
- Section 2: 400 (Option 2) or 600 (Option 3); and
- Section 3: 200 (Option 2) or 500 (Option 3).

In addition to the workers formally employed by the Contractor, there will be employment opportunities created through spin-off activities such as informal caterers, informal transport services.

2.1.4 Drainage Structure Improvements

There are ten bridges between the KIA turn-off and the Mzimba turn-off, as well as 220 minor culverts and 20 major box and pipe culverts. None of the bridges or major culverts show significant distress but they will all need to be widened to accommodate the proposed wider cross-section of the road and ensure safe passage of NMT. Widening of the bridges and major culverts should incorporate concrete parapets as an additional safety measure. Some of the minor culverts will require replacement and extension.

Pedestrian access and safety will be improved by providing handrails and establishing pedestrian walkways. Other improvements associated with the upgrade of the 10 bridges include:

- **Implement erosion control measures** - many of the embankments leading to the rivers are in a poor state, as are some of the river beds. These will be re-worked and gabions/riprap installed to prevent further erosion;
- **Repair drainage chutes** - most of the bridges have drainage chutes on the approaches running down the embankments. These chutes are either filled with vegetation or rubble or are damaged and eroded. Some of this damage has led to embankment erosion, which will be repaired. Vegetation is required on the embankments to prevent erosion, but it has not always been maintained and in some locations is causing damage to structural elements of the bridges (including gabions and riprap); and
- **Formalise foot paths** - many of the rivers are used by the local community for washing and access from the road level is required. Most of the embankments have footpaths that have developed over time. Some of these footpaths have contributed to embankment erosion, which is severe in some cases. These footpaths will be formalised possibly with concrete steps.

2.1.5 Other Ancillary Upgrade Activities

The following activities will also be undertaken as part of the road upgrade and rehabilitation project:

- **Replace road signs** - most of the existing road signs are in fair or poor condition. It is also evident that a high proportion of signs are missing, with only 176 signs recorded on the entire 234 km length of the road. It is assumed that all signs will need to be replaced during the road rehabilitation.
- **Upgrade safety barriers** - metal safety barriers were provided during the original construction of the road on high fills and on approaches to bridges. They were mounted on concrete posts. Most of the posts are still in place but virtually all of the rails are missing. They will be replaced with concrete safety barriers designed according to the recommendations of the Road Safety Auditor.

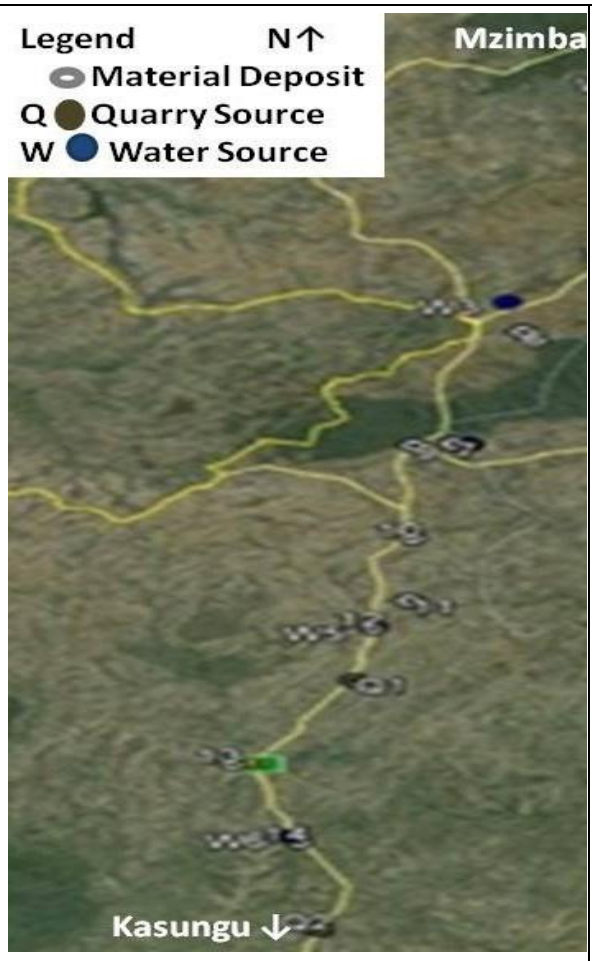
- **Clean culverts and side drains** - some of the relief culverts are filled with debris, rendering them dysfunctional. On some sections of the road, the side drains have been filled due to siltation or human activity. The culverts and side drains will be cleaned as part of the road upgrade.

2.2 SOURCES OF WATER AND ROAD CONSTRUCTION MATERIALS

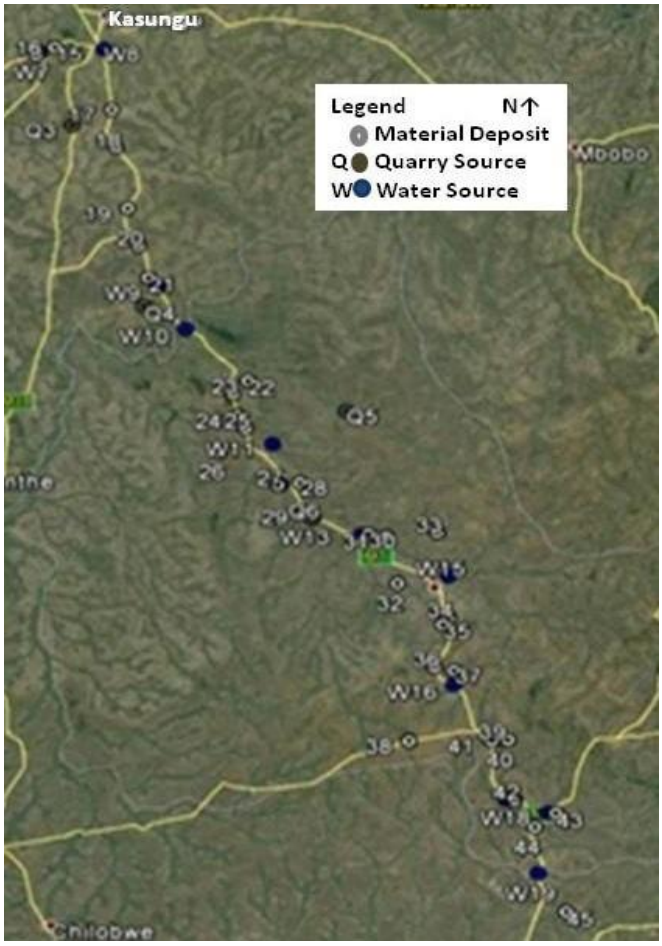
The road upgrade and construction activities will require water and the extraction of source materials such as sand, stone and gravel. Good quality natural gravel and rock for road construction is available in close proximity to the project road. As the sources and quantities are still being verified by the Road Engineers, it is the preliminary findings that are described in this section.

2.2.1 Potential Borrow Pit Deposits

The materials investigation has identified the location of material deposits, quarry sources and water sources along the M1 road from KIA to the Mzimba spurs (**Plate 5**).



Material deposits, quarries and water sources from Kasungu to Mzimba



Material deposits, quarries and water sources from Lilongwe to Kasungu

Figure 5: Overview of borrow pits, quarries and water sources along project road

Forty five potential borrow pits (Table 4) have been identified and will be inspected and subjected to tests by the Roughton Engineers during the detailed design phase to determine the volumes and suitability of the material for use in pavement layers. Borrow pits that contain adequate volumes and suitable material will be used by the Contractor during the construction phase.

Table 4: Location of potential borrow pits along the M1 national road

No.	Eastings	Northings	Deposit	Material	Designation	Distance from road
1	572634	8665143	Large deposit	Laterite Gravel	Base	Roadside
2	571464	8663406	Borrow Pit	Laterite Gravel	Selected Fill	50 m
3	570687	8662104	Borrow Pit - Large	Laterite Gravel	Base	70 m
4	571519	8658135	Quartz /	Quartz Gravel	Selected Fill	50 m

No.	Eastings	Northings	Deposit	Material	Designation	Distance from road
			Deposit			
5	568800	8642263	Borrow Pit	Laterite Gravel	Base	150 m
6	562360	8632767	Borrow Pit	Laterite Gravel	Base	3.5 km
7	558423	8620183	Borrow Pit	Laterite Gravel	Base	3.0 km
8	559316	8620121	Quartz Deposit	Quartz Gravel	Selected Fill	3.6 km
9	556177	8619997	Borrow Pit - Large	Laterite Gravel	Base	300 m
10	556057	8609553	Borrow Pit	Laterite Gravel	Base	800 m
11	555849	8602489	Borrow Pit	Laterite Gravel	Base	6.8 km
12	553836	8599436	Laterite Deposit	Quartz and Laterite	Base / Selected	120m
13	545821	8584043	Borrow Pit	Laterite Gravel	Base	1.4 km
14	549569	8575175	Quartz Gravel	Quartz	Selected Fill	70 m
15	548372	8556066	Borrow Pit	Laterite	Base	4.5 km
16	546842	8555324	Borrow Pit	Laterite	Sub Base	6.8 km
17	553131	8549948	Borrow Pit	Quartz Gravel	Selected Fill	Roadside
18	553497	8546250	Borrow Pit	Laterite	Base	Roadside
19	554515	8540346	Borrow Pit - Large	Laterite	Base	500 m
20	555417	8536728	Borrow Pit - Large	Laterite	Base	500 m
21	556265	8533650	Side Borrow Pit	Laterite	Base	Roadside

22	564429	8523724	Borrow Pit - Large	Laterite	Base	2 km
23	563231	8522452	Borrow Pit	Laterite	Base	300 m
24	563646	8520338	Borrow Pit	Laterite	Base	Roadside
25	564278	8519160	Borrow Pit	Decomposed	Selected Fill	Roadside
26	562214	8516914	Borrow Pit - Large	Laterite	Base	3 km
27	566950	8513718	Borrow Pit - Large	Laterite	Base	800 m

No.	Eastings	Northings	Deposit	Material	Designation	Distance from road
28	568723	8513940	Borrow Pit -	Laterite Quartz	Fill	600 m
29	569124	8511208	Borrow Pit / Quartz	Quartz / Laterite	Base	300 m
30	574268	8509074	Quartz Gravel	Quartz Gravel	Selected Fill	1.3 km
31	575756	8508826	Borrow Pit - Large	Laterite	Base	3.4 km
32	576638	8504382	Borrow Pit - Large	Laterite	Base	2.4 km
33	579819	8509208	Borrow Pit - Large	Laterite	Base	5.5 km tarred access road
34	580733	8501140	Quartz Gravel	Quartz Gravel	Selected Fill	1.2 km Steep
35	580292	8500510	Borrow Pit (side) -	Quartz Gravel	Selected Fill	Roadside
36	579624	8496486	Deposit either side of road	Quartz Gravel	Selected Fill	Roadside
37	581203	8496156	Large deposit	Laterite	Base	2.2 km
38	577600	8489558	Borrow Pit	Quartz Gravel	Selected Fill	6 km Good
39	584917	8489676	Borrow Pit	Quartz Gravel	Selected Fill	800m Good access road
40	585534	8489646	Borrow Pit - Large Deposit	Laterite with clay deposits. Excavation is required for	Used as base after selected excavation	1.6 km

41	584237	8489564	Borrow Pit (side) -	Quartz Gravel and	Selected Fill	Roadside
42	586046	8484038	Borrow Pit - Large Deposit	Quartz Gravel	Selected Fill	Roadside
43	589356	8482752	Large deposit	Quartz and Laterite	Base and	3 km Tarred
44	587686	8481476	Borrow Pit - Large Deposit	Laterite Gravel	Base	600 m Good access road
45	590158	8473554	Large deposit	Laterite Gravel	Base	2.9 km

2.2.2 Quarries Sources

Table 5 lists the four existing quarries and two potential quarries that have been identified (see Plate 5 for location). Determination of the aggregate crushing value (ACV) of material from these quarries will be carried out during the detailed design phase.

Table 5: Location of Potential Quarry Sources

No.	Eastings	Northings	Deposit and Chainage	Distance from road
1	552736	8593435	Quarry Site (km 142+040)	200 m on RHS
2	550709	8565170	Kasungu Chipala Quarry Site (km 110+040)	Roadside 30m on RHS
3	549907	8548438	Quarry Site (km 91+800)	3.4 km on LHS
4	555918	8530872	Potential Quarry Site (km 73+300)	3.6 km on LHS
5	572435	8520774	Quarry Site - Large Deposit (km 58+090)	8.8 km on RHS
6	569709	8510562	Potential Quarry Site - Large Deposit (km 46+990)	200 m on LHS

2.2.3 Water Sources

Thirteen potential water sources for construction purposes are listed in Table 6 and shown in Plate 5.

Table 6: Potential sources of water for abstraction during construction phase

No.	Eastings	Northings	Source type	Distance from road
W1	570571	8661184	South Rukuru River	Intersects main M1 road
W2	571053	8652369	Ruvuri River	Intersects main M1 road
W3	561507	8636131	Kamalabwa Dam	1.9 km
W4	559205	8620106	Kakwale River	3.8 km
W5	553818	8599479	Milenje River	120 m

W6	549268	8575790	Dwangwa River	Intersects main M1 road
W7	547102	8555566	Dam	6.5 km
W8	552351	8555896	Dam	side
W9	556990	8532696	Dam	500 m
W10	559337	8528684	Bua River	Intersects main M1 road
W11	566476	8517664	Stream active only during wet season	1.6 km
W12	567195	8513826	Dam	500 m
W13	569769	8510662	Stream	Intersects main M1 road

No.	Eastings	Northings	Source type	Distance from road
W14	573769	8509028	Perennial River	800 m
W15	580173	8505062	Perennial River	1.1 km
W16	581171	8494816	Perennial River	Intersects main M1 road
W17	585427	8484018	Perennial River	Intersects main M1 road
W18	588676	8482810	Perennial River	2.4 km tarred road
W19	587927	8477146	Small River	Intersects main M1 road

The proposed rehabilitation and reinstatement measures for borrow pits and quarries are included in the Environmental and Social Management Plan (ESMP). Similarly, the approach for compensation required to land owners is described in the RAP.

2.3 UTILITIES

An inventory of the utilities that may be affected by road construction activities was carried out by Roughton International to minimise damage to such structures during the construction phase. The extent and nature of the proposed road upgrade activities and potential impact on existing utilities was discussed with the relevant agencies and feedback as described below was received.

2.3.1 Malawi Telecommunication Limited (MTL)

The MTL provided drawings of the ADSL and optic fibre cables crossing or parallel to the road and advised that they be contacted before any construction work commenced. The optic fibre runs parallel with the road for its full length but it is located 25 m from the road centre line and therefore unlikely to interfere with road widening works.

2.3.2 Electricity Supply Company of Malawi (ESCOM)

Correspondence from the ESCOM stated that no underground utilities occur along the project road. During the site visit it was noted that it may be necessary to relocate some electricity poles in trading centres. This is not expected to present a significant problem.

2.3.3 Water Board

The Water Board operations are divided by District:

- The Lilongwe Water Board provided drawings of the existing pipes crossing or parallel to the project road from the KIA turnoff to Lumbadzi;
- The Mponela Water Supply provided drawings of its water system; and
- The Kasungu Water Supply gave an indication of water pipes parallel or crossing the project road.

2.3.4 Municipal Councils

No sewers were seen in any of the trading centres along the road. Verbal confirmation was received from the Kasungu Municipal Council that there are no sewers located along the M1 road.

2.4 TECHNOLOGY, METHODS AND PROCESSES TO BE USED DURING IMPLEMENTATION

2.4.1 Construction Equipment and Machinery

The road construction and upgrade project requires the use of different types of equipment and machinery during the construction phase such as earth moving equipment, compactors, other lighter equipment and heavy excavators. The Contractor is likely to use the following equipment:

Graders, compaction machines, dozers, loaders, dumpers, lift trucks, mixers, paver finishers, diesel and water bowsers, primary and secondary crushers, water pumps and tanks, concrete plant, light and heavy vehicles, etc.

2.4.2 Construction camps and Laydown Areas

The location of construction camps and laydown areas is not known at this time. It is likely that the Contractor will use sites from previous road construction activities. Guidelines for site selection and management are recommended in the ESMP.

2.4.3 Accommodation of Traffic

The road infrastructure within the trading centres located along the M1 road will be improved during the road upgrade project. There will be temporary disruptions to traffic and to the local population in these settlements during the upgrade and establishment of side roads, drains, pavements, bus shelters, etc. The assumptions made for purposes of the preliminary design cost estimates regarding the accommodation of traffic are summarised in Table 7.

Table 7: Accommodation of Traffic

Section	Option A	Option B	Option C
Section 1 Km 0 – km 102	N/A	Diversion road on full length except at Mtiti, Kawerawera and Bua Bridges	Diversion road on full length except at Mtiti, Kawerawera and Bua Bridges
Section 2 Km 102 – km 185	N/A	Diversion road on sections receiving granular overlay and widening (27 km). Half-width construction elsewhere.	Diversion road on sections receiving granular overlay (27 km). Half-width construction elsewhere.
Section 3 Km 185 – km 234	N/A	Half-width construction.	Half-width construction.

The diversion roads will be approximately 7 m wide and mostly, if not all, within the 60 m road reserve. The diversion road could be located on either side of the road, depending on which is easier for the contractor and to avoid compensation requirements. In some cases, there could be two narrower roads, one on each side of the project road.

Temporary diversions will be required at the Lumbadzi, Kasakadzi and Msusu Bridges. Where half width construction is permitted it is recommended that the maximum continuous length of a discrete section should not exceed 2 km and the Contractor should not operate more than five such discrete sections at any one time. Only after at least one of these discrete sections has been completed to the state where the road is open to bi-directional public traffic on the final surfacing will the Contractor be allowed to work on an additional 2 km section. The Contractor will be required to prepare a traffic management plan for approval prior to commencement of construction to cater for:

- Peak flows of general and site traffic;
- Temporary footpaths at all locations along the road to accommodate NMT;
- Stop-and-Go procedures and signage during daylight hours and night time;
- Two-way communication between the operators of the Stop/Go sign boards;
- Flood lighting of stopping areas at night and traffic lights in addition to the controllers; and
- Suitable security for the stopped vehicles at each stopping point.

2.5 CONSTRUCTION PERIOD

The proposed period for completion of the works varies with each rehabilitation option. The recommended overall project completion periods are summarised in Table 8.

Table 8: Project Completion Period

Section	Option A	Option B	Option C
Section 1: Km 0 – km 102			
Advertisement for tenders	N/A	Month 0	Month 0
Submission of tenders	N/A	Month 0 + 3	Month 0 + 3
Award of Contract	N/A	Month 0 + 6	Month 0 + 6
Commencement of construction	N/A	Month 0 + 8	Month 0 + 8
Completion of the works	N/A	Month 0 + 32	Month 0 + 38
End of Defects Liability Period	N/A	Month 0 + 44	Month 0 + 50
Section 2: Km 102 – km 187			
Advertisement for tenders	N/A	Month 0	Month 0
Submission of tenders	N/A	Month 0 + 3	Month 0 + 3
Award of Contract	N/A	Month 0 + 6	Month 0 + 6
Commencement of construction	N/A	Month 0 + 8	Month 0 + 8
Completion of the works	N/A	Month 0 + 26	Month 0 + 32
End of Defects Liability Period	N/A	Month 0 + 38	Month 0 + 44
Section 3: Km 187 – km 234			

Advertisement for tenders	N/A	Month 0	Month 0
Submission of tenders	N/A	Month 0 + 3	Month 0 + 3
Award of Contract	N/A	Month 0 + 6	Month 0 + 6
Commencement of construction	N/A	Month 0 + 8	Month 0 + 8
Completion of the works	N/A	Month 0 + 23	Month 0 + 32
End of Defects Liability Period	N/A	Month 0 + 35	Month 0 + 44

2.6 PRELIMINARY COST ESTIMATES

The preliminary cost estimates included in Table 9 are based on preliminary quantities of the works activities scheduled in accordance with SATCC standard specifications (SATCC, 2001) and method of measurement. Separate cost estimates are provided for the three identified sections of the road.

Table 9: Preliminary Construction Cost Estimates (US dollars)

	Option A (do nothing)	Option B (15 year)	Option C (20 year)
Section 1	0	$77 million	$77 million
Section 2	0	$27 million	$37 million
Section 3	0	$13 million	$33 million

2.7 PROJECT ALTERNATIVES AND ANALYSIS

Two main options have been considered by the Design Engineer, *i.e.* 'do-nothing' option and 'undertake the road upgrade' option. As indicated earlier, the project road has been divided into three sections based on the condition of the road and the volumes of traffic in each section. The environmental and social implications of each option have been considered in selecting the preferred option.

2.7.1 'Do-Nothing' Option

Option 1 represents maintaining the status quo. Under this option, it is anticipated that the RA will continue with routine maintenance activities along the M1 road that typically include repairing edge breaks, patching and resealing potholes and reconstructing gravel shoulders. Congestion in the trading centres will increase and road safety is likely to worsen.

The current dangerous situation where cyclists, pedestrians and other NMT share the road with fast moving vehicles (including heavy and light duty goods vehicles, buses, pickups, mini buses and passenger cars) will continue.

2.7.2 'Upgrade and Rehabilitate the Road' Option

Under this option, the carriageway has to be widened and the recommended designs for 20 and 15-year design lives are included in Table 3.

A design speed of 100 km/h is provided except in trading centres where it is 60 km/h. Roughton International have recommended designs for 15 and 20-year design life as summarised in Table 3 and these are not repeated again.

In Section 1 (km 0 to km 102) with high traffic volumes, the thickness and materials to be used for the widening of the shoulders and carriageway are based on the SATCC Pavement Design specification for AC surfacing. For this section, it is recommended that the carriageway base is widened to 11 m for the entire section with a 50 mm application / overlay of AC.

In Section 2 (km 102 to km 185) and Section 3 (km 185 to km 234) where the traffic volumes are low (less than about 600 vehicles per day), a double surface dressing is recommended, except between km 203 and km 223 where an AC overlay is required for strength purposes. In Section 2, the existing shoulders will be paved to 1.5 m. The existing carriageway width of 3.35m will be retained with widening to 11 m between km 102 -121 and km 337-145 and in the in the trading centres of Mphomwe, Chatoloma, Nkhamenya and Jenda. On Section 3, it is proposed that the existing shoulder is sealed for 1.0 m and that the existing carriageway is retained for 3.35.

CHAPTER THREE: POLICY AND LEGAL FRAMEWORK

This section provides information on the legal and administrative framework within which the ESIA was conducted. Legislation, policies and instruments are available to support environmental management and the ESIA process in Malawi. The National Environmental Policy (2004) and the Environment Management Act (EMA, 1996) are the key instruments that cover environmental management in all the sectors of development. The Environmental Impact Assessment Guidelines (1997) prescribe the process, procedures and practices for conducting an ESIA and preparing ESIA reports for projects such as road construction. In addition to these instruments, there are sector specific guidelines, policies and legislations that that provide regulation for protecting and managing the environment. Summarized below are some of these policies and legislation that are relevant to the project.

3.1 POLICY FRAMEWORK

3.1.1 The Constitution of the Republic of Malawi, 1995

The Constitution of the Republic of Malawi (1995) is the supreme law of the land. It contains, among other things, principles of national policy in Section 13. Section 13 (d) of the Constitution provides that the state shall actively promote the welfare and development of the people of Malawi by progressively adopting and implementing policies and legislation aimed at managing the environment responsibly in order to:-

- Prevent the degradation of the environment;
- Provide a health living and working environment for the people of Malawi;
- Accord full recognition to the rights of future generations by means of promoting environmental and social protection and sustainable development of natural resources;
- Conserve and enhance the biological diversity of Malawi; and
- Enhance the quality of life in rural communities with the ultimate aim of attaining sustainable development.

3.1.2 The National Environmental Action Plan (1994)

The Government of Malawi signed the Rio Declaration on Environment and Development in 1992 and committed herself to put in place tools and mechanisms that ensure sustainable utilization of her resources. One of the outcomes of the Rio Conference was the Agenda 21 which is an action plan for sustainable development in the 21st Century. The Agenda 21 required that the Government prepare a National Environmental Action Plan (NEAP). The NEAP, developed in 1994, provides the framework for integrating environmental protection and management in all country development programs, with the view of achieving sustainable socio-economic development.

The NEAP highlights key environmental issues that need to be addressed which include soil erosion; deforestation; water resources degradation and depletion; threat to fish resources; threat to biodiversity; human habitat degradation; high population growth among others. NEAP also provides guideline actions to be taken by stakeholders such as local communities, government, agencies, non-governmental organizations and donors in environmental planning and management.

Some of the activities to be undertaken under this project may lead to soil erosion, loss of vegetation and the risk of water pollution. Mitigation measures for these impacts have been outlined in Chapter 6 of this ESIA report.

3.1.3 The National Environmental Policy (2004)

Based on the findings of the NEAP, a National Environmental Policy (NEP) was developed in 1996, and revised in 2004. The NEP highlights the areas of priority including efficient utilization and management of natural resources. It promotes the private sector, CBOs, NGOs and community participation to initiate and mobilize resources, to achieve sustainable environmental management, and to involve local communities in environmental planning. The policy empowers the communities to protect, conserve and sustainably utilize the nation's natural resources. It advocates enhancement of public awareness and promotion of public participation. It also prescribes cooperation with other Governments and relevant international and regional organizations in the management and protection of the environment.

The NEP objectives address a broad range of environmental problems facing Malawi. The overall policy goal is the promotion of sustainable social and economic development through the sound management of the environment in Malawi. In line with the requirements of the NEP, the project will have to integrate environmental management and protection during planning, implementation and operational phases, to ensure integrated natural resources management. The NEP provides the basis for the participation of the local communities in the management of natural resources and the environment for the project.

3.1.4 National Forest Policy (2016)

The goal of National Forestry Policy is to sustain the contribution of the national forest resources to enhance quality of life in the country by conserving the resources for the benefit of the nation. There are three general objectives for the policy and these are:

- Promoting regulated and monitored access to forest resources and products.
- Contributing towards improving the quality of life in rural communities and providing a stable local economy in order to reduce the degenerative impact on the environment that often accompanies poverty.
- Promoting incentives for community based forest conservation and sustainable utilization in order to alleviate poverty.

The Department of Forestry has identified all catchment areas, hill slopes and other environmentally fragile areas for permanent forest cover and protection. The department also works on improvement on control, protection and management of woodlands on customary land, forest reserves and protected hill slopes. In addition, the Department of Forestry works with local communities and non-governmental organization on various afforestation programmes covering bare area, fragile areas in the country. The policy will guide the replacement of trees where they have been removed to pave way for expansion and upgrading of the road under this project. Approval to work in the forest areas will be obtained from the Department of Forestry.

3.1.5 Decentralization Policy (1998)

The Decentralization Policy, developed in 1998, devolves administrative and political authority to the district level, in order to promote popular participation. It assigns certain responsibilities to district councils. One of the key responsibilities is to assist the government in the management and preservation of the environment and natural resources. This policy is useful for the implementation of this project, as it supports the creation of different sectoral committees at all levels of the district to ensure participation of local institutional and community stakeholders. In addition, to that the councils also play a very important role in the implementation of the environmental management process for this project.

3.1.6 National Parks and Wildlife Policy (2000)

The goal of the National Parks and Wildlife Policy is to ensure proper conservation and management of wildlife resources in order to provide for sustainable utilization and equitable access to the resources; and the sharing of benefits arising from the use of the resources for both present and future generations. One of the objectives of achieving this goal is to ensure adequate protection of ecosystems and their biological diversity through promotion and adoption of appropriate land management practices that adhere to the principle of sustainable development. The project will ensure that meaures stipulated in the ESMP for proper conservation and management of wildlife are implemented.

3.1.7 National Land Policy (2002)

The National Land Policy is the principal policy that guides land management and administration in Malawi. The policy introduces major reforms intended for land planning, use, management and tenure. It provides clear definition of land ownership categories, and addresses issues of compensation payment for land. The policy has provisions for environmental management, urban management of solid and liquid wastes, protection of sensitive areas, agricultural resource conservation and land use, community forests and

Woodland management of particular importance are the requirements in Section 9.8.1(b) of the policy, that ESIA studies shall be mandatory before any major land development project is carried out; and in Section 9.8.1(c) that development activities in vulnerable ecosystems such as wetlands, Wildlife Reserves, Forest Reserves and critical habitats will only be permitted after the appropriate authority has conducted an ESIA study. in adherence to these provision, this ESIA has been conducted to take care of all ecosystems.

3.1.8 National Water Policy (2005)

Government recognizes that water is an important resource for life and industrial development, and that the country faces a number of challenges including water scarcity due to among others climate change and environmental degradation.

This policy empowers the Minister responsible for water affairs in the country to put in place sustainable mechanisms to ensure that water is of acceptable quality and is accessible to all Malawians at all times. The policy also advocates an integrated approach to the management of water resources in the country and thereby recognizes the importance of other policies and laws for achieving its goals. The project will ensure prevention of pollution of water sources from construction activities by ensuring that the mitigation measures for water pollution are been followed.

3.1.9 National HIV and AIDS Policy (2012)

The Malawi National HIV and AIDS policy was adopted by government in 2012 and its main goal is to prevent HIV and AIDS infections, to reduce vulnerability to HIV and AIDS, to improve the provision of treatment, care and support for people living with HIV and AIDS and to mitigate the socio-economic impact of HIV and AIDS on individuals, families, communities and the nation.

Chapter 7 of the Policy observes that in workplaces unfair discrimination against people living with HIV and AIDS has been perpetuated through practices such as pre-employment HIV and AIDS testing, dismissal for being HIV and AIDS positive and the denial of employee benefits if known to be infected. HIV and AIDS affect every workplace through absenteeism and death which impacts on productivity, employee benefits, production costs and workplace morale. As a way of implementing the Malawi National HIV and AIDS policy, the proponent will implement an HIV and AIDS policy and prevention, treatment, care, support and

impact mitigation programmes as one way of effectively reducing and managing the impact of HIV and AIDS in the project site specific areas.

3.1.10 National Gender Policy (2015)

The National Gender Policy calls for integration of gender responsiveness in planning and implementation of development projects and programmes. It is considered that consideration of gender needs and benefits enhance poverty reduction in both rural and urban environments. The proposed development and operation of this project will integrate consideration of the needs of women, men, boys and girls, people living with HIV and AIDS and people with disabilities in the project activities. Some of the potential consideration will be the following:

a) Employment of both male and female workers in project sites;
b) Consideration of both men, women and youth in participating in construction activities;
c) Provisions of female and male condoms to the workers as this would empower both men and women to reduce risks of contracting HIV and AIDS and sexually transmitted diseases during construction and operation phases of the project
d) Provision disability friendly infrastructure.

Some of the recommendations have been incorporated in the ESMP and are included in the enhancement measures. In addition, the project will ensure that wherever there are any employment opportunities women and youth will be given equal chances as men for employment.

3.2 LAWS AND REGULATIONS

3.2.1 The Environment Management Act (1996)

In Malawi, the Environment Management Act provides the basic legal framework for environmental planning including the preparation of Environmental Impact Assessments for prescribed projects. The Environmental Management Act of 1996 is administered by the Director of Environment Affairs in the Environmental Affairs Department of the Ministry of Natural Resources Energy and Mining. The law covers specific responsibilities and duties for various public authorities in the environmental planning and management. In order to integrate environmental considerations into the activities of the project, the Act provides for environmental planning to be done at both the national and district level.

Section 24 of the Act is on Environmental Impact Assessment (EIA). Under this section, a prescribed project (as listed in Appendix B to the ESIA Guidelines 1997 – *refer to* sub-section 4.4 below) cannot receive the required authorization to proceed from the relevant licensing authority unless the Director has issued a certificate that an ESIA is not required, or that he has approved the project on the basis of an ESIA report. The Director is empowered under the Act to require changes to a project in order to reduce environmental impact and to reject a project, if, in his view, the project will cause significant and irreparable injury to the environment. A person not satisfied with the decision of the Director may appeal to the Environmental Appeals Tribunal. Section 24 also mandates the Minister to specify the types and sizes of projects that may not be implemented unless an environmental impact assessment is carried out. The nature and scope of the proposed project triggers for a mandatory ESIA .

3.2.2 Water Resources Act (2013)

This Act makes provision for the control, conservation, apportionment and use of water resources in Malawi. Under the Act, the right to use public water may be limited if the use may cause damage to natural resources of the area or in the vicinity. The Act defines pollution or fouling of public water to mean the discharge into or in the vicinity of public water or in a place where public water is likely to flow, or any matter or substance likely to cause injury whether directly to public health, livestock, animal life, fish,

crops orchards or gardens which such water is used or which occasions, or which is likely to occasion, a nuisance.

The Act establishes that all water resources are vested in the State and that beds and banks of watercourses and lakes and the adjacent strips are public land. A National Water Resources Authority was established to manage these resources under the direction of a board appointed by the Minister. Abstraction and use of water from a water resource would require a license granted by the Authority. When necessary, this license could be combined with a permit. Permits would be required for drilling boreholes to explore groundwater and for discharging effluents.

The Water Resources Act also authorizes the Minister to prescribe standards for effluent quality and to set charges for water use and effluent discharges, and give state schemes priority for the use of water resources. The implication of this Act on this project is that all construction works should avoid water degradation and depletion construction of proposed infrastructure. The project will also ensure that permits are obtained before abstracting water from rivers and streams.

3.2.3 The Public Roads Act (1962)

The Public Roads Act of 1962 as amended was enacted to consolidate and amend the law relating to Public Roads. In this Act the highway authority is assigned responsibilities for the construction, care and maintenance of any road or class of road in accordance with the Act.

The Public Roads Act provides for various instances when compensation may or may not be paid. Sections 44-50 of the Act provide for issues relating to compensation including assessment of compensation generally and for surface rights, compensation for land which becomes public land, matters to be taken into consideration in assessing compensation for alienated land and claims for compensation. The part also provides for procedures to be followed before a Land Tribunal and the right to apply to the High Court for judicial review if the claimant of highway authority is unhappy with a decision of the Land Tribunal.

This Act provides for road standards, safety and classification. The proposed road will fully comply with the provisions of the Act by ensuring that appropriate infrastructure for public safety and road durability are considered. Such infrastructure includes road signage, packing bays, bridges, road markings, road shoulders, drainage systems, road crossings and junctions, road reserves, vertical and horizontal alignments and others. The public roads act covers the management of road reserves and streets. Land acquisition and resettlement issues are outlined in part II of the act. Section 44 provides assessment of compensations which can be paid under this act. The compensations cover surface and land rights of the owner or occupier of land. Section 45 provides for compensation for conversion of land into public use and the section states specifically that in case of customary land compensation is in respect to disturbance to people, section 49 and section 50 provide opportunities for land owners or occupiers to appeal to the High Court on grievances related to resettlement and compensations provided for in this act. The project will abide by all the provisions of this Act for the safefy and well being of the workers and general public.

3.2.4 Forestry Act, 1997

The principal legislation that governs forestry matters in Malawi is the Forestry Act No. 11 of 1997, which provides for participatory forestry, forest management, forestry research, forestry education, forest industries, protection and rehabilitation of environmentally fragile areas and international co-operation in forestry and for matters incidental thereto or connected therewith

The Forestry Act affirms the role of Department of Forestry (DoF) on control, protection and management of forest reserves and protected forest areas. Any activities in such areas are subject to the DoF's permission and in some instances annual payments for non-forestry uses of land in forest reserves

may be levied. The Act recognizes the need to promote participatory social forestry and empowerment of communities for conservation and management of trees within the country, in an attempt to counteract the increasing trend to illegal harvesting of forest products and deforestation of the public forest estate,

notably forest reserves. In this regard the act encourages community involvement in management of forest reserves through co-management approaches, as is the case of the Mua-Livulezi Forest Reserve, where forest blocks have been allocated for sustainable management by local villages in terms of co-management agreements signed with each forest block committee.

It further provides for the protection of the environment from construction activities and requires that an ESIA be undertaken for all large and medium-scale irrigation projects. This ESIA report is therefore in line with the requirements of the Act. The Act further prohibits use of certain specified chemicals in the protected areas. It is therefore expected that implementation of the activities for the project under consideration will be done with due respect to the provisions of the Act.

3.2.5 Land Act No.16 of 2016

The Land Act 2016, which repealed the Land Act of 1965, is the principal legislation dealing with land tenure, land use and land transfer. The Commissioner of Lands is responsible for the administration of the Act. Section 7 of the Act recognizes two categories of land namely; public land and private land. Public land is defined as land as held in trust for the people of Malawi and managed by Government, a local government authority and a Traditional Authority. Private land is defined as all land which is owned, held or occupied under a freehold title, leasehold title or as a customary estate or which is registered as private land under the Registered Land Act. The Act recognizes that every person has a natural dependency on land and that it is therefore important that Government provides for secure and equitable access to land as a multipurpose resource and an economic assert by defining issues of security of tenure.

The Land Act outlines some procedures to be followed for land acquisition by individuals or Government including issuance of formal notices to persons with existing land interests to payment of compensation however most provisions relating to acquisition of land are in the Land Acquisition Act as amended. The proposed project will require some land from the community members especially for the diversion and other works. As a result, the project will compensate all the people whose property will be affected by the proposed project.

3.2.6 Customary Land Act No.19 of 2016

The Customary Land Act No.19 of 2016 provides for the management and administration of traditional land. Customary land consists of land within the boundaries of a Traditional Land Management Area other than Government or reserved land, land designated as customary land under the Land Act of 2016, land, the boundaries of which have been demarcated as traditional land under any written law or administrative procedure in force at the time before the Act came into operation and land the boundaries of which have been agreed upon by a land committee claiming jurisdiction over that land. A certificate is issued by the Commissioner of Lands for each Traditional Land Management Area in respect of which the boundaries to the area have been demarcated or agreed. Such certificate, issued in the name of the Traditional Authority, confers upon the land committees in that area the function of management of customary land and affirms the occupation and use of customary land by the persons in the Traditional Land Management Area in accordance with the customary law applicable to land in that area.

The Act established customary land committee in section 5 of the Act. These committees are supposed to be at Group Village Headman level and their main function is to manage customary land within its area of

jurisdiction, on trust, as if the committee were a trustee of the land and the villagers were beneficiaries. The Act provides that the customary land committee may not allocate land or grant a customary estate without the prior approval of the relevant Traditional Authority.

The proposed project will require some land from the community members especially for the diversion and other works. As a result, the project will compensate all the people whose property will be affected.

3.2.7 Lands Acquisition and (Amendment) Act No.9 of 2017

The Lands Acquisition (Amendment) Act No. 9 of 2017 has amended some provisions of the Lands Acquisition Act, the main one being that the Amendment Act now provides for the acquisition and compensation of land in the citation.

Section 3 of the Act read with the Amendment Act empowers the Minister responsible for lands whenever he is of the opinion that it is desirable or expedient in the interests of Malawi, to acquire land for public utility, either compulsorily or by agreement, and pay compensation as may be agreed or determined under the Act.

Sections 5-7 of the Act provide for the issuing of notices upon the persons who are possessed of an interest in the land. According to section 12 of the Amended Act when a notice to acquire land has been issued and published, the land shall revert to the Government as public land within 2 months of the publication of the notice.

Section 9 as amended provides for the payment of compensation. It provides that where any land is acquired by the Minister under this Act the Minister shall pay in respect thereof appropriate compensation agreed or determined in accordance with the provisions of this Act. The Amendment Act further provides that compensation shall be paid in one lump sum; therefore, the assumption is that compensation shall only be monetary.

Amended provisions relating to assessment of appropriate compensation provide that an assessment is to be done by an independent valuer appointed by the Minister, unless the parties agree otherwise. The Amendment to the Act also provides information on the grounds on which compensation can be calculated which include; loss of occupational rights, loss of land, costs of professional advice and disturbances which are a natural and reasonable consequence of the disposition of land. The Amendment has inserted substantive provisions on matters to be taken into consideration in assessing compensation for alienated land under section 10A.

Section 11 of the Act deals with the effect of payment of the compensation and states that a person who has been paid compensation for land cannot make further claims in respect of the land. However, this does not prevent any subsequent proceedings against the person to whom the same was awarded by any person claiming to have a better right to the compensation or the right to a share thereof.

3.2.8 Local Government Act, 1998

The Local Government Act 1998, as read with Section 146 of the Constitution, provides the mandate to the local assemblies in planning, administration, and implementation of various development programs in their areas. It further provides for environmental functions, which include urban management, local planning, local afforestation programs, control of soil erosion, and appropriate management of solid and liquid waste. Lilongwe District Council and M'mbelwa Council where the project will be implemented wre consulted with respect to their mandate at the district level and how the proposed project would comply with their planning requirements.

The Act also consolidates all laws relating to local government. Section 34 of the 1998 Act provides for the acquisition of land by Agreement. It states that that for the purpose of (a) any of its functions under

this Act or any other written law; or (b) the benefit, improvement or development of its area, the Assembly may acquire whether by way of purchase, lease, exchange or gift, any land, whether situated inside or outside its area. Subsection 2 of section 34 of the 1998 Act has been deleted and substituted

with a new subsection 2 that provides that subject to the provisions of the Land Acquisition Act, the Council may acquire land to be used for any of the Council's functions.

3.2.9 Gender Equality Act, 2013

The Act aims at promoting gender equality, equal integration, influence, empowerment, dignity and opportunities for men and women in all functions of society to prohibit and provide redress for sexual discrimination, harmful practices and sexual harassment, to provide for public awareness on promotion of gender equality and provide for connected matters.

Section 4 (1) a & b states that a person shall not treat another person less favorably than he or she would treat a person of his or her own sex; or apply to the other person an exclusion, distinction or restriction which applies or would apply equally to both sexes. In addition, Section 7 (1) states that the Government shall take active measures to ensure that employers have developed and are implementing appropriate policy and procedures aimed at eliminating sexual harassment in the workplace which shall entitle all persons who have been subjected to sexual harassment in the workplace to raise a grievance about its occurrence and be guaranteed that appropriate disciplinary action shall be taken against perpetrators

The project shall support interventions and develop policies aimed at eliminating sexual harassment in the project areas. Further to that, the project shall develop a Grievance redress Mechanism that will incorporate procedures followed in reporting grievances related to sexual harassment.

3.2.10 Occupational Safety, Health and Welfare Act (1997)

The Occupational Safety, Health and Welfare Act makes provision for the regulation of conditions of employment in workplaces with regard to safety, health and welfare of employees; for the inspection of certain plant and machinery; for the prevention and regulation of accidents occurring to persons employed or authorised to go into the workplace, and for some related matters. Part II deals with registration of workplaces, Part III with duties and responsibilities of employers and employees, Part IV with health and welfare, Part V with machinery safety, Part VI with health and safety, Party VII with notification and investigation of accidents, dangerous occurrences and industrial diseases, Part VIII with records, Part IX with administrative matters, and Part X with offences, penalties and legal proceedings.

Some of the implications from the Occupational Safety, Health and Welfare Act for consideration under this project include ensuring that all the necessary workplace environmental health and safety measures for workers are provided for and hired workers are provided with protective clothing when likely to be exposed to dust or smoke. All workers will be issued with Personal Protective Equipment (PPE) and standard operating procedures (SOPs) will be drawn up to ensure safe work practices.

Construction activities in general pose a number of occupational health and safety risks and probable risk to workers and the surrounding communities at large. Furthermore, in large scale civil engineering projects the operation of heavy plant, vehicles and equipment during construction pose a significant risk of accidents to the surrounding communities as well as the construction workers. Some of the occupational health risks for workers during construction of the proposed project may include:

a) Injuries due to blasting
b) Accidents with vehicles
c) Injuries due to heavy falling objects
d) Working with hand tools, powered tools and heavy, powered, mobile equipment;
e) Excessive vibration in the hands, arms or body from powered tools or equipment;
f) Confined spaces;
g) Excessive noise;

h) Working at heights;
i) Electrical hazards;
j) Working with cranes, hoists, and other material handling equipment;

k) Slips, trips and falls;
l) Pain or injury from physical over-exertion, repetitive manual tasks, or working in awkward positions;
m) Respiratory and fire hazards;
n) Dust;
o) Injuries due to improper working practices with dangerous chemicals
p) Shift work or extended work days

The Act therefore places a duty of care on contractors throughout the project construction phase and similarly, the workers have a duty to take reasonable care for their own safety and health. The duty of ensuring safety, health, and welfare of workers is on the employer. However, every employee is required to take reasonable care for his/her own safety and that of other workers. The key provisions relevant to the project under discussion are as follows:

i) Section 13(1) places a duty on every employer to ensure the safety, health and welfare of all his employees at work;
ii) Section 51(1) mandates that manufacturers, importers and suppliers of hazardous substances used at workplaces shall provide sufficient information on such substances as well as the precautions to be taken; and
iii) Section 81 (7) stipulates that where the use of hazardous chemicals is likely to penetrate the skin and cause rash, skin contact with hazardous chemical shall be avoided and personal hygiene and the type of clothing worn shall be such as to enable rapid removal of any chemical from skin contact.

Considering that the construction phase of the project will require a lot of labour force and use of heavy machinery, the Occupational Safety, Health and Welfare Act is important in safeguarding the health and welfare of all workers. The contractors in this project will ensure that there is adequate training and protection of all workers on site.

3.2.11 Public Health Act, 1968

This Act is for the preservation of public health. Section 59 of the Act prohibits any person from causing nuisance on any land or premises owned or occupied by him. The developer should therefore not cause any nuisance during the construction and operation of the said project. The Act requires developers to provide adequate sanitary and health facilities to avoid harmful effects of waste on public health. Further, section 82 prohibits persons from passing in an uncontrolled/ untreated manner certain liquid wastes into public waters, including hydrocarbon residues, sewage and any substance that may cause injury to public health. The developer will have to comply with the requirements of this Act by designing waste disposal facilities in accordance with the anticipated volumes of waste.

The developer will ensure that the construction sites are not a breeding ground for mosquitoes. If the land becomes a breeding ground for mosquitoes, then the developer will be guilty of creating a nuisance. Any pollutants entering rivers too pose a low risk to downstream communities since the river flow volume is such that dilution would render pollutants harmless; in any event, the most harmful substances used on site are hydrocarbons.

3.2.12 Monuments and Relics Act (1990)

The Act governs the management and administration of monuments and heritage sites in Malawi. Among other things, the provisions of the Act restrict unregulated development in protected areas. The contractor

will report to the Department of Antiquities on the discovery of objects of historic importance. The same department should be consulted prior to commencing excavation activities so as to seek guidance on the possibility of unearthing objects of that nature.

3.2.13 Mines and Minerals Act (1981)

Minerals activities are governed by Mines and Minerals Act (1981) and complemented by Explosives Act (1998). The Mines and Minerals Act stipulates that all potential environmental impacts must be included in the application for exploration and mining licences and that the proposed quarry should include plans for addressing environmental problems, prevention of pollution, treatment of waste and land rehabilitation. The Act states that a ESIA must be submitted with each application. For large scale exploration and mining, the Minister grants the licences on recommendations of a technical Mining licensing committee. In compliance with the provisions of this Act, An ESIA has been conducted for the whole road works and separate ESMPs will be conducted for the Quarry sites and borrow pits that will be operated.

3.2.14 Explosives Act, (1968)

The Explosives Act of 1968 regulates and controls the acquisition, manufacture, sale, conveyance and use of explosives. The ESIA report looked into the demand of this Act in order to minimize the negative environmental and social impacts emanating from the use of explosives on the environment as follows;

- The project must strictly adhere to the proper site design parameters (in the event of future, explosives shall be used in the quarry extraction) for drilling and blastings; although it is not envisaged that explosives will be used at any point in time in this project. since situation may arise in future where such may be required, the developer will have to adhere to all the regulations therein and consistent with legislation in question;
- As and when that arises, explosives must be secured and safely stored in an explosives magazine in accordance with provisions of the Act; and
- In that event, the project will have to employ an experienced and registered blaster.

3.3. Administrative Framework

The Act and the ESIA Guidelines provide for the administrative framework to the ESIA process, which is managed by the Director of Environmental Affairs. The Director of Environmental Affairs works with other line ministries/agencies and stakeholders. The Director relies on the advice of the Technical Committee on the Environment (TCE) established under section 16 of the Environment Management Act (1996) in order to make his determination. Through this committee, member agencies are informed about projects being appraised; participate in reviews of project briefs, ESIA TORs and ESIA reports; develop project approval terms and conditions; develop and monitor project auditing conditions; and recommends courses of action to the Director. The Director is not bound by the advice of the Committee to arrive at any action that may be considered necessary.

Institutional responsibilities for the co-ordination, planning, administration, management and control of development and environmental issues are fragmented among a number of agencies, ministries and organizations. The major institutions to be involved in this project shall include:

- Environmental Affairs Department;
- Ministry of Agriculture, Irrigation and Water Development;
- Ministry of Transport and Public Works including the Roads Authority;
- Ministry of Local Government and Rural Development;
- District Councils;

- Department of Physical Planning; and
- Department of Climate Change and Meteorology

3.4 INSTITUTIONAL ARRANGEMENTS

Institutional responsibilities for co-ordination, planning, administration, management and control of development and environmental issues are fragmented among a number of agencies, ministries and organizations. The major institutions involved include: the Environmental Affairs Department (EAD); the Ministry of Water Development and Irrigation; the Ministry of Transport and Public Works; the Roads Authority; the Ministry of Local Government and Rural Development; the District Councils; the Ministry of Agriculture and Food Security; the Department of Physical Planning; and the Department of Climate Change and Meteorology.

The EMA (1996) provides the framework for ESIA for prescribed projects and defines the roles and responsibilities of various public authorities in environmental planning and management. The EAD is the authority charged with administering the ESIA process and works with other institutions in the process. The Act under Section 10 provides for the establishment of the National Council for the Environment (NCE) and the establishment of the Technical Committee on the Environment (TCE) under Section 16. The NCE is a policy making body which advises EAD and the Government in general, on environmental matters while the TCE provides technical advice on environmental matters.

Through the TCE, member agencies are informed of projects being appraised, review projects, participate in formulating ESIA terms of reference, develop project approval terms and conditions and recommend course of action to the Director. The NCE provides policy guidance to EAD and based on recommendations from TCE will make recommendations to the Minister responsible for environmental affairs on approval or non-approval of ESIAs. As provided for in Section 26 of the EMA, a prescribed project cannot receive the required authorization to proceed from the relevant licensing authority unless and until the Director of Environmental Affairs issues a certificate stating that an ESIA is not required or on the basis of an ESIA report that he has approved the Project.

3.5 ROLES AND RESPONSIBILITIES

To ensure sound development and effective implementation of the ESMP, it is necessary to identify and define the responsibilities and authority of the various persons and organisations that will be involved in the project. Strict supervision of the road construction activities is required prior to, during and following construction to ensure that works are constructed in accordance with the approved designs and that all environmental impacts are fully mitigated in accordance with the ESMP. The following key players are involved in ESMP implementation during construction stage:

Roads Authority (and the Environmental Manager in particular)

The Director of RA with the assistance of the RA Environmental Manager is the entity responsible for ensuring that the requirements of the ESMP are complied with. The RA is required to certify to the regulatory bodies and the EAD that relevant environmental safeguarding measures are being complied with during the project implementation.

The Environmental Manager from the RA will oversee ESMP implementation at project site level in close coordination with Engineer and Contractor. To this end, a representative from RA should ideally

attend the monthly progress meetings to monitor the Contractor's compliance with the requirements of the ESMP.

The RA will typically commission quarterly or biannual external audits for the duration of the construction period, followed by a final audit after rehabilitation. The external auditor will prepare an audit report for the Client and for use on site after each audit. These audit reports will be maintained on site with the Environmental Control Officer's (ECOs) diary.

Construction Supervision Engineer or Site Manager / Resident Engineer.

The responsibility for the implementation of this ESMP on site rests with the appointed Contractor, but must be enforced on behalf of the Client (Roads Authority) by the Construction Supervision Engineer's Site Manager or Resident Engineer. The Resident Engineer (RE) will ensure that joint (Engineer/Contractor) environmental inspections are carried out as per requirements of this ESMP.

Environmental Manager (EM)

To ensure that the ESMP is properly implemented it is recommended that the Engineer employs a part-time qualified and experienced Environmental Manager (EM). This person will be appointed directly by the Construction Supervision Engineer and must have adequate knowledge of the principles of Integrated Environmental Management, as well as sound environmental legislative knowledge to understand and ensure implementation this ESMP.

The EM will be responsible for environmental oversight, record keeping, providing instructions through the Engineer/RE for corrective actions, ensuring the Contractor through his ECO, complies with the ESMP and with various statutory and legislative requirements and assisting the Engineer/RE to prepare environmental reports to the RA. It is recommended that the EM visits the construction site every two weeks at the start of the project and thereafter monthly.

Upon failure by the Contractor or his employees to show adequate consideration to the environmental aspects of this contract, the EM may recommend to the Engineer/RE to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is appropriately addressed. No extension of time will be granted in the case of such suspensions and all costs will be borne by the Contractor.

Contractor

The Contractor will be required to comply with the requirements of the ESMP and must ensure that all his employees and sub-contractors are inducted on the requirements of the ESMP. This will be in the form of presentations and demonstrations to be conducted by the Contractor's ECO. The Contractor shall further ensure that his employees have a clear understanding of the Occupational Health and Safety (OHS) aspects of the contract works (Section 4).

The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the works and all associated operations on-site or off-site are carried out in conformity with the statutory and regulatory environmental requirements including those prescribed elsewhere in this document.

Environmental Control Officer (ECO)

The Contractor will be required to appoint a dedicated Environmental Control Office (ECO) to ensure and monitor compliance with the ESMP. The ECO will be responsible for day-to-day implementation of the ESMP on site. The ECO will be required to:

- Be familiar with the recommendations and mitigation measures of this ESMP.
- Undertake daily monitoring of the construction site according to the ESMP.
- Educate the construction team about the management measures of the ESMP.
- Regularly liaise with the construction team and the Contractor's site manager.
- Implement corrective action for any environmental non-compliance incidents on the construction site.
- Document any non-compliance issues (incidents, accidents and near misses).
- Attend site meetings to be able to report on and respond to any environmental issues and be issued copies of minutes of such meetings.
- Compile environmental method statements on behalf of the Contractor and other environmental issues within the defined work areas.
- Take photographs (digital) of the site prior to, during and immediately after construction and rehabilitation as a visual reference.

Community Liaison Officer (CLO)

It is further required that the Contractor appoint a Community Liaison Officer (CLO) to liaise with the project-affected communities. The CLO shall be responsible, through the Contractor, for the following aspects:

- Keeping the local communities advised about the general progress of the Works.
- Giving advance notification to the local community when particular operations will commence and finish, particularly those which might inconvenience the residents of the area or against which they should take safety precautions.
- Receiving and replying to complaints from the general public about all matters related to the Works.
- Ensuring that remedial and corrective action is taken wherever necessary in response to complaints from the public.
- Arranging tours of the Works by approved visitors.
- Supporting community awareness programmes and local development programmes.
- Publicising training and job opportunities.
- Discouraging and controlling proliferation of informal settlements in and around the site.

Health and Safety Officer

The Contractor is required to appoint a Health and Safety Officer (HSO) who will be responsible for:

- Weekly reporting to the ECO who will compile a consolidated Safety, Health and Environmental (SHE) report;
- Daily inspections to ensure that the Health and Safety Plan is being adhered to;
- The HSO shall keep a site diary in which events and concerns of health and safety significance are recorded;
- Where incidents are of a serious nature, the Department of Labour and the Roads Authority must be contacted; and
- Attending weekly site meetings and reporting back on any health and safety incidents and how they were dealt with.

The RA will be invited to monthly progress meetings and will receive monthly SHE monitoring reports to ensure their involvement with the project. SHE issues must be included as an item on the agenda the monthly site meetings. The HSO and ECO must attend these meetings to provide input with respect to compliance with the ESMP and the Record of Decision.

3.6 Summary of Project permit requirements

The project will require a number of permits. Table 9 provides a list of permits required for the project and responsible institutions.

Table 9: List of statutory licences required for in implementation and operations of proposed project

List of statutory approvals or licences to be obtained	Legal and regulatory framework	Responsible institution for processing approval or licence
Environmental Impact Assessment Certificate	Environment Management Act (1996)	Environment Affairs Department
Workplace Registration Certificate	OSHWA (1997)	Ministry of Labour
Planning Permission	The Physical Planning Act No 17 (2016)	M'mbelwa District Council
Waste Management Licence Chemicals Licence	Environment Management Act (1996)	Environment Affairs Department
Approval to dispose of waste	Local Government Act (1998)	M'mbelwa District Council
Mining Licence	Mines and Minerals Act	Mines Department
Water right for abstraction	Water Resources Act (CAP 72.03)	National Water Resources Authority

CHAPTER FOUR: DESCRIPTION OF BIOLOGICAL AND SOCIO-ECONOMIC ENVIRONMENT

This section of the report describes the environmental and social setting of the project area in enough detail to allow for an understanding of the analysis and assessment of impacts. It describes the existing condition of the physical, biological and human environments of the project area, as well as trends and the anticipated future environmental conditions should the project not go ahead and environmentally-sensitive areas of special or unique biophysical, socio-economic or cultural value. The proposed project road starts from the turn-off to the KIA and traverses the districts of Lilongwe, Dowa, Kasungu and Mzimba until the road end point at the turn-off to Mzimba. The four districts through which the road transverses have varying biophysical and socio-economic environmental settings.

4.1 BIOPHYSICAL ASPECTS

This section includes a description of biophysical aspects such as topography, climate, soils and geology, hydrology and drainage, vegetation and fauna.

4.1.1 Topography

The Great Rift Valley traverses Malawi from north to south. Lake Malawi lies in this deep trough. West of the Great Rift Valley, the land forms high plateaus, generally between 900 and 1 200 metres above mean sea level (mamsl). The project area is located to the west of Lake Malawi in northern and central Malawi and the M1 road has been constructed largely on the watershed line along the whole length of the project scope.

The topography along the road remains relatively consistent throughout the first 170 km of the project road (from KIA turn-off and the Kachinda turn-off to the S113) with the road traversing mainly rolling to flat terrain with several river crossings. The land along this section has been cultivated in most places and the existing soil type is laterite that is common to many areas in southern Africa.

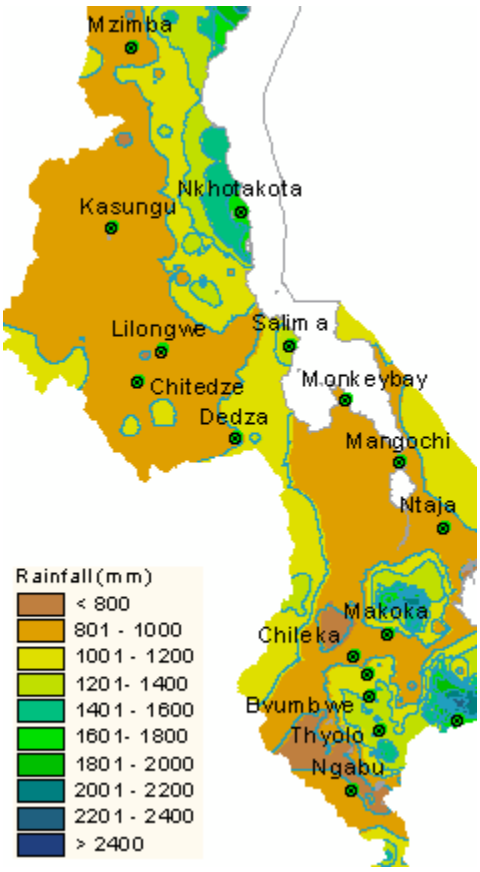
The terrain in the northern section of the project road (north of the Kachinda turn-off) is hilly and steep in parts (up to 30%) and passes through a number of Forest Reserves.

4.1.2 Climate

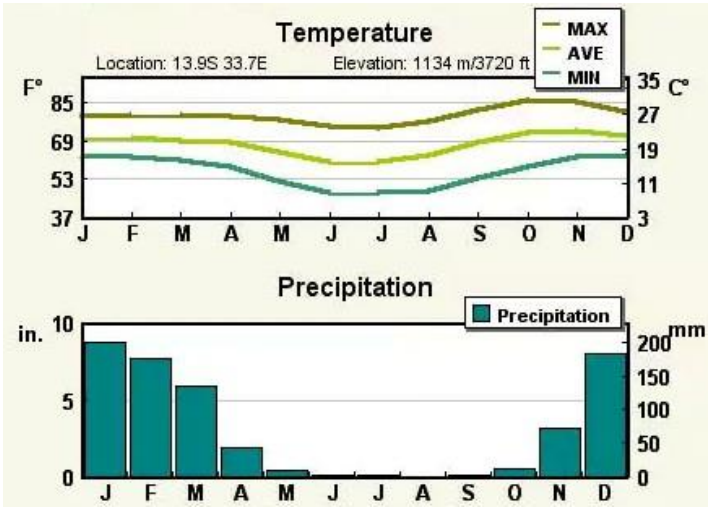
Malawi has a relatively dry sub-tropical climate with two distinct seasons: a wet, warm season and a dryer, cooler season. The warm-wet season stretches from October to April, during which 95% of the annual precipitation takes place. The annual average rainfall for Lilongwe (start of road) is 900 mm and for Mzuzu (end of road) is 1,289 mm (http://www.metmalawi.com/climate).

A cool, dry winter season is evident from May to August (Figure 4) with mean temperatures varying between 17 ˚C and 27 ˚C with temperatures falling between 4 ˚C and 10 ˚C. Frost occurs in isolated areas in June and July. A hot, dry season lasts from September to October with average temperatures varying between 25 ˚C and 37 ˚C. Humidity ranges from 50 % to 87 % for the drier months of September / October and wetter months of January / February respectively.

Extreme conditions include the drought that occurred in 1991 / 92 season and floods of 1988 / 89 season.



Rainfall in project area



Annual average Temperature and Rainfall for Lilongwe

Figure 6: Rainfall in project area (801–1000 mm/a) and Lilongwe mean temperature and rainfall

4.1.3 Geology and Soils

The geology of Malawi comprises an early Precambrian to early Palaeozoic Basement Complex, an overlying sequence of Permo-Carboniferous to Lower Jurassic sedimentary rocks of the Karoo Supergroup and superficial Tertiary to Recent post-Karoo sediments.

Much of the project road is located on the Muva Supergroup (Figure 5) that overlies the Ubendian Supergroup and Nyika granites. This Supergroup is characterised by pelitic to semipelitic rocks dominated by hornblende –biotite paragneisses with units of marbles, calcsilicates, gneisses, quartzites and mica schists (Ministry of Energy and Mines, 2009).

A small section of the project road is located on the Ubendian Supergroup that outcrops near Jenda close to the Zambian border. The road then crosses over granitoid and pegmatoid gneisses north of Jenda and over the Muva Supergroup between Jenda and the Mzimba turn-off (Figure 7).

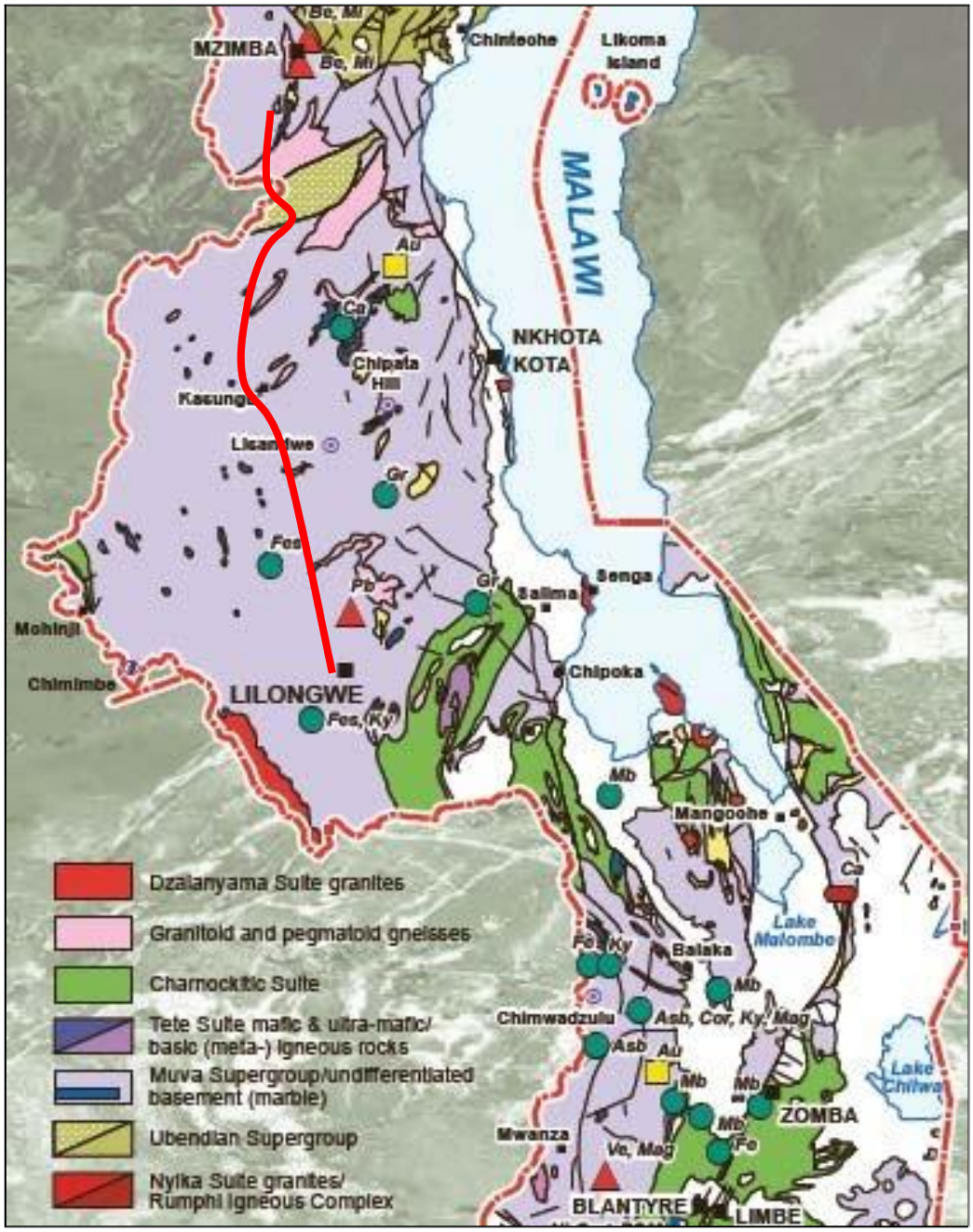


Figure 7: Geology of Malawi (Ministry of Energy and Mines, 2009) (approximate road outline)

Most of the use of land is arable land and pasture in the form of subsistence and typically not on a commercial scale. The main forms of soil range from agricultural soils of moderate quality with a very good economic potential. The existing soil type is laterite.

4.1.4 Hydrology and drainage

Major rivers that cross the M1 project road include the Bua River (km 77.0) and Dwangwa River (km 124.0) in the Kasungu District and the South Rukuru River (near town of Jenda) in the Mzimba District (Figure 8). The Dwangwa River is approximately 160 km long and flows from Kasungu National Park on Malawi's central plateau to Lake Malawi. The South Rukuru River is the main river in the Northern region of Malawi and flows through the Nyika Plateau.

Smaller rivers and streams that cross the M1 Road include the Lumbadzi (km 3.0), Mtiti (km 47.0), Kasangazi (km 55.0), Mpasazi (km 134.0), Milenje (km 152.0), Nkhamenya (km 164.0), Dofe, Lodjwa, Lisasadzi, Msuzu (km 166.0), Kasanama and Lodjwa Rivers amongst others.

Refer to Section 1.2.4 for a general summary of the rehabilitation work required at the 10 bridges over rivers crossing the section of the M1 road to be upgraded.

Figure 8: Major rivers crossing the M1 Road in project area

4.1.5 Vegetation

The project area in northern and central Malawi is located in an ecoregion that is categorised by the World Wildlife Fund (WWF) as the Central Zambezian Miombo woodlands ecoregion (Figure 9). The woodlands contain typical miombo flora of high trees with shrub and grassland underneath.

North of the Kachinda turn-off where the terrain becomes hilly, the road passes through the Chimaliro (Kaning'ina) Forest Reserve before reaching Jenda. The road passes through the Perekezi (Vipya) Forest Reserve before reaching the turn-off to Mzimba.

Miombo woodlands comprise forestlands in the hills and escarpments near Jenda. Large trees noted along the road in the forested areas included *Faidherbia albida* (Nsangu), *Bauhinia thonningii* (Chitimbe), *Ziziphus mucronata* (Masawu), *Colophospermum* sp. (Tsanya), *Dalbergia melanoxylon* (Phingo) and *Terminalia sericea* (Naphini). Wetland vegetation consisting of perennial wet fringes was seen in the areas adjacent to the larger rivers such as the Bua and Dwangwa Rivers.

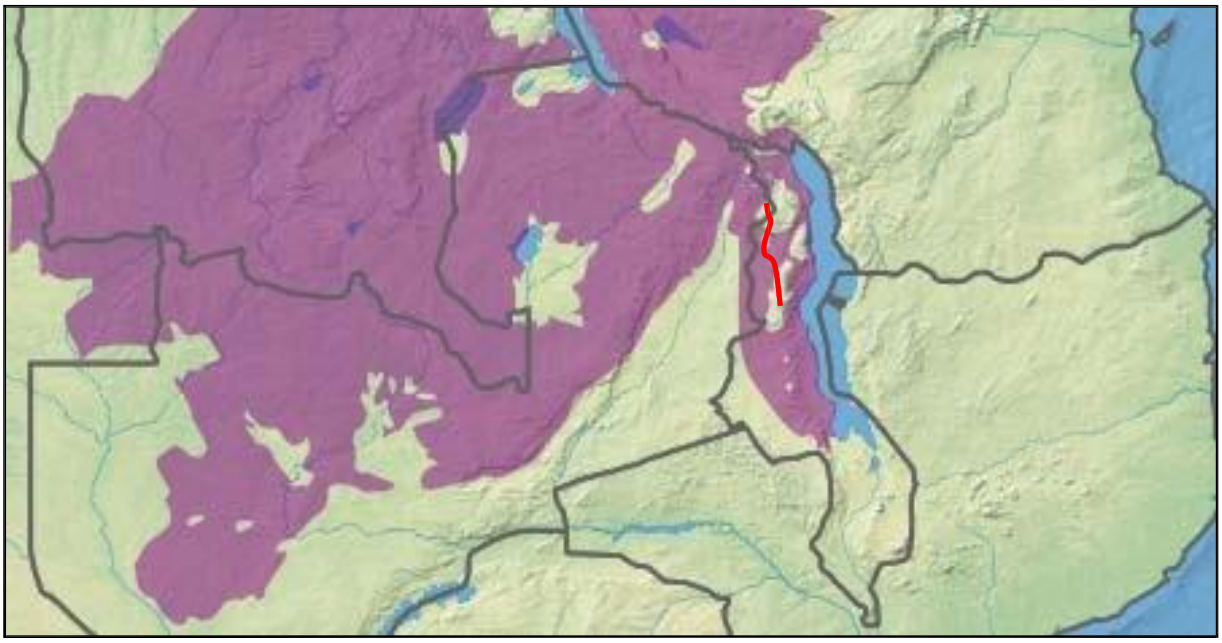


Figure 9: Central Zambezian Miombo woodlands Ecoregion (WWF)

The vegetation of the project area has been almost totally transformed by subsistence agricultural activities with a range of crops being grown including maize and tobacco. Remnants of the original woodland vegetation are noted in the transformed areas (Plate 6).

Figure 10: Remnants of woodlands vegetation in areas transformed by subsistence agriculture

Areas of low density woodlands (shrubs, bushes, trees and grassland) exist along the entire road. It is noted that large trees occur within the 60m RoW along some sections of the road such as the trees shown in figure 11 located outside Lumbadzi.

Figure 11: Tall trees located within the 60 m RoW outside Lumbadzi

4.1.6 Fauna

The project area is characterised by the national M1 road and it is unlikely that any of the threatened or endemic fauna listed in Table 10 would occur in the 60 m RoW owing to the noise of vehicles, presence of NMT and people.

Table 10: Endemic fauna of Malawi

Faunal Type	Scientific and Common Names
Fish	Fish occurring in areas in Malawi other than in Lake Malawi: *Nothobranchius wattersi* (Killifish) *Labeobarbus nthuwa* (Yellowfish) *Barbus choloensis* (Silver Barb)
Reptiles	*Nadzikambia mlanjensis* (Mlanje Mountain Chameleon) *Rhampholeon chapmanorum* (Chapman's Pygmy Chameleon) [This species is only known from a single location, in the remnant of rainforest on Malawi Hill, within the Matandwe Forest Reserve, part of the Natundu Hills range. This species is considered Critically Endangered and there is even a possibility that it is extinct]. *Platysaurus mitchelli* (Mitchell's Flat Lizard) *Cordylus nuikae* (Nyika Girdled Lizard) *Trachylepis mlanjensis* (Mulanje Skink) *Trachylepis hildae* (Nyika Three-striped Skink) *Eumecia johnstoni* (Nyika Serpentiform Skink) *Lygodactylus rex* (King Dwarf Gecko)

Amphibia	*Amietia johnstoni* (Johnston's River Frog) *Ptychadena broadleyi* (Broadley's Ridged Frog) *Hyperolius friedemanni* (Friedemann's Long Reed Frog)

Malawi is a bird sanctuary with population of 650 species recorded throughout the country. According to the National Parks and Wildlife Act of Malawi, fish eagles and ducks are protected bird species. Populations of fish eagles seem to be declining along with white storks.

4.1.7 Air Quality

The sources of air pollutants in the project area include domestic fuel combustion, charcoal production, emissions from vehicles, dust raised by the vehicles using unpaved roads in the project area, wind erosion of open areas and dust generated by agricultural activities, *i.e.* farming and burning of crop residues.

In the absence of significant sources of industrial pollution along the M1 road corridor and taking into account the existing atmospheric dispersion conditions, the air quality in the region is viewed as good.

4.1.8 Noise and Vibration

The layout of M1 Road traverses a number of towns, trading centres and dispersed villages. Currently, the M1 road is the only noise source in the area. Human activities located near the road are also a significant source of noise.

4.1.9 Sensitive Areas

Sensitive areas include granite hills, rivers, streams and wetlands (Plate 8) located in close proximity to the M1 Road.

Figure 12: Sensitive areas next to M1 road includes wetlands and granite hills

4.2 SOCIAL ASPECTS

Baseline socio-economic aspects that will be discussed include population data, land use and tenure systems, health, education, economic activities, religion, settlement patterns and migration, communication and transport systems and energy sources associated with the project area.

4.2.1 Population

In 2013, it was estimated that Malawi had a population of 16,777,547 million people with a growth rate of 2.8 %. The project road is located in the Central and Northern Regions and the population density in these regions is 192 people/km^2 and 78 people/km^2 respectively. Administratively, Malawi is divided into 28 districts and the section of the M1 road to be rehabilitated is located in four of

these districts, *i.e.* Lilongwe, Dowa, Kasungu and Mzimba. Table 11 summarises the population projections for each district using values from the 2008 census.

Table 11: Population Projections for Districts (Population Projections Report, National Statistical Office)

Region	District	2008 Census	2009	2010	2011	2012	2013	2014	2015
Northern	Mzimba	729,933	751,124	773,009	795,708	819,297	843,788	869,202	895,550
Central	Kasungu	629,123	654,730	680,791	707,862	735,836	764,859	794,991	826,285
	Dowa	559,950	586,430	613,692	641,895	671,075	701,225	732,343	764,414
	Lilongwe	1,234,110	1,264,444	1,294,449	1,325,01	1,356,2	1.388,4	1,421,4	1,455,5

In 2014, the life expectancy at birth for males was 53.7 years and for females it was 56.6 years based on the 2008 census population projections. The average household size in 2014 was 4.6 people.

Table 12 shows that approximately 60 % of respondents in the MDHS (2016) were under the age of 30, reflecting the young age structure of the population.

Table 12: Demographic data between ages 15 and 49 (MDHS, 2016)

Age	Woman (%)	Men (%)
15-19	21.4	25.5
20-24	21	19.8
25-29	16.1	14.3
30-34	14.9	13
35-39	11.9	12.4
40-44	8.3	8.7
45-49	6.4	6.3

4.2.2 Land Use and Land Tenure System

The Land Act of 1965 (Cap. 57:01) governs customary, private, and public use of land in terms of three main tenure systems:

- **Customary Land** - before the colonial period in Malawi, land was held communally, *i.e.* it was held in trust for all the people forming the community. The duty to allocate land fell upon the leader of the community, who allocated the land to the head of a family who, in turn, allocated it to individual family members. Today, the same pattern still obtains where customary land law is practiced. The head of the community would be identified as the traditional authority. Each administrative district in the country is divided into areas which are controlled by traditional authorities. Each traditional authority has a number of villages which are controlled by village headmen. Approximately 85 % of the land in Malawi is held under customary tenure;

- **Private Land** - Private Land is defined by the Land Act as all land which is owned, held, or occupied under a freehold title, a leasehold title, or a certificate of claim, or which is registered as private land under the Registered Land Act; and
- **Public Land** - Public land is defined by the Land Act as all land which is occupied, used, or acquired by the Government and any other land that is not customary land or private land.

The proposed road passes through customary land controlled by Traditional Authorities in all four districts. In the trading centres and larger towns such as Dowa, Mponela and Kasungu, the land is owned by the councils, private institutions and individuals.

4.2.3 Health

The Malawi Demographic and Health Survey (MDHS, 2016) provides a comprehensive overview of population and maternal and child health issues.

Fertility

Fertility is notably higher among rural women than among urban women. On average, rural women will give birth to nearly two more children during their reproductive years than urban women, 4.8 and 3.0, respectively (MDHS, 2016).

Teenage Pregnancy and Motherhood

The issue of adolescent fertility is important on both health and social grounds. Children born to very young mothers are at increased risk of sickness and death. Teenage mothers are more likely to experience adverse pregnancy outcomes and are more constrained in their ability to pursue educational opportunities than young women who delay childbearing.

Family Planning

Overall, 59 % of currently married women are using a method of family planning and among sexually active unmarried women, 44 % are currently using a contraceptive method (MDHS, 2016). Women with no education are less likely than women who have attained a primary or higher education level to use contraceptives. Contraceptive use tends to increase with increasing wealth and with increasing number of living children.

Early Childhood Mortality

Infant and child mortality rates are basic indicators of a country's socio-economic situation and quality of life (UNDP 2007). The 2015-16 MDHS indicates that under-5 mortality rates have declined from 112 deaths / 1,000 live births in 2001 - 2005 to 64 deaths / 1,000 live births in the 5 years prior to the 2015 - 16 MDHS survey.

Common Diseases

Malaria is the most prevalent disease in the project districts. Other commonly occurring diseases in the district are waterborne diseases, eye infections, tuberculosis and acute respiratory infections.

HIV/AIDS Awareness, Knowledge, and Behaviour

The MDHS (2016) result show that 75 % of men and women aged between 15 and 49 know that consistent use of condoms is a means of preventing the spread of HIV. Eighty-six % of women and 89 % of men know that limiting sexual intercourse to one faithful and uninfected partner can reduce the chances of contracting HIV. Seven in 10 men and women know that both using condoms and limiting sexual intercourse to one uninfected partner are means of preventing HIV. By marital status, women and men who have never been married and never had sex are least likely to know that using condoms and limiting sexual intercourse to one uninfected partner reduces the risk of HIV

transmission (58 % and 62 %, respectively). Respondents with no education are the least knowledgeable of HIV prevention methods compared with other respondents.

Knowledge of how HIV is transmitted is important to enable people to avoid HIV infection. This is especially true for young people, who are often at greater risk because they may have shorter relationships with more partners or engage in other risky behaviours. Forty one % of young women and 44 % of young men have knowledge of HIV prevention. Among both sexes, the proportion with comprehensive knowledge generally increases with age, educational attainment, and wealth. Urban young people are more likely than rural young people to have knowledge of HIV prevention.

Knowledge of HIV status helps HIV-negative individuals make specific decisions to reduce risk and increase safer sex practices so that they can remain disease free. Among those who are HIV infected, knowledge of their status allows them to take action to protect their sexual partners, to access treatment, and to plan for the future. The majority of respondents between the age of 15 and 49 knew of a place where they could get an HIV test. Younger respondents (age 15-19) were less likely than those aged between 20 and 49 years to know a place where they could go to be tested. Knowledge of a place to get an HIV test generally increases with education. Most of those who had been tested said that they had received the results of the last test they took.

4.2.4 Access to Infrastructure

Sanitation

About half of households in Malawi (52 %) usually use an improved and not shared toilet / latrine facility, whereas a third of households (31%) use facilities that would be considered improved if they were not shared by two or more households. The most common type of toilet facility in rural areas is a pit latrine with a slab that is not shared with other households (52% of rural households). While pit latrines with a slab are also the toilet facilities most commonly used by urban households, they are usually shared with other households (50 % of urban households). Overall, 6 % of households have no toilet facility at all; they are almost exclusively rural, accounting for 7 % of rural households.

Sources of Drinking Water

Table 13 indicates that the majority of households in Malawi (87 %) obtain drinking water from an improved source. This is an improvement since the 2010 MDHS when 80 % of households obtained drinking water from an improved source. Use of improved drinking water sources is more common among households in urban areas (98 %) than among those in rural areas (85 %). The most common source of drinking water in urban areas is water piped into the dwelling / yard / plot, to a neighbour or to a public tap, with more than 8 in 10 urban households (86 %) using this source. In rural areas, the most common source of drinking water is a tube well or borehole (72 %).

For the purposes of this ESIA, it may be assumed that the people who may potentially be affected by road upgrade activities are located in urban areas (trading centres and villages) where the majority of these people have access to an improved source of drinking water.

Table 13: Sources of household drinking water for urban and rural households (MDHS, 2016)

Source of drinking water	Urban Households	Rural Households
Improved source	**98.0**	**85.2**
Piped into dwelling	13.5	0.4
Piped to yard/plot	27.9	1.8
Piped to neighbour	11.7	1

Public tap/standpipe	32.7	5.9

Source of drinking water	Urban Households	Rural Households
Tube well or borehole	9.6	71.6
Protected well	2.3	4.1
Protected spring	0.1	0.2
Non-improved source	**2.0**	**14.6**
Unprotected well	1.6	9.2
Unprotected spring	0.1	1.1
Surface water	0.4	4.3
Other source	0	0.2
Total	**100**	**100**

Power Supply

The Electricity Supply Company of Malawi (ESCOM) provides hydro electrical energy but only a few people (less than 20%) have access to it. Table 14 lists the percentage of households in each district that have access to the national electricity grid. It is seen that an average of 35.6% of Malawian households have access to the national power grid.

Table 14: Percentage distribution of households living in communities with access to national electrical power by districts (WMS, 2014)

District	Community connected to national electricity grid (%)
Lilongwe (Rural)	15.
Mzimba	18.0
Kasungu	19.
Dowa	22.3
Malawi	**35.**

The major source of energy for the area is firewood and charcoal. The continual reliance on firewood has resulted in deforestation of especially natural trees.

4.2.5 Education

The primary school net enrolment rate in 2014 was 86.7 % and the secondary school net enrolment rate is 10.8% (WMS, 2014). Twelve % of women have no education compared with 5 % of their male counterparts (

Table **15**). Thirty-six % of the men reported attending at least some secondary school, compared with 26 % of the women. The proportion of literate persons aged 15 years and above was 91.2 % in urban areas and 68.2 % in rural areas (WMS, 2014).

Table 15: Education levels of men and women ages 15-49 (MDHS, 2016)

Education	Woman	Men
No education	12.1	5.3
Primary	62.1	58.3
Secondary	22.8	31.5
More than secondary	3.0	4.9

4.2.6 Economic activities

The economy of Malawi is predominantly agricultural, with about 90% of the population living in rural areas. Locally produced crops include maize, cassava, sweet potatoes, bananas, vegetables and other cash crops. The major exported commodities include tobacco, tea, sugar and cotton and the two main imported commodities include fuel oils and fertilisers.

The M1 road is a major route from Lilongwe to the north of Malawi and carries significant local traffic serving the Lilongwe, Dowa, Kasungu and Mzimba District administrative centres and trading centres along its route. The road provides for access to local economic growth points and enables the transportation of essential food, consumer goods and fuel. The road also serves productive farming areas along its length. The local population is dependent on the road to transport their crops to local markets, as well as to markets in the Lilongwe and the regional towns and villages in the project area. Kasungu District is the principal tobacco growing area of Malawi and there is a large tobacco sales facility south of the Boma. The proposed rehabilitation of this road will directly benefit the people of those districts.

4.2.7 Religion

It is estimated that the vast majority of Malawians are Christian (87%) and the remaining 13 % are Muslims (MDHS, 2016).

4.2.8 Settlement Pattern and Migration

The settlement pattern is generally linear and follows the proposed M1 Road. A significant proportion of the population has settled in areas very close to the road reserve, particularly in the trading centres.

4.2.9 Communication and Transport Systems

The project impact area (road corridor) has mobile phone reception in most parts. Some of the trading centres and larger towns have post offices and banks. Transport systems operating along the M1 section of road include minibus, buses and trucks. Bicycle taxis and motor cycles also operate in the town centres ferrying people from one place to another.

4.2.10 Safety Aspects

In all the trading centres, it was seen that there are structures within the existing road reserve. Some resettlement might be necessary in places, although this is likely to be limited. High-density settlements occur along the road and this poses a safety concern, particularly in Section 1 and Section 2.

The poor safety record of the road is captured in the Road Authority's (RAs) draft Road Safety Assessment report (July 2014), which identified 29 locations between the KIA turn-off and the Mzimba turn-off where accidents have been recorded. In some of these locations more than 20

crashes occurred in the period 2008 to 2012 and 11 locations are considered as 'potential black spots'. It is noted that:

- Most crashes involve pedestrians and cyclists;
- Most of the accident black spots are between the KIA turnoff and Kasungu; and
- Several bridges are identified as black spots.

The Road Safety Assessment report provides recommendations for road improvements at the identified black spots. These will be taken into account in the detailed design of the road in the trading centres and at the main intersections. Design details will be based on recommendations from the Manual on Safe Road Design, which will provide a basis for the Road Safety Audit of the road design. This audit will be conducted in close liaison with the Roads Authority and the Road Traffic Directorate.

4.3 CULTURAL ENVIRONMENT

The courts in Malawi continue to apply customary law, which gives great deference to decisions made by traditional leaders. According to section 27 of the Monuments and Relics Act (29:01), any entity that finds a relic or archaeological element during excavation must halt work and report it to the national government within fourteen days. The dead are buried in small graveyards, thirteen of which were noted along the M1 road (Table 16 and Plate 9). While these graves may be located within the 30 m road reserve, the Contractor will be instructed not to disturb them in any way. Measures to avoid disturbing the graves will be provided in the ESMP and these will include identifying each grave and graveyard as a no-go area.

Table 16: Location of graveyards along the project road

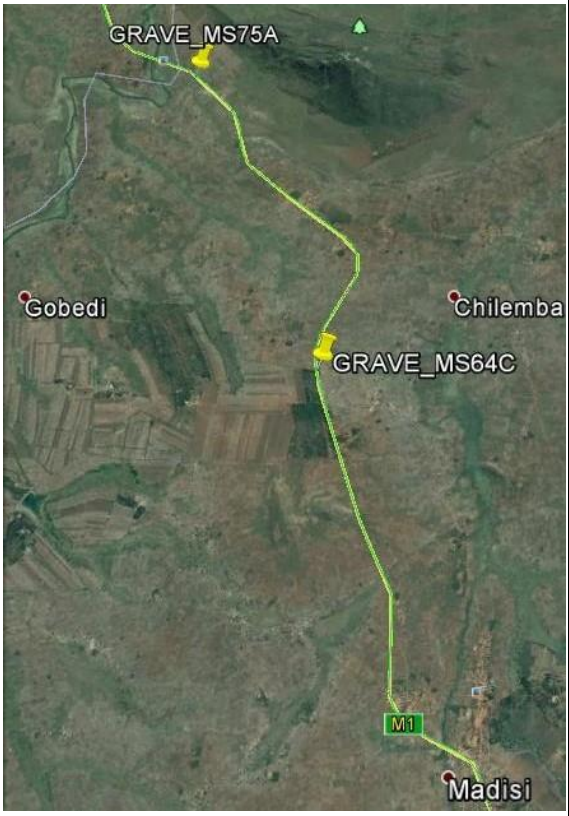
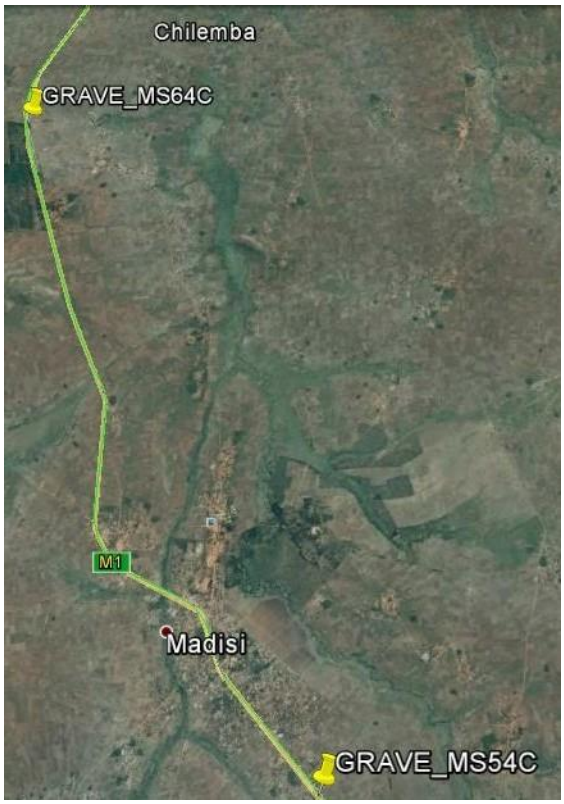
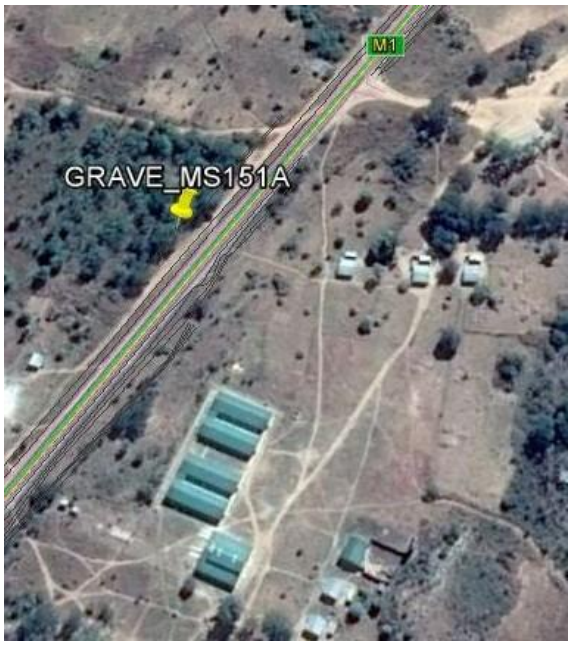
Grave	Latitude	Longitude	Height	Location
GRAVE_MS41A	-13 30 36.27028	33 42 09.63962	1178.107	4.54 km north of Mponela Trading Centre on eastern side of M1 (near
GRAVE_MS19	-13 39 22.84601	33 46 27.37242	1349.295	500m south of the M1 and S115 Roads intersection on western side of the M1 road. Approximately 15km north of Lumbadzi Trading Centre.
GRAVE_MS19B	-13 39 14.20163	33 46 15.93367	1347.519	Located 113 m south of S115 and M1 Roads intersection on eastern side of the M1 road.
GRAVE_MS7B	-13 44 07.02005	-33 48 22.08380	1240.783	Located 4.5km north of Lumbadzi Trading Centre on eastern side of M1 road. It is located 1.7km south of the intersection of M7 with the M1 road.
GRAVE_MS54C	-13 26 03.61969	33 37 14.22188	1125.657	Located approximately 3 km south of river flowing through the Madisi Trading

GRAVE_MS64C	-13 21 40.29712	33 34 48.10734	1121.087	Grave is located approximately 6.726 km north

Grave	Latitude	Longitude	Height	Location
				of Madisi Trading Centre on eastern side of the road.
GRAVE_MS75A	-13 18 42.66936	33 33 18.37931	1050.202	Located 15 km north of Madisi Trading Centre on eastern side of the M1
GRAVE_MS103	-13 06 15.15756	33 29 19.39738	1105.079	Grave is located 1.8 km north of intersection of T338 road with M1 road on eastern side of the M1 road. This grave is ~ 6 km south of Kasungu.
GRAVE_MS151A	-12 44 08.51646	33 28 27.78978	1121.313	This grave located roughly 10km north of Mphomwa and 20 km south of Nkhamenya on western side of the M1 road
GRAVE_MS31	-13 34 36.23548	33 44 50.68660	1301.680	This grave is located roughly 5 km south of Mponela Trading Centre on eastern side of M1 road close to three other graves.
GRAVE_MS31A	-13 34 26.24751	33 44 49.86829	1298.589	Grave is located near 3 other graves and roughly 4.75 km south of Mponela
GRAVE_MS31B	-13 34 17.52480	33 44 48.21871	1298.127	Grave is located near 3 other graves and roughly 4.5 km south of Mponela Trading Centre on western side of M1 road.
GRAVE_MS31C	-13 34 09.26658	33 44 45.298480	1294.64	Grave is located near 3 other graves and roughly 4 km south of Mponela

GRAVE_MS19 and GRAVE_MS19B located approximately 15 km north of Lumbadzi Trading Centre

GRAVE_MS41A located ~ 4.54 km north of Mponela Trading Centre on eastern side of M1 road

	
GRAVE_MS75A located ~ 15km north of Madisi on eastern side of M1 road.	GRAVE_MS54C located ~3 km south of river in Madisi on western side of M1 road and GRAVE_MS64C located ~ 6.73 km north of Madisi.
	
GRAVE MS103 is located ~ 6 km south of Kasungu on eastern side of M1 road.	GRAVE MS151A located ~10 km north of Mphomwa and ~ 20 km south of Nkhamenya on west side of M1.

Grave_MS31, MS31A, MS31B and MS31C are located between 4 km and 5 km south of Mponela Trading Centre.

Figure 13: Graves located in close proximity to the M1 Road

CHAPTER FIVE: PUBLIC PARTICIPATION

5.1 INTRODUCTION

In compliance with the requirements of the Environment Management Act and to align with best practice such as the International Finance Corporation (IFC) Standards, a public consultation process was undertaken during this ESIA.

The objectives of consulting with stakeholders were to:

- Achieve continued, optimum stakeholder input and support for the current project (upgrade and rehabilitation of the existing M1 Road over a distance of 234 km);
- Understand stakeholder's viewpoints;
- Build trust by, *e.g.* providing feedback to stakeholders;
- Avoid crisis management and manage expectations;
- Implement experiences and lessons learnt from stakeholders and community experience;
- Inform decision making and facilitate sustainable development; and
- Empower and build capacity amongst stakeholders.

5.2 METHODS

The approach and specific methods used to undertake the public consultation process for the M1 road upgrade and rehabilitation project are summarised in Table 17.

Table 17: Public Consultation Methodology

Approach	Description
Meeting with Environment	At the start of the project, the Developer (Roads Authority) introduced the
Stakeholder analysis and identification	List of Stakeholders Consulted (Annexure C).
Site visit with Roads Authority	A site visit was held with the Roads Authority's Environmental Manager.
Background Information Document (BID)	A BID (included in Annexure C) was prepared and distributed to notify key stakeholders of: - Proposed road upgrade project; - ESIA process; and - Opportunities for stakeholders to register their issues and concerns and to comment on the proposed process & ToR.
Courtesy visits (Sensitization Phase)	Meetings were held with a number of key stakeholders at national and district level to establish consensus on the approach to and methods for community consultations and to inform them of the
Key stakeholder meetings	Formal public meetings were held with key district representatives in Dowa, Kasungu and Mzimba Districts (minutes are included in Annexure C).

Community Consultations	Community meetings and Focus Group Discussions were held in each of the four districts (minutes are included in Annexure C)
Issues and Responses summary	The information collected during the public consultation process was consolidated and incorporated in the ESIA report (Table 19).
Stakeholder Disclosure	Distribution of the Executive Summary of the ESIA to key stakeholders for comment over a 30-day period.

Table 18 contains a summary of the consultation activities undertaken for the M1 Road upgrade and rehabilitation project.

Table 18: Summary of consultation activities undertaken for M1 upgrade project

Date	Consultation Activity
14 August 2015	Introductory meeting with Environment Affairs Department, Roads Authority and the Environmental Consultants.
14 August 2015	Site visit of project road with Roads Authority Environmental Manager
1 – 4 February 2019	Meeting with representatives from various government departments including the Environment Affairs Department, Mines and Geology, Forestry, Water Affairs, Lands, Road Traffic and Road Safety, Department of Antiquities and Agriculture.
2 - 4 February 2019	Meetings with Dowa DC and Kasungu DC (3 February 2019) and Lilongwe DC (2 February 2019) and Mzimba DC (4 February 2019).
7 January 2019	Kasungu District Council meeting held at Kasungu District Council Offices
9 January 2019	Lumbadzi Trading Centre
11 January 2019	Dowa District Council meeting held at Dowa District Council Offices
12 January 2019	Mzimba District Council meeting held at Mzimba District Council Offices
26 January 2019	Chimwaza Trading Centre
26 January 2019	Madisi Trading Centre
26 January 2019	Mponela Trading Centre
27 January 2019	Nkhamenya Trading Centre
27 January 2019	Jenda Trading Centre
4 May 2019	Mponela Trading Centre

Figure 14 provides photos taken during some of the meetings held in trading centres along the project road.

	
Mponela Trading Centre meeting	

	
Madisi Trading Centre meeting	Nkhamenya Trading Centre meeting
	
Jenda Trading Centre meeting	Meeting with Mponela Trading Centre Executive Committee Members

Figure 14: Public meetings held with stakeholders in Trading Centres located along the M1 road

5.3 SUMMARY OF FINDINGS

Table 19 summarises the issues raised by stakeholders during the public consultation process; indicates the forum where the issue was raised; and provides a response to address the issue. The issues and concerns raised by stakeholders have been grouped into a number of categories and include road design and alignment aspects including safety, compensation, timing of the project, social and communication aspects with only few environmental issues being raised by stakeholders.

Table 19: Summary of issues raised and responses

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
How substantial is the construction of climbing lanes in relation to the number of trucks?	Dowa District Council meeting Kasungu District Council meeting	There are no climbing lanes in the design as the traffic levels are too low to justify them. Safety barriers (concrete type will be
Will widening of the road not cause more accidents? **Is it possible to widen the road even more than proposed in the design, as trucks cause hindrance to vehicular traffic?** **Is widening of the road economical?**	Mzimba District Council meeting Dowa District Council meeting	Improving the road will not prevent accidents. The aim of rehabilitating the road is to reduce the current number of accidents. The design standard is dictated by RA and widening is deemed economical in some sections. The project engineers propose to widen the

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
Cyclists use the road instead of the shoulders. **The EDO stated that it is high time** **the council has high standards when it comes to development of the road project instead of complaining that widening the road will affect cyclist as these are not allowed to road but the shoulders.**		road in trading centres to reduce accidents. RA determines the width of the road.

Sign posts must be installed to minimise accidents. **Will reconstruction of this road include new road safety features especially in trading centres, which are prone to accidents, hence the need to add humps or rumble strips?** **What is Roads authority going to do in-terms of reducing**	Dowa District Council meeting Chimwaza Trading Centre Meeting Mponela Trading Centre meeting	The road designs include the installation of signposts. Road safety features are included in the designs. Road safety audits are conducted to determine the appropriate features to be introduced to prevent accidents occurrence. These auditors liaise with the people in the project area and indicate where road safety measures should be applied.
Culvert bridges must be installed in places where there is an access road adjoining to the main road. The drainage system must be well considered or it could lead to loss of property and land especially during rainy season and to formation of gullies, *e.g.* Chitete area in Mponela. **The existing road is overtopped with water during rainy season.** **It was proposed that the**	Dowa District Council meeting Mponela Trading Centre meeting	The recommendation will be included in the design of the road. During this feasibility study, an investigation to determine the drainage requirements was carried out. The adequacy and current status of the drainage systems along the project section of the M1 road were evaluated as part of this feasibility study and recommendations for new designs have been formulated as required.
A service road must be built where travellers can rest.	Dowa District Council meeting	Noted. This depends on the availability of financial
If the proposed design for the road is too expensive, it is better to develop the road in phases to suit the budgetary allocation rather than constructing a road	Dowa District Council meeting Kasungu District Council meeting	Recommendation is noted. The method of construction depends on the availability of financial resources. There are a number of factors that contribute

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
with poor durability. Concern was raised on the durability of most of the road projects in the country. It was proposed therefore that the design of the road		to durability of the road including: • Good design with inadequate resources. • Poor supervision of contractor by supervision consultants.
Which part of the road will be rehabilitated, the outer road or the inner road or both?	Kasungu District Council meeting	Sections of the road through trading centres and the sections in between trading centres will be rehabilitated.
Is it possible to change the road alignment as the current one tends to cause a lot of accidents?	Mzimba District Council meeting	No. The project aim is to rehabilitate the road. However, wider paved shoulders are proposed to reduce accidents caused by cyclists.
Will Mzimba be considered in terms of completing the road? Can the road be completely	Mzimba District Council meeting	Mzimba is not the only district facing this problem. Nonetheless it depends on Government to do as recommended.
Which of the COMESA design options will be used?	Mzimba District Council meeting	This will depend on the amount of funds that Government is able to procure
It is recommended that an inland road (~access road) to the trading centre be constructed, as to entice customers since	Chimwaza Trading Centre meeting	This suggestion will be put forward to the appropriate experts for consideration.
Will the road be a dual carriage or a three way?	Jenda Trading Centre meeting	The road will not be a dual carriage nor a three way. It will be widened and shoulders will be established
Is it possible to construct a depot, proper minibus taxi rank and walkways for people and cyclists as the	Jenda Trading Centre meeting	The suggestion will be noted. It is likely that most these suggestions are already incorporated in the design phase.
Will the construction of the road consider extending the road shoulder with a concrete pavement up to where shops are located to reduce dust and mud	Madisi Trading Centre meeting	The design of the road has included recommendations to widen the shoulder of the road.
What is the possibility of government to install street lights in trading centres?	Madisi Trading Centre meeting	Suggestion is noted but street lighting does not fall within ambit of this project.

What type of road will it be? Will it be for vehicles	Madisi Trading Centre meeting	It will be for vehicles.

Issue	Forum Raised	Respons e
ROAD DESIGN AND ALIGNMENT ISSUES		
line?		
The community unanimously presented that their preference was to have the M1 road by-pass the whole Mponela Town since the Town was growing and that it was not appropriate for a busy road to pass in the middle of the	Mponela Trading Centre meeting	The proposal is sensible. However, a feasibility study will have to be carried out to fully understand the scope of the project and its viability economically, socially and environmentally.
Will the government of Malawi be able to construct the road as they have been failing to maintain the existing one?	Mponela Trading Centre meeting	This is a separate project with a different approach. The rehabilitation of the road will be financed by multiple donors.
Has the road reached its life span or not? If it has, why has it not been rehabilitated? **The committee raised a concern pertaining to the road not looking like an M1 road. There is a need for the Roads Authority to**	Mponela Trading Centre meeting	The road has reached its lifespan and that is why it has to be reconstructed. Concern will reach the appropriate personnel and when designing the road all aspects and standards will be considered.
It was requested that New Jersey barriers be constructed along the road in trading centres as a safety measure.	Mponela Trading Centre meeting	The road design includes safety measures and this request will be taken into consideration.
ROAD CONSTRUCTION MATERIALS		
What type of material will be used for resealing?	Mzimba District Council meeting	For seaing the road asphalt concrete will be used on section 1 and double surface dessing on section 2 and 3
COMPENSATI ON		

The community wanted to know if it was possible to access the legislations that talk about land issues since most of them were not aware about these laws.	Mponela Trading Centre meeting	The Acts are enacted by the National Assembly and printed by the Government Print Offices. They can be accessed from the DCs office. However the Ministry of Transport, through Roads Authority as custodian of the Public Roads Act has the responsibility to raise awareness about the contents of the Public Roads.
Project-affected people (PAPs) should be compensated. Will government be able to	Madisi Trading Centre meeting Dowa District Council meeting	Government will compensate every affected person. PAPs will be compensated. The details of the PAPs will be listed in the

Issue	Forum Raised	Respons e
ROAD DESIGN AND ALIGNMENT ISSUES		
money?		
Will people whose property will be affected by the project be compensated or not since they encroached into the road reserve?	Kasungu District Council meeting	People whose property will be affected by the project will be compensated. The details of the affected people and their property will be included in the RAP prepared for this project.
People who may be affected by gully formation due to the contractor sourcing gravel must be compensated.	Mzimba District Council meeting	This recommendation will be incorporated in the RAP.
Until of late when the Road Reserve Boundaries marker posts were erected, local people were not aware of the exact boundary for the road reserve. Some people have established these settlements out of ignorance. What measures has the government put in place to	Chimwaza Trading Centre meeting	Government has already started considering them, as evidence by the conducting of this meeting to engage them in this process. A detailed Resettlement Action Plan (RAP) of how this will be done will be prepared and shared with them through the 'Public Disclosure'. This will be communicated to them via appropriate channels like their local leaders through the DC's

The 60 m road reserve as stipulated by the law is large and as such it will affect a lot of properties especially on trading centres. Is there any consideration for minimizing the number of properties to be affected in these areas?	Chimwaza Trading Centre meeting	The law provides for 36 m and 18 m in certain designated roads other than the M1. These may sometime be applied very critical circumstances, such as when the road passes through areas of high population densities such as cities and towns. This may be considered in trading centres with regard to circumstances at hand. Wherever road re- alignment is considered viable, it may also be
We are of the view that Government tolerated people to settle on the road reserve so evicting them at this point when we have established our livelihoods will cause a lot of suffering.	Chimwaza Trading Centre meeting	Government is currently rectifying the problem by erecting beacons for the road reserve boundary. Government has also undertaken awareness campaigns to distract people from encroaching on the road reserve. The RAP that will be prepared will spell out mechanisms for livelihood restoration.
How will those that built their structures knowingly and unknowingly in front of a beacon be differentiated?	Jenda Trading Centre meeting	With respect to the laws they are all wrong doers. However both will be compensated. Shortly Government will enforce regulations that prohibit settlement within road reserves.
Will those affected during construction due to operations of machinery be compensated?	Jenda Trading Centre meeting	These will be considered, even if they are just cracks on houses. Assessments will be conducted and the right amount will be given
How will those that have farms near the road be considered?	Jenda Trading Centre meeting	Those that have crops will be asked to reap/harvest their produce.

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
		They will also be compensated by estimating the amount of crops in the field if the crop is lost.
How does government intend to reduce arguments that arise due to compensation?	Jenda Trading Centre meeting	Government will follow a procedure that will involve taking full details and pictures of the owners as well as their structures. This will reduce

How will the estimates of items per house be calculated?	Jenda Trading Centre meeting	A property evaluator will estimate and calculate all the costs per house depending on the current prices of the items.
Late compensation results in arguments about compensation. This issue needs to be taken into	Jenda Trading Centre meeting	Recommendation noted and will be addressed.
Is it possible to start construction before compensation is made?	Jenda Trading Centre meeting	No. Funding for the road project will only be released to the Government once all affected people have been compensated.
Lilongwe City Council should arrange for a place where the displaced people will be plying their businesses. In addition the place to be identified should be along the main road not behind the trading centre because they will lose their customers.	Lumbadzi Trading Centre meeting	This request made by the vendors has been noted. It will be communicated to relevant authorities and included in the ESIA report as one of the mitigation measures for loss of business by the vendors.
There is a tendency by District Council officials who tend to either pocket money for compensation or pay the project affected persons less money than they are due. **There is need to alert the District Commissioner for Dowa about this malpractice**	Lumbadzi Trading Centre meeting	This observation will be communicated to the office of the District Commissioner during sensitization meeting that will be held on Monday 11th January 2019. In addition the RAP will also make some recommendations regarding this issue. The consultants further informed the meeting that it is the office of the DC only that is mandated to administer compensations. However, mechanisms
Will people be given notice before the demolition of their structures?	Lumbadzi Trading Centre meeting	Indeed people will be given notice before demolition of their structures. Firstly census of project affected people and their property will be made and people to be affected will be informed.

How will those that have properties in the road reserve be differentiated in-terms of establishment of structures	Madisi Trading Centre meeting	They will all be compensated. However, a time will come when a letter through the DC`s office will entail the closing period when anyone who constructs in the

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
before and after placing of beacons		road reserve will not be considered anymore. It is important to note that the law does not differentiate people on the basis of ignorance.
What is a period laps between receiving compensation and commencement of road construction	Madisi Trading Centre meeting	In most cases three months before construction is the time period given to compensate the people. However, it all depends on funding and time required to appoint a contractor.
It was suggested that the same consultants conducting the meetings be present during relocation of properties to reduce	Madisi Trading Centre meeting	This may be considered but it is very unlikely to be possible. The feedback will be submitted to the right authorities who will avoid misunderstandings.
Who is responsible for determining the value of the properties to be compensated? The owner or property evaluators?	Madisi Trading Centre meeting	Government registered property evaluators will be engaged for that purpose.
PROJECT TIMING		
When will results of the feasibility study be given to the Government?	Dowa District Council meeting	The results will be submitted by August 2019 so that by September Government will have started reviewing the feasibility reports.
When will the project start?	Dowa District Council meeting	The date for the start of the project is not known. However, the Government is very keen to start the project as soon as possible.
Will the road be finished especially in Mzimba? There are many road projects in the area that never been completed.	Mzimba District Council meeting	Question is noted. Funding for the project must still be sourced.

Time period when the project will start after the briefing at the council?	Mzimba District Council meeting	Latest known time is September 2019.
At which end will construction start? Mzimba or Lumbadzi?	Mzimba District Council meeting	The construction will start in the most damaged part of the road, *i.e.* Lumbadzi.
What will start between compensation and road construction	Madisi Trading Centre meeting.	The people will first be compensated then the construction can take place. Donors require proof that the people were Compensated before they provide funding for any given project.
Is the meeting at Mponela the first to be carried out in the country concerning the road rehabilitation project?	Mponela Trading Centre meeting	This is not the first meeting to be carried out. Meetings have been held with other trading centres near Mponela.
COMMUNICATIONS		
Traditional leaders around the area to be consulted before	Dowa District Council meeting	Community leaders will be notified prior to construction commencing.

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
construction begins so that they can sensitize their subjects especially those that will be affected by the		
Traditional leaders in the area be consulted and engaged to reduce cases of vandalism of property.	Kasungu District Council meeting	The recommendation will be included in the Environmental and Social Management Plan.
How will the offices of the council be involved with the implementation of the project?	Mzimba District Council meeting	The office of the District Commissioner will be actively involved in the monitoring of the implementation of the project. This will be clear in the environmental management and monitoring plan.
The Council must be consulted on where the camp site of the contractor can be located and on the type of materials that will be used to build structures, as	Mzimba District Council meeting	The Council will be consulted regarding the location of the Contractor construction camp.
The Councillor for the area indicated that apart from holding such a meeting at Lumbadzi Trading Centre, it will be more effective if the is a public Notice in Radios and Television as such more people will be informed about the development.	Lumbadzi Trading Centre meeting	This recommendation has been taken and will be communicated to Roads Authority.
Is there any joint coordination among the countries implementing the project when it comes to choosing the COMESA options? (Do nothing, period of 10 years or period of 20 years).	Mzimba District Council meeting	COMESA is the coordinator and Malawi is a member of COMESA. COMESA develops the terms of reference for all consultants. The option selected will depend on the funds available. Different countries get funding from different donors.

It was suggested that government allocate personnel to talk to the people especially youths of the area about sanitation on Trading Centres (open defecation). This comment in particular came from a very old man who voluntary sweeps around the Trading Centre.	Madisi Trading Centre meeting	This is a welcome idea and will be taken to the District Environmental and Health office for action.
HEALTH / SOCIAL ISSUES		

Issue	Forum Raised	Response
ROAD DESIGN AND ALIGNMENT ISSUES		
How does the project intend to reduce risks of HIV transmission due to the presence of migrant workers on the project?	Kasungu District Council meeting	The project aims to employ most of the unskilled labourers' from within the project area, as they will reside and work from their own houses. In addition, the project will liaise with District AIDS Coordinator to give periodic talks on AIDS to the workers. AIDS-awareness materials (information, education and communication) and condoms will be made available to workers.
It was requested that PLAN International be given time to give a talk to the Contractor on the issue of child protection. PLAN International is operating along the 47 km stretch of M1 Road in Kasungu District.	Kasungu District Council meeting	Recommendation will be included in the ESIA Report.

What measures have been put in place to address issues of Gender and HIV due to the presence of migrant workers in the project site?	Mzimba District Council meeting	The project intends to employ most of the unskilled labourers from within the project area as workers will be based at their houses. The project will liaise with District AIDS Coordinator to give periodic talks on AIDS to the workers; AIDS awareness materials (Information, Education and Communication) and condoms will be made available to workers. In-terms of gender, the contractor will be recommended to be gender balance even though in most cases relating to
ENVIRONMENT		
What measures have been put in place to address issues of the Environment due to the presence of migrant workers in the project site?	Mzimba District Council meeting	In areas where trees will be cut down reforestation will take place. Where borrow pits will be established, the contractor will rehabilitate the pits before leaving.
EMPLOYMENT		
Most of the contractors in Road construction are international not local, why is it so?	Kasungu District Council meeting	Most of the projects are advertised internationally and those that succeed are based on merit, *i.e.* good technical proposals.

Responses from the consultations provided relevant background information and helped in the identification of major social and environmental concerns of the communities along the project road. The minutes of the meetings held with the District Councils and in the Trading Centres are included in Annexure

CHAPTER SIX: IMPACT IDENTIFICATION AND ASSESSMENT

6.1 INTRODUCTION

This section of the report presents the potential environmental, social, economic and cultural impacts associated with the rehabilitation and upgrade project for the M1 Road. It should be noted that the road remains within the horizontal alignment for most of its length and this reduces and minimises the potential impacts on the surrounding environment. Similarly, the vertical alignment remains unchanged for much of the length of the road. The corridor area immediately adjacent to the project road has been disturbed by previous road establishment and construction activities. As the proposed rehabilitation of the M1 road is largely confined to this corridor, it is therefore anticipated that project-related activities will not result in highly significant impacts.

It should further be noted that the Contractor(s) will make every effort to make use of existing and established commercial quarries rather than apply for a permit or licence to establish a new quarry. Similarly, the Contractor(s) will make use of already established borrow areas[1] rather than establish a new borrow area. This further reduces the frequency and the significance of potential impacts.

6.2 SIGNIFICANCE RATING METHODS

The rehabilitation of the section of the M1 Road from KIA turn-off to the Mzimba turn-off will have both positive and negative impacts on the surrounding environment. The purpose of impact assessment and mitigation (this section) is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria; to develop and describe measures that will be taken to avoid or minimise any potential adverse effects and enhance potential benefits; and to report the significance of the residual impacts that remain following mitigation.

An impact is any change to a resource or receptor brought about by the presence of a project component or by the execution of a project-related activity. The baseline data (Section 1 and Section 3 of this report) provides important information for the process of evaluating and describing how the project could affect the biophysical and socio-economic environment. Impacts are described in terms of their nature or type as summarised below.

Nature or Type	Definition
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors, e.g. between occupation of a site and the pre- existing habitats or between an effluent discharge and receiving water quality.
Indirect	Impacts that result from other activities that are encouraged to happen as a consequence of the Project, *e.g.* in-migration for employment placing a demand on resources.
Cumulative	Impacts that act together with other impacts including those from concurrent or planned future third party activities to affect the same resources and/or receptors as the Project.

Forty five (45) existing borrow areas have been identified along the length of the project route as indicated in
Section 1.3.1.

Impacts are further described in terms of significance. The significance of the environmental and social impacts resulting from project is assessed using a standard impact assessment rating matrix where impacts are described in terms of significance. The significance of the identified impacts was determined using the approach outlined below that incorporates two aspects for assessing the potential significance of impacts, *i.e.* occurrence and severity, which are further sub-divided as follows:

To assess each of these factors for each impact, the following four ranking scales are used:

Occurren	Duration	
5 - Definite	5 – Permanent	
4 - Highly probable	4 – Long term (impacts that will continue for the life of the Project, but ceases when the Project stops	
3 - Medium probability	3 – Medium term (8-15 years)	
2 - Low probability	2 - Short term (impacts that are predicted to last only for the duration of the construction period)	
1 - Improbable	1 – Immediate	
0 - None		
Scale / Extent	**Magnitude / Intensity (degree of change brought about in the environment)**	
5 – Transboundary / International Impacts that affect internationally important resources such as areas protected by international conventions.	**Biophysical Environment** Intensity can be considered in terms of the sensitivity of the biodiversity receptor, i.e. habitats, species or communities.	**Socio-Economic Environment** Intensity can be considered in terms of the ability of project affected people / communities to adapt to changes brought about by the Project.
4 – National Impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences	**10 – Very High**	**10 – Very High**
3 – Regional Impacts that affect regionally important environmental resources or are experienced at a	**8 – High** Where natural functions or processes are altered to the extent that it will temporarily or	**8 – High** Those affected will not be able to adapt to changes and continue to maintain-pre impact

2 – Local Impacts that affect an area in a radius of 20 km around the development area	**6 – Moderate / Medium** Where the affected environment is altered but natural functions and processes continue, albeit in a modified way.	**6 – Moderate / Medium** Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support.
1 - Site only Impacts that are limited to the site area only	**4 –Low** The impact affects the environment in such a way that natural functions	**4 – Low** People / communities are able to adapt with relative ease and
0 – None	**2 – Negligible** The impact on the environment is not detectable.	**2 – Negligible** There is no perceptible change to people's way of life.

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

SP (significance points) = (magnitude + duration + scale) x probability

The maximum value is 100 significance points (SP). The impact significance will then be rated as follows:

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 -75	Indicates moderate environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP < 30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive Impact	An impact that constitutes an improvement over pre-project conditions

Mitigation of Potential and Residual Impacts

For activities with significant impacts, the Project is required to identify suitable and practical mitigation measures and fully implement them. The implementation of the mitigations is ensured through the application and enforcement of measures included in the ESMP. Once mitigation is applied, each impact is re-evaluated, assuming that the mitigation measure is effectively applied, and any remaining impact is rated once again using the process outlined above. The result is a significance rating for the residual impact (Table 21).

The significance of potential impacts arising from the road upgrade activities has been assessed for biophysical, social and cultural heritage aspects as outlined in the sections that follow. The Environmental Affairs Department requested that 'the impacts identified should be identified based on project phase, for example, what will be the impacts during construction works, operation and decommission works' (refer to Annexure B). However, the impacts identified are based on the Construction Phase activities.

The Operational Phase of the project, i.e. road users using the road as they currently are, is deemed to be under the jurisdiction of the Roads Authority who deal with road maintenance through already existing road maintenance plans. The decommissioning phase relates to the unlikely decommissioning of the M1 National Road and is not addressed in this ESIA. The rehabilitation of borrow areas may be equated to decommissioning and this aspect is addressed in the ESMP (Annexure D).

Table 21 summarises all the biophysical aspects, the construction activity, potential impacts and mitigation measures and provides a significance rating prior to and after the application of mitigation.

6.3 BIOPHYSICAL ASPECTS

Project activities that may affect the water resources such as rivers, streams and wetlands along the M1 Road include bridge structure management and ditch and watercourse management activities.

6.3.1 Hydrology and Geohydrology

ACTIVITY UPGRADING / REPLACEMENT OF BRIDGE AND CULVERT STRUCTURES

The proposed design recommends the widening of all bridges and major culverts (Section 1.2.3) to accommodate the proposed wider cross-section of the road and ensure safe passage of pedestrians and non-motorised vehicles. The design further recommends that widening of the bridges and major culverts should incorporate concrete parapets as an additional safety measure. Some of the minor culverts will require replacement and extension.

Bridge structure management activities include the cleaning and painting of bridge structures, as well as the repair, rehabilitation, and replacement of bridge elements including decks, railings, abutments, and bearings. Works may include concrete works and piling. These activities help to ensure bridge structures remain structurally sound and safe for public use.

Impacts

Potential hydrological impacts relating to the proposed bridge and culvert structure management activities are typically direct, negative impacts and include the following (Table 21):

- Loss of instream and channel structure - the removal of boulders, woody debris, root systems, etc reduces habitat complexity and overall habitat value;
- Critical functions, *i.e.,* erosion control, filtering function, climate control, provided by riparian vegetation are lost. The altered function affects quality and value of fish habitat as fish passage is affected. Fish may not be able to access upper reaches of waterways or spawning grounds;
- Potential reduction in the productive capacity of riparian habitat;
- Ecological balance may be upset by removal of fish from an area where they acted as predators or prey and productive capacity decreases;
- Surface flow rate increases causing potential for bank scour;
- Alterations to riparian habitat have potential to hydraulically affect other reaches of the watercourse;
- Cleaning may introduce accumulated harmful substances such as sediment, oils, paint chips, treated wood debris, etc to a watercourse resulting in contamination of water course;
- Repair works may cause erosion of watercourse banks and generation of sediment if bridge abutments are not protected from draining wash water; and
- Disturb instream and riparian habitat by changing the channel structure, banks, substrate or vegetation.

Mitigation Measures

- Habitat enhancement or compensation is required to offset loss;
- Introduce river bank stabilisation measures;
- If activities involved the disturbance of soils or the use of erodible materials, e.g., sands, topsoil; prevent the transport of sediment through the installation of appropriate erosion and sediment control devices such as silt traps;
- Minimize vegetation-clearing activities;
- Store hazardous materials on an impermeable surface;
- Ensure all equipment used on site is well maintained and free of fluid leaks;
- Have a spill response plan in place and spill kits on site;
- Prevent wash water and construction and maintenance debris from entering a watercourse;
- Ensure adequate design of drains and culverts in terms of structure, size, number and position and align culverts and drains with natural flow directions;

- Contractor workers must not enter a sensitive site unless for stipulated construction activities within these sites, in which case all activities must be confined to the Road Reserve;
- Use the following threshold value to identify the level at which sediment becomes harmful - sediment becomes a harmful substance when a water sample taken from the discharging water source has a total suspended solids (TSS) value more than 25 mg/ℓ above the background TSS value of the receiving watercourse;
- Use temporary covers to keep erodible construction materials dry if they are stored on site near watercourses
- Clean tools and equipment off-site to prevent the release of wash water that may contain harmful substances;
- If potentially harmful materials, *e.g.,* cement-based products, are used for repair works, ensure raw material and wash water will not be released to any watercourse;
- Material that pose a risk of contamination to soils, surface water or groundwater should be disposed of appropriately off-site;
- Techniques to prevent wash water and construction and maintenance debris entering the watercourse include: building forms around the work area, hanging tarps to trap loose material, and (for inert substances and debris) using booms on surface waters below work areas to trap and remove any floating substances that may escape the primary containment system; and
- Inspect drain blocks, and wash water runoff areas regularly to ensure they are functioning and repair as required.

ACTIVITY DRAINS AND WATERCOURSE MANAGEMENT

Road rehabilitation and upgrade activities involving drains and watercourses include debris, sediment and vegetation removal from both natural channels and constructed drains and culverts; repair of bank erosion and grading and construction of roadside drains. These activities are undertaken to provide safe, unobstructed drainage for all road surface runoffs, natural roadside runoffs and drains and to create collection areas for debris. The impacts associated with this activity are negative, direct impacts (Table 21).

Impacts

Drains and watercourse management activities may impact on the aquatic environment through:

- Introduction of sediment or other harmful substances to a watercourse;
- Damage to aquatic habitat through the improper location of disposal sites in drains, wetlands, streams and rivers;
- Disturbance of wildlife species, e.g. birds;
- Damage to aquatic habitat by altering instream and bank structures and vegetation through the placement of riprap; and
- Contamination of surface waters, groundwater and soils through improper storage or disposal of materials.

Mitigation Measures

- Select appropriate equipment and work access routes to reduce damage to riparian vegetation and watercourse banks;
- If removing debris from a watercourse, operate equipment from the bank or road shoulder;
- Do not allow machinery to cross through water;
- Ensure all equipment used on site is well-maintained and free of fluid leaks;
- Refuel and lubricate equipment on dry land away from watercourses;
- Use drip trays to contain any spillage during equipment maintenance;
- Isolate the works area from any flowing water that may be present;

- Ensure any flows are temporarily diverted around the portion of the drain, culvert or watercourse where work is being undertaken;
- Contain any sediment-laden water generated during the works in an isolated work cell. Use a pump to draw sediment-laden water out of the work cell and discharge it to a level vegetated area where sediment can settle as the water infiltrates the ground;
- Use clean materials, free of fine soils that may contribute sediment to the watercourse, when installing riprap or other bank erosion protection measures; and
- If excavated materials or any other erodible materials are to be left on site, ensure they are placed in a manner that will prevent the introduction of sediment to any watercourse, i.e., temporary covers, grading and seeding, installation of silt fence around spoil piles.

ACTIVITY ABSTRACTION FROM WATER RESOURCES

Water will be required for compaction during construction, washing of machinery and equipment, for sanitation and personal hygiene activities, for reducing the impacts of dust and for domestic use by the contactor's work force. The Contractor will be drawing water for the road construction from a number of different sources (thirteen potential water supply sources are listed in Table 6). Water abstraction activities typically a direct and negative impact on water bodies (Table 21).

Impact

- The demand for water during the construction phase will exert pressure on the existing water supply sources and bring about a change in water availability, due to the increased use of water at construction sites;
- Potential decrease in downstream flows;
- Possible habitat loss as aquatic fauna and flora suffer decreased volume in tributaries;
- Possible reduction in fish passage; and
- Decreased quantity in waterway may increase tESMPerature, causing fish to avoid the waterway resulting in a loss of species to that area.

Mitigation Measures

- Abstraction of water for construction purposes shall take into consideration the requirements for local potable water supplies and the riparian rights of the people downstream; and
- If required, alternative water supply sources shall be provided for construction camp sites to avoid interference with local water supplies.

ACTIVITY ROAD WIDENING, PAVEMENT AND SHOULDER ESTABLISHMENT

Road upgrade and rehabilitation activities include the widening of the road surface, replacing road surface / pavement, establishment of a road shoulder and the establishment of borrow areas and quarries. Road construction activities will also involve the use of materials such as bitumen, paint, fuels, some of which are hazardous materials. These activities may contaminate soil and water resources and are direct, negative impacts (Table 21).

Impacts

- Road upgrade activities may resulted in the release of sediments and sediment-laden waters to a watercourse;
- Run-off from patching and sealing compounds, tar, asphalt, and chemical surface treatments enter watercourses and drain into the underlying soils. This may bring about a change in water quality due to effluent generation, generation of sediment and generation of hazardous waste;

- Sediment in runoff from disturbed soils, newly applied gravel or riprap materials and materials stockpiles;

- Leachate and raw product from concrete and cement-based products used to repair concrete structures;
- Equipment oils and fuels may contaminate water sources; and
- Generation of solid waste and hazardous waste may result in contamination of water sources and of the underlying soil.

Mitigation Measures

- Mix concrete compounds, sealants or other chemicals used, in a contained area and away from any watercourse if there is the potential for materials used in the activity to contaminate soils or surface waters adjacent to the road surface;
- Minimize soil exposure and removal of desirable vegetation to prevent establishment of invasive plants;
- Dispose of excess materials, excavated soils, and removed debris away from any watercourse;
- Have a spill response plan in place and spill kits on site;
- If potentially harmful material, e.g., cement-based products, are used for repair works, ensure raw material and wash water will not be released to any watercourse; and
- Inspect drain blocks, sediment controls and wash water runoff areas regularly to ensure they are functioning. Repair as required.

6.3.2 Geology, Soils, Land Use and Land Capability

ACTIVITY ESTABLISHMENT OF HAUL ROAD, ACCESS ROAD AND DETOUR ROAD

During the construction phase, the project will involve opening up of new roads for detours, access roads and the existing road may be widened in places. Construction and road rehabilitation activities will expose loose earth, making it prone to various forms of erosion such as wind and surface run-off. The loose material may settle on vegetation or may be blown into water bodies. The environmental impacts associated with establishment of these roads are typically negative, direct impacts.

Impacts

- Uncovered soil may be washed away through drainage into existing water bodies causing sedimentation of the rivers with detrimental impacts on water quality for aquatic life or ecology and domestic uses;
- This will have a further negative impact on the people using the river for bathing and washing (indirect impact);
- Loss of topsoil due to land clearing and earth moving activities;
- Changes in the landscape; due to the clearing of land and earth moving and storage of inert material;
- Soil compaction due to the movement of machinery and vehicles; and
- Generation of solid waste and hazardous waste, *e.g*. chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil.

Mitigation Measures

- Construction contracts to include a clause prescribing access, haul and detour roads as part of the site, so that the powers and authority of the Engineer extend to them in the same way as to other areas where works are being undertaken;
- Store surplus excavated topsoil and use it to rehabilitate disturbed areas;
- Loosen compacted soils upon commissioning and vegetate with seedlings, as appropriate;

- Spoil soil should be timely collected and transported to designated disposal sites;
- Spoil soil should not be disposed of or accumulate near river banks, close to the streams, dams or at water ways and flood routes;

- Where road works involve the disturbance of soils or the use or storage of erodible materials, *e.g*. sands, topsoil, apply appropriate erosion and sediment control practices and devices to prevent the transport of sediment;
- Mix any hazardous materials in a contained area to reduce the risk of contaminating soils or surface waters adjacent to the road surface;
- Avoid spilling chemicals during transfer and loading of applicator tanks.

Clean equipment and tools off-site where possible;

- Ensure all equipment used on site is well maintained and free of fluid leaks;
- Requirement to rehabilitate haul, access and detour roads is to be included in the contract;
- Cover embankment sides with grass and ensure growth through watering; and
- Ensure that any structures installed are maintained and monitored until they are no longer needed, *i.e.* vegetative cover on seeded areas is adequate to control erosion.

ACTIVITY ESTABLISHMENT OF GRAVEL PITS AND QUARRIES

A number of existing quarries will be used to extract mineral rock aggregate for the production of rock aggregates. Large volumes of crushed rock base will be required for the upgrading and rehabilitation of the proposed road. Key activities at the quarry sites include land clearing, drilling, blasting, hauling of rocks and crushing of quarry stone to different sizes for use during construction of the proposed road. It is anticipated that the Contractor will make use of existing commercial quarry operators rather than establishing a new quarry. However, in the event that a Contractor decides to establish and operate a quarry, the following direct, negative impacts are likely (Table 21):

Impacts

- Loss of topsoil due to land clearing and earth moving activities;
- Changes in the landscape; due to the clearing of land and earth moving and storage of inert material;
- Soil compaction due to the movement of machinery and vehicles; and
- Generation of solid waste and hazardous waste, *e.g.* chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil.

Mitigation Measures

- The construction contracts to include a clause prescribing quarry sites as part of the site, so that the powers and authority of the Engineer extend to them in the same way as to other areas where works are being undertaken;
- A detailed material plan to be prepared as part of the initial design review. Subsequent to this, quarries areas should be identified, marked on engineering drawings, and specified in the tender/contract document. Only approved quarry areas should be used;
- Quarrying for filling should only take place at designated sites, and existing quarries should be used where possible;
- Following the cessation of use, pit faces should be sloped using granular materials to a minimum 1.5 horizontal to 1 vertical and a stable drainage network constructed to minimize erosion.

ACTIVITY ESTABLISHMENT OF BORROW SITES

Road construction materials such as stone, sand, aggregate and gravel will be obtained from existing borrow areas located along the proposed road. The exact number of borrow areas that will be used for extraction of gravel for the road project is not known yet and will only be known once the extent

of rehabilitation is agreed on by the Government of Malawi. This will inform the Contractor who will be sourcing material from the borrow sites.

Key activities at the borrow pits typically include bush clearing, creation of access roads, removal and stockpiling of topsoil and overburden, extraction of suitable gravel, stone or other material, haulage, stockpiling and transportation of gravel, stones, etc to the proposed road for construction. Impacts on the soils and land use and capability are typically negative and direct as described below and summarised in Table 21.

Impacts

- Changes in the landscape; due to the clearing of land and earth moving and storage of inert material;
- Loss of topsoil due to land clearing and earth moving activities;
- Soil compaction due to the movement of machinery and vehicles; and
- Generation of solid waste and hazardous waste, *e.g.* chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil; and
- Impact on faunal habitat through the removal of vegetation cover and removal of topsoil.

Mitigation Measures

- Written agreements should be developed and signed between the land owners and community leaders and the Contractor;
- Where sufficient fill material is available, borrow sites are to be backfilled with topsoil and revegetated to return the ground surface to its original landform;
- Backfilled material shall be adequately compacted to prevent erosion of surface materials and to avoid settlement and creation of depressions in which water will collect;
- Borrow areas requires that soils be exposed and excavated. Without the protective cover of vegetation, sediment will be eroded by wind, rain, or surface runoff. The management of erosion and sediment within a borrow area becomes a particular concern near watercourses and in small pits without adequate space for settling ponds.
- Within the borrow area, minimize excavation or storage of erodible materials near watercourses. Store piles on flat areas and collect local drainage in settling ponds. Use control measures, *i.e.*, temporary covers, grading and seeding, installation of silt fence around stock piles, etc to contain sediment safely within the borrow area;
- Ensure that all sediment control structures are installed, maintained and monitored regularly until they are no longer needed; and
- Include the requirement to rehabilitate borrow areas in the contract.

ACTIVITY WASTE GENERATION

The road upgrade and rehabilitation project will generate solid waste through the removal of old tar, clearing of access roads, construction materials, as well as the material from domestic activities by the construction teams. The solid waste from the clearing of roads will include vegetation (grass, shrubs and trees), quarry and gravel. From the domestic activities paper, bottles, old clothes and left over food can be typical constituents. Construction activities will result in the establishment of materials stockpiles, work camps and other temporary work sites. These waste generation activities will result in direct, negative impacts on the local geology, soils and land use:

Impacts

- Contamination of water resources through generation, leakage and spillages of waste material;
- Changes in the landscape due to clearing of land and earth moving; and
- Soil contamination through generation, leakage and spillages of waste material.

Mitigation

- The Contractor to prepare and implement a Waste Management Plan; and
- Dispose of debris and other wastes at appropriate places as designated by the relevant councils.

6.3.3 Fauna and Flora

ACTIVITY ROAD CONSTRUCTION WORKS, ESTABLISHMENT OF ACCESS ROADS, CONSTRUCTION CAMPS AND LAYDOWN AREAS

The proposed road upgrade will involve clearing of land that includes removal of flora and fauna along the entire road construction corridor /right of way. Further, land will be cleared in all places where diversions, access roads, sites for extraction of construction materials and campsites will be established resulting in direct, negative impacts on the flora and associated faunal habitat (Table 21):

Impacts

- Loss of biodiversity along the road corridor, in borrow pits and quarry areas;
- Loss of individuals of the local wildlife, due to clearing of land and earth moving;
- Disturbance of wildlife due to clearing of land, earthmoving and noise emissions and removal of soil in the borrow areas and quarries;
- Land clearing will lead to loss of vegetation and habitat for different animal species; and
- Deforestation where the road runs through Forest Reserves.

Mitigation Measures

- Construction activities must remain within defined construction areas and the servitudes;
- No construction / disturbance of fauna and flora to occur outside this area. This is important to note in relation to granite hills and near streams and wetlands (= sensitive habitats);
- Employees must be briefed regarding the consequences of poaching;
- Only vegetation falling directly in the demarcated access routes will be removed where necessary after consultation with the appointed Environmental Control Officer (ECO);
- Temporary access roads, batching sites, etc. must avoid identified sensitive areas;
- Retain existing vegetation and ground cover where possible to limit areas of exposed soils, which may be transported to watercourses through overland flow;
- Restrict vehicle or equipment access to paved or surfaced areas to minimize disruption of existing site vegetative cover;
- Contractor to observe the requirement of confining earthworks within the road reserve of 30m (15 m either side of the road from the centre line) to minimise the loss of vegetation;
- Contractor shall seek approval prior to felling trees and where trees are felled; these will be compensated by replanting at appropriate locations or compensation of the owners;
- Re-vegetate exposed soils as quickly as possible, and use plant species that are native and/or adapted to the area to aid in site stabilization, long-term erosion and sediment control, and invasive plant control; and
- All disturbed sites must be rehabilitated.

ACTIVITY ESTABLISHMENT OF CRUSHER PLANTS; EARTHWORKS AND BORROW AREAS

Establishment of crusher plants, earthworks and borrow areas will lead to clearing of vegetation and disturbance of faunal habitat and movement corridors. This is a direct, negative impact that will result in the loss of habitat and in the fragmentation of faunal habitat.

Impacts

- Loss of biodiversity (fauna and flora species) including Red Data species in borrow areas and quarry areas, some of which may be located near sensitive areas, *e.g.* granite hills, wetlands, *etc*;
- Disturbance of wildlife due to clearing of land, earthmoving and noise emissions and removal of soil in the borrow areas and quarries; and
- Destruction / disturbance of faunal and floral habitat.

Mitigation

- Construction activities must remain within clearly defined borrow areas;
- No construction / disturbance of fauna and flora to occur outside this area;
- Employees must be briefed regarding the consequences of poaching;
- Only vegetation falling directly in the demarcated borrow area to be removed after consultation with the appointed Environmental Control Officer (ECO);
- Temporary access roads, batching sites, *etc* must avoid identified sensitive areas;
- All disturbed sites must be rehabilitated; and
- Excavation of existing borrow pits and the establishment of new borrow pits must be done in accordance with all applicable legislation.

6.3.4 Air Quality

ACTIVITY: MECHANICAL EXCAVATING, SORTING, CRUSHING, SCREENING AND WASHING OF MATERIALS AND HAULING TO ROAD CONSTRUCTION SITE

Gravel pits provide sources of aggregate materials such as rock, stone, gravel, and sand used in many construction or maintenance activities. Heavy equipment and vehicles are used to transport materials around the site and from the pit to construction and maintenance sites. The major sources of pollutants are emissions from construction machinery and vehicles. The major pollutants are dust, gaseous emissions and particulate matter (PM).

Impacts

- Activities related to gravel pits may release dust and PM that will have a negative, direct impact on human health, fauna and flora and settlements; and
- Vehicular movement may cause a localised increase in dust levels leading to an increase in particulate matter.

Mitigation Measures

- Application of dust control products to reduce the dust levels during the construction phase;
- Prepare environmental specifications for contractors;
- Enforce existing regulations for air quality control; and
- Avoid application of dust control chemicals to road surfaces near watercourses or over watercourse crossings.

6.3.5 Noise

ACTIVITY: USE OF QUARRIES AND BORROW AREAS, HEAVY MACHINERY AND CONSTRUCTION VEHICLES

In road development activities, noise is generated from construction machinery and vehicles. Blasting at quarries also causes elevated noise levels and vibrations. These activities impact on human welfare causing discomfort to the local population. These impacts are direct, negative impacts.

Impact

- Plant and heavy machinery such as heavy vehicles, jack hammers, hoists, cranes, *etc* used during road construction may cause an increase in ambient noise levels in the short term; and
- Noise created by blasting at quarries and by loud machinery can cause long-term damage to hearings in humans and disrupts and displaces wildlife.

Management Measures

- Construction activities must be restricted to working hours Monday to Saturday, unless otherwise approved;
- Livestock owners must be warned in advance of blasting and construction activities that take place near their fields so that they have the opportunity to move their livestock, if necessary;

- Provide barriers around noisy construction machinery and equipment to reduce noise levels;
- Include environmental specifications in contract documents for contractors and machine operator for noise reductions in construction, quarrying and hours of operation, materials haulage routes and permissible noise standards;
- Maintain close cooperation and coordination among road engineers, contractors, machine operators and villagers.

Table 20: Biophysical Impact Assessment matrix for the rehabilitation and upgrading of the M1 National Road

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
BIOPHYSICAL ASPECTS														
Changes in Hydrology (Water Resource and Water Quality)														

Replacement / upgrading of bridge and culvert structures may result in the alteration, disruption or destruction of riparian zones and instream habitat including riparian vegetation. This may be caused by Contractor clearing and grubbing activities and / or through the establishment of access routes to watercourse crossing structures (bridges) and to culverts.	Negative & Direct Impacts • Loss of instream and channel structure, e.g., boulders, woody debris, root systems, reduces habitat complexity and overall habitat value; • Critical functions, i.e., erosion control, filtering function, climate control, provided by riparian vegetation are lost; • Altered function affects quality and	8	2	2	3	(8+2+2)*3	36	• Habitat enhancement or compensation required to offset loss; • Introduce river bank stabilisation measures; • Minimize vegetation-clearing activities; • Prevent transport of sediment through silt traps; • Cover erodible construction materials stored near watercourses; • Store hazardous materials on an impermeable	4	2	2	3	(4+2+2)*3	24

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

	an area where they acted as predators or prey and productive capacity decreases; - Productive capacity of riparian habitat is reduced; - Alterations to riparian habitat have potential to hydraulically affect other reaches of the watercourse; - Contamination of water course by e.g. sediment, oils, paint chips, treated wood debris, etc. - Erosion of watercourse banks and generation of							- maintained and free of fluid leaks; - Have a spill response plan in place and spill kits on site; - Prevent wash water and construction and maintenance debris from entering a watercourse; - Ensure adequate design of drains and culverts in terms of structure, size, number and position; - Align culverts and drains with natural flow directions; and - Contractor workers must not enter a sensitive site unless for stipulated construction						
Road drains and	Negative & Direct	8	3	2	3	(8+3+	39	- Select appropriate	4	2	2	2	(4+2+	16

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
management and structure maintenance involves clearing and grubbing, equipment use and debris removal. These activities disturb the soil in culverts and channels and may result in deterioration of water quality.	▪ Damage to aquatic habitat through the improper location of disposal sites in drains, wetlands, streams and rivers; ▪ Damage to aquatic habitat by altering instream and bank structures and vegetation through the placement of riprap; ▪ Contamination of surface waters, groundwater and soils through improper storage or disposal of materials; and ▪ Ineffective soil stabilization / site restoration will cause an increase					2)*3		equipment; ▪ Place access routes so as to reduce damage to riparian vegetation and river banks; ▪ If removing debris from a watercourse, operate equipment from the bank or road shoulder; ▪ Do not allow machinery to cross through water; ▪ Ensure all equipment used on site is well-maintained and free of fluid leaks; ▪ Refuel and lubricate equipment on dry land away from watercourses; ▪ Use drip trays to contain any spillage					2)*2	

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	○ deposited eggs are covered and suffocate; ○ Increases turbidity of the water; fish cannot see their prey (i.e. food items); food sources become buried or leave the area; ○ Fish gills become clogged; decreased respiration and mortality;							draw sediment-laden water to discharge it to a level vegetated area; and Place any excavated materials or erodible materials left on site in a manner to prevent sediment entering watercourse, *i.e.*, tESMPorary covers, installation of silt fence around spoil piles, etc.						
Abstraction of water for construction purposes from water resources may result in decreased water volume in small tributaries, streams, rivers or groundwater sources.	Demand for water during construction will exert pressure on the existing water supply sources; Downstream flows decreased;	8	2	2	3	(8+2+2)*3	36	Abstraction to consider local potable water requirements and riparian rights of people downstream; and If required,	6	2	2	3	(6+2+2)*3	30

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	volume in tributaries; Possible reduction in fish passage; and Decreased quantity in waterway may increase							with local water supplies.						
Road widening, pavement and shoulder establishment activities including the establishment of construction camps, workshops and lay down areas	Road upgrade activities may resulted in the release of sediments and sediment-laden waters to a watercourse; Run-off from patching and sealing compounds, tar, asphalt, and chemical surface treatments enter watercourses. This may bring about a change in water quality due to	6	2	2	3	(6+2+2)*3	30	Mix concrete compounds, sealants or other chemicals in a contained area and away from any watercourse; Dispose of excess materials, excavated soils, and removed debris away from any watercourse; Ensure that sanitation facilities such as pit latrines are not constructed in locations that	4	2	2	2	(4+2+2)*2	16

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	or riprap materials and materials stockpiles; Leachate and raw product from concrete and cement-based products used to repair concrete structures; Equipment oils and fuels may contaminate water sources; and Generation of solid waste and							based products, are used, do not release raw material and wash water to any watercourse; and Inspect drain blocks, sediment controls and wash water runoff areas regularly to ensure they are functioning. Repair as required.						
Soils and Land Use Capability														

Establishment of haul road, access road and detour road	• Activities will expose loose earth, making it prone to wind erosion and surface run-off; • Loose material may settle on vegetation making it less	6	2	2	4	(6+2+2)*4	40	• Construction contracts to include a clause prescribing access, haul and detour roads as part of the site, so that the powers and authority of the Engineer extend to them in the same	4	2	2	3	(4+2+2)*3	24

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	sediment levels with detrimental impacts on water quality for aquatic life or ecology and domestic uses (bathing & washing); Loss of topsoil due to land clearing and earth moving activities; Changes in the landscape; due to clearing of land and earth moving and storage of inert material; Soil compaction due to the movement of machinery and vehicles;							areas; Loosen compacted soils upon commissioning and vegetate with seedlings, as appropriate; Spoil soil should be timely collected and transported to designated disposal sites; Spoil soil should not be disposed of or accumulate near river banks, close to the streams, dams or at water ways and flood routes; Where road works involve the disturbance of soils or the use or storage of erodible materials, *e.g.*						

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
								surface waters adjacent to the road surface; Clean equipment and tools off-site where possible; Ensure all equipment used on site is well maintained and free of fluid leaks; Requirement to rehabilitate haul, access and detour roads is to be included in the contract; Cover embankment						

Use of existing quarries to extract and produce rock aggregates. Key activities at the quarry sites include land clearing, drilling, blasting, hauling of rocks and crushing of quarry stone to different sizes for use during construction of the proposed road.	Loss of topsoil due to land clearing and earth moving activities; Changes in the landscape; due to the clearing of land and earth moving and storage of inert	6	5	1	4	(6+5+1)*4	48	The construction contracts to include a clause prescribing quarry sites as part of the site, so that the powers and authority of the Engineer extend to them in the same way as to other	6	4	1	3	(6+4+1)*3	33

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	to the movement of machinery and vehicles; and Generation of solid waste and hazardous waste, *e.g.* chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil.							A detailed material plan to be prepared. Quarries areas to be marked on engineering drawings, and specified in the tender/contract document. Use only approved quarry areas; Quarrying for filling should only take place at designated sites, and existing quarries should be used where possible; At end of use, pit faces should be sloped using						

Key activities at the borrow areas typically include bush clearing, creation of access roads, removal and stockpiling of topsoil and overburden, extraction of suitable gravel, stone, sand or other material, haulage, stockpiling and transportation of gravel, stones, sand etc to the proposed road for construction.	Borrow areas requires that soils be exposed and excavated and with no without the protective cover of vegetation, sediment will be eroded by wind, rain, or surface runoff; Changes in the landscape; due to the	6	5	1	4	(6+5+1)*4	48	Written agreements to be developed and signed between land owners, community leaders and the Contractor; Manage erosion and sediment in a borrow area, particularly near watercourses and in small pits without	6	4	1	3	(6+4+1)*3	33

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

	clearing of land and earth moving and storage of inert material; - Loss of topsoil due to land clearing and earth moving activities; - Soil compaction due to the movement of machinery and vehicles; - Generation of solid waste and hazardous waste, *e.g.* chemicals, oil, bitumen and fuel spillage, may result in the contamination of the underlying soil; and - Impact on faunal habitat through the removal of vegetation cover and removal of topsoil.							adequate space for settling ponds through minimising excavation or storage of erodible materials near watercourses; - Store piles on flat areas and collect local drainage in settling ponds; - Use control measures, *i.e.*, temporary covers, grading and seeding, installation of silt fence around stock piles, etc to contain sediment safely within the borrow area; - Ensure that all sediment control structures are installed, maintained and monitored regularly until they are no longer needed;						

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
								Backfilled material shall be adequately compacted to prevent erosion of surface materials and to avoid settlement and creation of depressions in						
The road upgrade and rehabilitation project will generate solid waste through the removal of old tar, clearing of access roads, construction materials, as well as the material from domestic activities by the construction teams. The solid waste from the clearing of roads will include vegetation (grass, shrubs and trees), quarry and gravel. From the	Contamination of water resources through generation, leakage and spillages of waste material; Changes in the landscape due to clearing of land and earth moving; and Soil contamination	4	2	1	4	(4+2+1)*4	28	The Contractor to prepare and implement a Waste Management Plan; and Dispose of debris and other wastes at appropriate places as designated by the relevant councils.	4	2	1	2	(4+2+1)*2	14
Fauna and Flora														

Rehabilitation and construction works for the proposed road	Increase / influx of alien and invasive	6	4	3	3	(6+4+4)*3	42	Construction activities must remain within	6	2	3	2	(6+2+3)*2	22

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

upgrade will involve land clearing along the entire road construction corridor / right of way. Further, land will be cleared in all places where diversions, access roads, sites for extraction of construction materials and campsites will be established.	plant species; - Loss of biodiversity along the road corridor, in borrow pits and quarry areas; - Loss of individuals of the local wildlife, due to clearing of land and earth moving; - Disturbance of wildlife due to clearing of land, earthmoving and noise emissions and removal of soil in the borrow areas and quarries; - Land clearing will lead to loss of vegetation and habitat for different animal species; and - Deforestation where the road							defined construction areas and the servitudes. This is important on granite hills and near streams and wetlands (= sensitive habitats); - Employees must be briefed regarding the consequences of poaching; - Only vegetation falling directly in the demarcated access routes to be removed; - Temporary access roads, batching sites, etc. must avoid identified sensitive areas; - Retain existing vegetation and						

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
								• Contractor to observe the requirement of confining earthworks within the road reserve of 30m to minimise the loss of vegetation; • Contractor to obtain approval prior to felling trees. Where trees are felled; these will be compensated by replanting at appropriate locations or compensation of the owners; • Re-vegetate exposed soils as quickly as possible, and use plant species that are native and/or						

~~Establishment of crusher~~	~~Loss of biodiversity~~	~~8~~	~~3~~	~~1~~	~~4~~	~~(8+3+~~	48	~~Construction~~	~~6~~	~~3~~	~~1~~	~~3~~	~~(6+3+~~	30

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

earthworks and borrow pits will lead to clearing of vegetation and disturbance of faunal habitat and movement corridors. This causes loss of habitat loss and fragmentation.	(fauna and flora species) including Red Data species in borrow areas and quarry areas; - Disturbance of wildlife due to clearing of land, earthmoving and noise emissions and removal of soil in the borrow areas and quarries; - Destruction / disturbance of faunal and floral habitat; and - Excavation of existing borrow areas and the establishment of new borrow areas must be done in accordance with					1)*4		must remain within defined borrow areas; - No construction / disturbance of fauna and flora to occur outside this area; - Employees must be briefed regarding the consequences of poaching; - Only vegetation falling directly in the demarcated borrow area to be removed; - Temporary access roads, batching sites, etc. must avoid identified sensitive areas; - All disturbed sites must be rehabilitated; and - Excavation of existing borrow					1)*3	
Air Quality															

The borrowing and quarrying operations include activities such	Quarrying and borrow area activities give rise	6	2	2	4	(6+2+2)*4	40	Ensure quarry workers and machine operators	4	2	2	2	(4+2+2)*2	16

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
as mechanical excavating, sorting, crushing, screening and washing of materials.	to elevated particulate matter levels and cause deterioration in ambient air quality; Emissions from pit machinery and haul trucks result in an increase in pollutants such as dust, gaseous emissions and particulate matter. This may cause lung damage, crop damage, impede visibility and cause a nuisance for nearby villages.							wear dust masks; and Apply dust control products to reduce the dust levels during the construction phase.						

Heavy equipment, machinery and vehicles are used to transport materials from the pit / quarry to road construction and maintenance sites.	Emissions from construction machinery and vehicles result in an increase in pollutants such as dust, gaseous emissions and particulate matter. This may impact on human health, fauna and flora and built	6	2	1	5	(6+2+1)*4	36	Apply dust control measures to reduce the dust levels; Prepare environmental specifications for contractors; Enforce existing regulations for air quality control.	4	2	1	2	(4+2+1)*2	14

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	harmful to humans and to fauna and													
During the construction phase, vehicular traffic will use unpaved side roads.	Increase in pollutants such as dust, gaseous emissions and particulate matter; and Unchecked dust creation causes lung damage, crop damage, impedes visibility for drivers and workers and is a nuisance for villagers.	6	2	2	5	(6+2+2)*5	50	Apply dust control products to reduce the dust levels during the construction phase; and Avoid application of dust control chemicals to road surfaces near watercourses or over watercourse crossings.	4	1	2	3	(4+1+2)*3	21
Noise														

Ambient noise levels are elevated due to blasting activities. Blasting may also result in elevated vibration levels. Plant and heavy machinery such as heavy vehicles, jack hammers, hoists, cranes, *etc* used during road construction emit high	Noise created by blasting at quarries and by loud machinery can cause long-term damage to hearing in humans and disrupts and	8	2	2	4	(8+2+2)*4	48	Construction activities must be restricted to working hours Monday to Saturday, unless otherwise approved; Ensure machinery is well maintained; Warn livestock owners must be warned in advance of blasting and	6	2	2	2	(6+2+2)*2	20

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

								equipment; - Warn local residents about blasting in advance through loud hailers, notices and notifying community leaders; - Include environmental specifications in contract documents for contractors and machine operator for noise reductions in construction, quarrying and hours of operation, materials haulage routes and permissible noise standards; and - Maintain close cooperation and coordination among road						

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
Sensitive Areas														
Construction activities may take place in sensitive areas such as granite hills, rivers, stream and wetlands.	• Disturbance of fauna and flora associated with these areas; • Spillage of oil or diesel fuel may contaminate water sources (rivers, streams and wetland areas) and lead to death of aquatic fauna and flora.	8	2	1	4	(8+2+1)*4	44	• All activities be restricted to the Road Reserve; • Access for fauna across the sensitive site is not blocked by the road, • No waste material will be dumped or left in a sensitive site; • Flow patterns of all water courses, including wetlands, are not altered; • Ensure the provision and proper utilisation, maintenance and disposal of ablution	6	2	1	2	(6+2+1)*2	18

6.4 POTENTIAL SOCIAL AND CULTURAL IMPACTS

Stakeholders raised a number of issues and concerns regarding the road upgrade project during the public participation process. The issues raised have been incorporated in the ESIA, inform the social impact assessment (SIA) phase and include the following:

- Alignment alternatives, including the rationale behind the determination of the road design, and alternative alignments within certain sections of the M1 Road;
- Access, including the provision of access to the upgraded M1 Road in urban centres;
- Safety and security issues;
- Presence of pedestrians and animals on the road that pose a safety risk to the road-user;
- Relocation and compensation including the methods of compensation; and
- Employment opportunities, including the use of local labour during the construction phase.

These issues have been incorporated in this ESIA and appropriate mitigation measures are proposed.

Table 22 summarises all the social and cultural aspects, the construction activity, potential impacts and mitigation measures and provides a significance rating prior to and after the application of mitigation.

6.4.1 Impacts on Local Communities

The widening or improvement of an existing road can have direct, negative impact on local communities as described below:

Impacts

- Split communities resulting in the disintegration of social activities and disruption of traditional modes of transport;
- Reduced community mobility due to land clearing and earth moving activities;
- Increase in traffic congestion along the road construction corridor that may result in delays and increased vehicle operating costs;
- Give rise to ribbon development or denser settlements along the road in an ad-hoc manner;
- Inadequate expectations for the project, resulting from the dissemination of information about losses and compensation;
- Disrupt farming and commercial activities;
- Increase pressure on services due to the opening of temporary jobs;
- In-migration due to the opening of temporary jobs;
- Damage to properties due to clearing of land and earthworks;
- Changes in the landscape due to clearing of land and earth moving activities;
- During the demobilization phase, rise in unemployment due to the reduction of direct and indirect jobs; and
- Reduce the formal economy and retraction of the local economy (during the demobilization phase) due to the reduction of direct and indirect jobs in the demobilization phase.

Mitigation Measures

- Minimize splitting of a community by taking into account local movements during design stage;
- Provide for improved crossings during the design stage;
- Ensure communities are made aware of the short-term nature of the project
- Provide alternative arrangements for local traffic movements, *e.g*. signals, service roads, etc;
-

RA to provide service areas adjacent to upgraded / widened road sections and encourage local businesses to make use of new opportunities provided.

6.4.2 Land Take, Resettlement and Compensation

The road passes through urban settlements, agricultural land, forest reserves and places of cultural significance such as graveyards. Fields, gardens and houses are seen to have encroached on the road (as described under chapter for project description, chapter two)

reserve along much of the road and will be affected by road construction activities. This may cause displacement and resettlement of project affected parties (PAPs). Vendors are also seen to occupy the roadway, which is a risk to their lives.

Impacts

- Monetary compensation poses a number of concerns as the valuation of losses may be problematic;
- Cause a loss of arable land due to land clearance;
- Social and psychological impacts of displacement and resettlement are complex and costly;
- Temporarily interruption of production due to the removal of subsistence farming areas;
- Changes in existing productive activities (also related to information means) due to the removal of structures; and
- Social interactions among communities may be disrupted.

Management Measures

- RA to physically demarcate the road reserve along the entire route;
- Encourage district authorities to enforce road reserve regulations with all stakeholders;
- Prepare a legally compliant Resettlement Action Plan (RAP) and guidelines for displacement and resettlement of affected people and implement the RAP;
- Restore or replace assets expropriated with adequate financial provision;
- Wherever possible, restore or replace the assets at a minimum distance from the previous location to ensure continuation of their economic activities under safe conditions for both customers and vendors;
- Construction of the road should be done during the dry season when many people have harvested their crops to minimize the loss;
- Awareness-raising meetings will be undertaken as part of the RAP to inform the people along the road when the road construction works are going to start so that those who cultivating along the fertile sides of the road reserve should stop;
- Incorporate the cost of resettlement in the road project's budget; and
- No construction should commence until all land and property expropriation procedures have been completed, replacement land allocated, and compensation paid.

6.4.3 Construction Camp and Laydown Area Establishment

The project contractor will build camps which will be used to provide accommodation for workers, as well as act as project administration offices, storage facilities for different building materials and an equipment workshop for servicing the vehicles and road construction machinery. The establishment of construction camps and accommodation for the construction work force and the Engineer's camp may have direct, negative impacts on the surrounding social environment:

Impacts

- Competition for limited local resources;
- Disorders in local traffic due to the increase of transit of vehicles, personal transport and transport of material;
- Disruption of social and economic activities, particularly during execution of the works; and

- The existence of camps for the constructions workers close to settlement areas may lead to cultural and social conflicts.

Mitigation Measures

- Avoid conflicts and problems with local resources and society through planning and locating construction camps in a way that does not negatively affect local communities. Consultation with the local administration shall be done to assist in identification of the appropriate camp site that can serve dual purposes; and

- Do not locate camps on or near environmental sensitive sites such as, wetlands, rivers, streams, forested areas, etc;
- Consider the future use of the facilities by local communities. The continued use of the buildings and the camp facility after commissioning of the road will avoid demolishing and disposal problems that could result both in economic losses and environmental damages to the surrounding area.

6.4.4 Health-related Impacts

The spread of sexually transmitted infections (STIs) including HIV / AIDS may become the most severe impact of the influx of outside workers. Potential health-related negative impacts that may occur as a result of the road construction and upgrade activities include:

Impacts

- Outside workers may remarry in the village or have affairs, which could lead to family break-ups and singe parent children when the project is completed;
- Increase in the rate of HIV and AIDS and other STIs due to a workforce with economic means working in the project area;
- Young women become pregnant and have to leave school to raise the child; and
- Threat to human health and safety by large construction vehicles.

Mitigation Measures

- Mainstream HIV / AIDS in the road upgrade activities by:
- Raising awareness and providing education to workers and the surrounding community;
- Supply condoms to workers at no cost;
- Facilitate workers being allowed to visit their families, e.g. month end long weekends;
- Provide guidance on good nutrition for HIV / AIDS infected workers; and
- Encourage voluntary counseling and testing.

6.4.5 Road Safety

The activities related to road construction involves an increase in traffic and large vehicles such as haul trucks. This may pose a direct, negative impact to road users and local residents:

Impacts

- Traffic congestion and disruption during construction caused by increase in construction vehicle traffic transporting equipment and personnel;
- Safety risks to pedestrians due to the transportation of materials and construction equipment; and
- Road improvements may lead to increased vehicular speed and consequently an increase in accident rates for both humans and animals.

Mitigation Measures

- Minimizing accidents with implementation of proper traffic operation and regulations;
- Ensure that the road is clearly marked for cyclists and pedestrians;
- Install road safety signs and speed limits especially when the road is passing through trading centres and close to schools;

- Set aside funds for road maintenance;
- Enforce road safety rules;
- Intensify road safety campaign for all road users; and
- Design and install road safety signage and speed limit signs during construction and operation.

6.4.6 Regional Integration

The upgrading of the proposed road is aimed at providing a reliable and durable bituminous road and bridges, which will enhance the usage of the road network. The project will contribute to promoting regional integration and will result in direct and indirect positive impacts:

Impacts

- Support socio-economic development in the project districts, the region and neighbouring countries such as Tanzania, Mozambique and Zambia;
- Open up previously untapped tourism areas, thus affording local communities business opportunities, tourism opportunities through enhanced access;
- Enhance local and regional trade; and
- Improve road links between Malawi and its neighbours within the SADC Region.

6.4.7 Reduction in Travel Time and Costs

The rehabilitation of the road will give result in a reduction in travel time and costs.

Impacts

- Improve linkage to markets, hospitals and other social amenities;
- The upgraded road will reduce the costs associated with wear and tear on vehicles;
- Road safety will be improved because the road will be wide enough to allow for other road users such as cyclists and pedestrians;
- The upgrading of the M1 Road will result in reduced travel time as vehicles will be able to move faster, covering longer distance is shorter time periods; and
- There will be a reduction in road maintenance costs.

6.4.8 Employment Opportunities for Local Community Members including Women

Road construction activities are a source of employment both for the local community and the specialised service sectors. This gives rise to both direct and indirect positive impacts:

Impacts

- Employment opportunities for people, many of whom will come from the local communities along the road project corridor especially the unskilled labour and women;
- Employment will in turn stimulate the informal and formal sectors of the local economy; and
- Increase in the potential employment opportunities for women.

Enhancement Measures

- Employment of work force mainly from the locality where the construction work is on-going;
- Employment of women and provision of training for women in the different skills; and
- Employment, wage system, and other administrative measures for the local workforce should be in line with Malawian legislation.

6.4.9 Creation of income-generating activities

The Project impact areas will benefit from increased business opportunities as a result of the construction works throughout the entire length of the M1 Road. The people at the campsites and the entire Project labour force will require a lot of food items such as vegetables and maize. This will create a market for the community and will contribute towards poverty alleviation in the project impact areas. This will, in a way, stimulate informal and formal sectors of the economy of the communities. Potential positive social impacts that may occur as a result of the road construction and upgrade activities include:

Impacts

- Creation of jobs by hiring direct and indirect labour;

- Increased transfer of competencies related to the mobilization of tESMPorary staff (qualification and training);
- Increase in indirect multiplier effects on the local economy (including procurement of goods, money spent in the area by workers), resulting from the acquisition of equipment, material and services;
- Stimulation of local and regional economy, related to mobilization of tESMPorary staff with the payment of wages and the demand for services and local and regional suppliers;
- Increased direct effects on the economy (market) for the acquisition of material, goods and services;
- Increase in revenue collection, payment of taxes and fees related to the acquisition of material, equipment and services;
- Increased indirect effect on job creation as a result of the acquisition of material, equipment and services; and
- Improvement of national logistics systems, due to the development of road infrastructure.

6.5 CULTURAL IMPACTS

As the proposed road development is an upgrade of the existing M1 road, the project's footprint will be limited to the existing road and associated road reserve / RoW. It is therefore not anticipated that significant archaeological or other physical cultural properties would be affected by the proposed road works. However, road work activities may inadvertently damage cultural heritage sites and such impacts are direct, negative impacts:

Impacts

- Damage to local cultural heritage features such as graves;
- Changes in cultural practices due to land clearance and earthworks;
- Damage to structures and remains of archaeological, historical, religious and cultural value;
- Damage to social value (spiritual, political or national or other cultural significances to specific groups of people); and
- Degradation of the aesthetic value of cultural and religious institutions and historical monuments and shrines.

Mitigation Measures

- Identify and prioritise cultural heritage sites prior to construction activities;
- Avoid any road alignment that cuts through known cultural heritage sites;
- Prepare a 'chance-find' procedure and ensure Contractor is familiar with proposed procedures to be followed in the event of a 'chance-find'; and
- Incorporate additional clauses in the contract document with respect to any extra works that may be required for protection and preservation of cultural heritage sites;
- Prior to any construction activities commencing in an area, the Contractor's community liaison officer to discuss location of known cultural heritage artefacts in the immediate construction area; and
- Cultural heritage features such as graves identified during this ESIA phase to be cordoned off with a visible barrier (fence or snow netting or chevron tape) and declared no-go areas with a buffer area of at least 5 m between the grave(s) and construction activities.

Table 21: Social and Cultural Impact Assessment Matrix for the rehabilitation and upgrading of the M1 National Road

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
SOCIAL ASPECTS														
Disruption of Local Communities														
The widening or improvement of an existing road includes land clearing and earth moving activities that may have direct, negative impact on local communities.	▪ Communities may be split resulting in the disintegration of social activities and disruption of traditional modes of transport; ▪ Reduced community mobility; ▪ Increase in traffic congestion resulting in delays and increased vehicle operating costs; ▪ Give rise to ribbon development or denser settlements along the road in	6	3	2	4	(6+3+2)*4	44	▪ Minimise splitting of a community by taking into account local movements during design stage; ▪ Provide for improved crossings during the design stage; ▪ Ensure communities are made aware of the short-term nature of the project ▪ Provide alternative arrangements for local traffic movements, *e.g.* signals, service roads, etc; ▪ RA to provide	4	2	2	2	(4+2+2)*2	16

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	• Disrupt farming and commercial activities; • Increase pressure on services due to the opening of tESMPorary jobs; • In-migration due to the opening of tESMPorary jobs; • Damage to properties due to clearing of land and earthworks; • Changes in the landscape due to clearing of land and earth moving activities; • Rise in unESMPloyment during the													
Land take, Resettlement and Compensation														

Road construction activities will affect vendors, fields, gardens and houses that have	The valuation of losses often proves problematic;	8	4	2	5	(8+4+2)*5	70	RA to demarcate the road reserve along entire route;	6	4	2	3	(6+4+2)*3	36

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

encroached on the road reserve. This may cause displacement and resettlement of project affected parties (PAPs).	• Cause a loss of arable and due to land clearance; • Social and psychological impacts of displacement and resettlement are complex and costly; • Temporarily interruption of production due to the removal of subsistence farming areas; • Changes in existing productive activities (also related to information means) due to the removal of structures; and • Social interactions among communiti							• District authorities to enforce road reserve regulations; • Prepare a legally compliant Resettlement Action Plan (RAP); • Implement the RAP; • Restore or replace assets expropriated with adequate financi al provision; • Restore or replace the assets at a minimum distance from the previous location to ensure continuation of their economic activities under safe conditions for both customers and vendors;						

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
								procedures have been completed, replacement						
Construction Camp and Laydown Area Establishment														

The Contractor will build camps which will be used to provide accommodation for workers, as well as act as project administration offices, storage facilities for different building materials and an equipment workshop for servicing the vehicles and road construction machinery.	▪ Competition for limited local resources; ▪ Disruptions to local traffic due to the increase of transit of vehicles, personal transport and transport of materials; ▪ Disruption of social and economic activities; and ▪ The existence of camps for the constructions workers close to settlement areas may lead to cultural and social conflicts.	6	2	2	4	(6+2+2)*4	40	▪ Plan and locate construction camps in a way that does not negatively affect local communities through consultation with the local administration; ▪ Do not located camps on or near environmentally sensitive sites, e.g. wetlands, rivers, streams, forested areas; and ▪ Consider the future use of the facilities by local communities.	4	2	2	2	(4+2+2)*2	16
Health-related Impacts													
The spread of sexually transmitted infections (STIs) including HIV / AIDS may become the most severe impact of the influx of outside workers. Potential	▪ Outside workers may remarry in the village or have affairs, which could lead to family break-ups	8	5	4	4	(8+5+4)*4	68	Mainstream HIV / AIDS in the road upgrade activities by: ▪ Raising awareness and providing	8	5	4	3	(8+5+4)*3	51

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
result of the road construction and upgrade activities.	completed; Increase in the rate of HIV and AIDS and other STIs due to a workforce with economic mean s working in the project area; Young women become pregnant and have to leave school to raise the							Supply condoms to workers at no cost; Facilitate workers being allowed to visit their families, e.g. month end long weekends; Provide guidance on good nutrition for HIV / AIDS infected workers; and Encourage voluntary counselling and testing.						

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
Road Safety														
Road construction activities may comprise the safety of road users and local communities.	▪ Traffic congestion and disruption during construction caused by increase in construction vehicle traffic transporting equipment and personnel; ▪ Safety risks to pedestrians due to the transportation of materials and construction equipment; and	6	2	2	4	(6+2+2)*4	40	▪ Minimizing accidents with implementation of proper traffic operation and regulations; ▪ Ensure that the road is clearly marked for cyclists and pedestrians; ▪ Install road safety signs and speed limits especially when the road is passing through trading centres and close to schools; ▪ Set aside funds for road maintenance; ▪ Enforce road safety rules; ▪ Intensify road	6	2	2	3	(6+2+2)*3	30

Regional Integration

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
The project will contribute to promoting regional integration and will result in direct and indirect positive impacts.	▪ Support socio-economic development in the project districts, region & neighbouring countries; ▪ Open up previously untapped tourism areas, thus affording local communities tourism opportunities	Improvement over pre-project conditions					+	-	Improvement over pre-project conditions					
Reduction in Travel Time and Costs														

The rehabilitation of the road will give result in a reduction in travel time and costs.	Improve linkage to markets, hospitals and other social amenities; Reduce the costs associated with wear and tear on vehicles; Road safety will be improved because the road will be wide enough to allow for other road users such as cyclists and	Improvement over pre-project conditions.		-	Improvement over pre-project conditions.	

Activity	Potential environmental impact	Significance before						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	pedestrians; Reduced travel time as vehicles will be able to move faster, covering longer distance is shorter time periods; and Reduction in road maintenance costs.													
Employment Opportunities for Local Community Members														

Road construction activities are a source of Employment both for the local community and the specialised service sectors. This gives rise to both direct and indirect positive impacts.	Increase in employment for local communities especially the unskilled labour; Stimulate the informal and formal sectors of the local economy; and Increase in the potential Employment opportunities for women.	Improvement over pre-project conditions.		Employment of work force mainly from the locality where the construction work is on- going; Employment of women and provision of training for women in the different skills; and Employment, wage system, and other administrative measures for the local workforce should be in line with Malawian legislation.	Improvement over pre-project conditions.	
Creation of Income-Generating Activities						
The Project impact areas will benefit from increased business opportunities resulting in potential positive social impacts.	Creation of jobs by hiring direct and indirect labour;	Improvement over pre-project conditions.		Improvement over pre-project conditions.		

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

	• Increased transfer of competencies related to the mobilization of temporary staff (qualification and training); • Increase in indirect multiplier effects on the local economy (including procurement of goods, money spent in the area by workers), resulting from the acquisition of equipment, material and services; • Stimulation of local and regional economy, related				

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures / Remarks	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP
	▪ Increase in revenue collection, payment of taxes and fees related to the acquisition of material, equipment and services; ▪ Increased indirect effect on job creation as a result of the acquisition of material,													
CULTURAL ASPECTS														

Road work activities may inadvertently damage cultural heritage sites and such impacts are direct, negative impacts.	• Damage to local cultural heritage features such as graves; • Changes in cultural practices due to land clearance and earthworks; • Damage to	8	5	1	4	(8+5+1)*4	56	• Identify and prioritise cultural heritage sites prior to construction activities; • Avoid road alignment that cuts through known cultural heritage sites;	4	2	1	2	(4+2+1)*2	14

Activity	Potential environmental impact	Significance before mitigation						Recommended Mitigation Measures /	Significance after mitigation					
		M	D	S	P	Total	SP		M	D	S	P	Total	SP

	▪ Damage to social value (spiritual, political or national or other cultural significances to specific groups of people); and ▪ Degradation of the aesthetic value of cultural and religious institutions and historical monuments and shrines.							▪ Add clause in contract with respect to works required for protection of cultural heritage sites; ▪ Prior to any construction activities commencing, the Contractor's community liaison officer to discuss location of known cultural heritage artefacts; and ▪ Cordon off known heritage features, *e.g.* fence or snow netting or chevron tape and declare no-go areas; and ▪ Establish a buffer						

CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

This section summarises the planning and design measures that have been incorporated into the project plan to reduce or eliminate potential environmental and social impacts. It presents a plan for monitoring and managing impacts during project implementation.

7.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

7.1.1 Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) typically consists of a set of measures to be taken during implementation of this road upgrade and rehabilitation project to eliminate, offset, or reduce adverse environmental impacts to acceptable levels. The plan identifies feasible and cost-effective measures and lists the institutional, training and monitoring requirements.

The ESMP further provides details on proposed work programmes and schedules to ensure that the proposed environmental actions are in phase with the construction and other project activities throughout implementation. The ESMP also considers compensatory measures if mitigation measures are not feasible or cost-effective.

As part of an ESIA report, ESMP provide a critical link between measures to mitigate adverse impacts and the integration of such measures during the implementation and operation of projects. The ESMP summarizes the anticipated environmental impacts of projects and provides details on the measures, responsibilities and scheduling to mitigate these impacts, costs of mitigation and monitoring and supervision. An ESMP that focusses on mitigating and managing construction-phase impacts identified in Table 22.

The following aspects among others are included in the ESMP:

- Summary of impacts (from Table 21)
- Description of mitigation measures (from Table 21 and Table 22);
- Objectives;
- Implementation schedule;
- Responsible Organisation for implementing the measures; and
- Cost estimates

Table 22: Environmental and Social Management Plan

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation for implementation	Estimated Cost (MK) Million
Pre-construction phase	Land acquisition and legal clearance for site establishment	Formal, legal and traditional local administration	Obtain all permits and licenses from relevant government departments, local authorities and secure public support for project.	• Contact traditional leaders (headmen, chiefs) to introduce project, request authorisations. Obtain permits from Department of Mines and Mineral Resources for exploitation of quarries, borrow pits. Share project Information with the affected parties prior to the commencement of the activity.	RA and the Contractor	Estimated in RAP
Pre-construction phase	Heritage, buildings and equipment	Relocation of utility network infrastructure, disruptions in service, loss of business assets and income due to relocation of assets	To minimise disturbances in disruptions of utility network services.	• Carry out inventory to include size of individual holdings of agricultural land, permanent fields and gardens including fixed property if any; and • Ensure relocation of properties and utility network infrastructure is completed well in advance of commencing construction.	RA, Contractor and District Councils.	Estimated in RAP

Construction phase	Water contamination and public health	Management of workers camps. Management of camp sites waste and sanitation. Water pollution	To avoid contamination of water from solid and sewage waste.	• Provide and maintain water from improved sources. • Ensure adequate waste disposal facilities, garbage disposal and sanitation facilities including septic and soak tanks (provide sanitary landfill, recycling facilities) at camps that include: - Burying the crushed residues in a pit; - Waste in septic tanks shall be cleared periodically; - Waste water produced in construction camps shall not	RA, Contractor and RE	14

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation	Estimated Cost
				discharge into waterways; and Liaise with district councils and village headmen to ensure waste management practices are in place to reduce road side littering, especially in towns and villages.		

		Water contamination / reduction in water supply to others or downstream users.	Controlling sources of water contamination.	▪ To minimize impacts of water contamination guaranteeing water supply for construction works and minimize reduction in supply of water to other users downstream. ▪ Ensure oil spills and vehicle leakages are minimized through regular monitoring and supervision. ▪ Checking of vehicle conditions regularly. ▪ Store oil and bituminous products at a contained location away from drainage lines and in appropriate manner. ▪ Provide own water supply point that does not interfere with local community users. ▪ Provide adequate flow dispersal structures to maintain the natural flow direction and to avoid flow concentration to specific sites;. ▪ Programme excavation activities at river crossing areas during dry season; ▪ Protect sensitive surface with mulch or fabrics, stone ripraps, gabions, etc. ▪ Avoid dumping and accumulation of spoil soil at river banks.	RA, and contractors	21
Construction	Soil erosion &	Reduce	To minimize the	▪ Ensure vegetation clearing minimized;	RA, Contractor and	

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation	Estimated Cost
phase	contamination of soils and underground resources	erosion. Avoid contamination of soils and underground water resources.	amount of sediment lost from the work sites (minimise soil erosion). To minimize contamination of soils and underground water resources. Minimize the impacts of storm water-containing sediments.	⁞ Avoid disturbance on steep slopes; ⁞ Keep vehicle on defined tracks; ⁞ Surplus excavated top soil shall be stored for at least one month, and used to rehabilitate degraded grounds; ⁞ Rehabilitate excavated ground upon completion of works; ⁞ Liaise and campaign with local authority to prohibit animal grazing on road shoulders; ⁞ Re-vegetate erodible soil surfaces as soon as possible; ⁞ Liaise with local authorities and contract a team to clean culverts and other drainage infrastructure to maintain the normal flow of water; ⁞ Rake or loosen all compacted ground surfaces; ⁞ Cover slopes and graded ground with grass, prohibit livestock grazing at road shoulders and embankments; ⁞ Control traffic accidents and transportation of hazardous chemicals; ⁞ Maintain leaking equipment and vehicle parts, avoid fuel and oil spillages while refuelling, collect and properly treat used oil; and ⁞ Schedule construction so that large areas of soil are not exposed during the wet season.	RA and the contractors	11
Construction phase	Air pollution	Noise and dust pollution	To ensure noise and dust pollution	⁞ Ensure that noisy construction activities are carried out during normal working	RA, Contractor, RE	15

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation for implementation	Estimated Cost
			is minimised and does not pose a health risk or inconvenience to workforce and surrounding communities.	hours; - Advise local people when there will be blasting or unusual unavoidable noises; - Provide protective equipment for construction workers in areas of high noise levels; - Spray water on exposed surfaces during dry season (deviations, access roads etc); - Install dust and smoke suppression accessories on asphalt plant and crusher equipment; - Avoid locating quarries and borrow pits close to settlements; and - Carry out regular maintenance of machinery and vehicles to reduce excessive gaseous emissions.		
Construction phase	Agriculture crops	Farmland acquisition, relocation, compensation	To minimise loss of farmland and livestock grazing areas; Minimise livestock accidents due to road works	- Ensure replacement land assessed takes into account productivity, so that crop production remains as previously. - Payments made in full and fair cash compensation, if land is under production of an annual or perennial crop. - Provide safe and convenient passage for vehicles, pedestrians and livestock passing through the works.	RA, Contractor, District Councils	200

Construction phase	Health and Safety	STIs, HIV and AIDS, workforce and Community prevention programme, address socio-	Minimise infections and spread of STIs, HIV to workforce and local population	• Liaise with RA for HIV and AIDS minimisation coordination. • Develop a STI and HIV Action plan to be approved by RE, which should include: Undertaking STIs, HIV and AIDS awareness and anti-stigma education programmes;	RA, Contractor,	

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation for implementation	Estimated Cost
		Cultural risk factors.		◦ Environmental sanitation education programmes for workers (including all contractor Employees, sub consultant Employees) and the adjoining communities. This should be undertaken at workers induction and every 2 months; ◦ KAP (Knowledge, Attitude and Perception) survey will be taken at induction and following completion of the programme; ◦ Displaying HIV and AIDS education materials in all buildings frequented by workers; ◦ Ensuring condoms (both male and female condoms) are freely accessible to workers and adjoining communities; ◦ Maintaining and operating STIs, HIV and AIDS clinic for the duration of the contract; and ◦ Peer educator training • Rehabilitating excavated ground at quarry sites and borrow pits to avoid mosquito breeding	RA and Contractor	18
Construction phase	Road safety of pedestrians, motorists and cyclists	Road safety for schools, clinics, road signs, road safety rules and transit rules	To minimize accidents to workforce, pedestrians, cyclists and motorists, road safety awareness.	◦ Deliver road safety campaigns; ◦ Implement traffic and transport regulations to minimise vehicular accidents; and ◦ Post warning signals and bumps at critical locations.	RA and Contractor	20

Construction	Employment	A priority to	Improve income	Arrange contractual commitments to	Contractor,	

Time frame/ phase	Environmental Impact	Issue	Objective	Mitigation Measures	Responsible Organisation for implementation	Estimated Cost
phase	and income generating activities	locals, equal opportunities to men and women, women integration in road works, provide relevant training.	base for locals and maximise community benefits from the project.	respect social factors for temporary Employees. - Arrange for local people to be Employed and trained as part of the activity. - Include women and other community groups in the activity whenever possible. - Create suitable working atmosphere at work place to encourage women involvement in the project activities. - Encourage workers to use locally available products to assist local economy. - Arrange and ensure supply of basic consumable items by encouraging entrepreneurs in the area.	Local Authorities	.5
Construction phase	Quality of life, noise and air pollution	Noise, dust, landscape scenic beauty	Minimize a reduction in quality of life of communities within the project boundaries.	- Locate camps away from sensitive sites like villages; - Avoid the use of quarries in the proximity of settlements; and - Water gravel accesses during dry season.	Contractor, Engineer	.22

Construction phase	Soil Contamination from oils and Fuel Leaks and Spillage	Soil and water pollution	To minimise water and soil pollution	⁞ Surface all vehicle servicing and fuel /oil storage areas with concrete or some appropriate impervious material to prevent contact of soil with the oils	RA and Contractor	
Construction Phase	Social Impacts	GBV, Child labour, child abuse and sexual Harassment	To prevent increase in GBV, Child abuse, Sexual harassment	⁞ Include a clause in the contract with constractors that prohibit any forms of abuse including prohibition on child labour ⁞ Sensitise local community leaders, children and community at large on prohibition of child abuse and GBV ⁞ Display posters at the project site that warn and inform against child labour and child abuse ⁞ Put in procedures for reporting and addressing child abuse , sexual harassment and GBV	RA, Contractor and local leaders	250

Operation phase	Socio-economic	Recuced travel time and costs	To minimize travel time pedestrians, cyclists and motorists,	Improve linkage to markets, hospitals and other social amenities; improve road safety ; reduction in road maintenance	RA	45
		Reduced accidents for pedestrians, motorist and cyclist	To improve road safety for pedestrians, motorist and cyclist through installation of safety signage and trainings on safety	installation of safety signage and trainings on safety rules to the pedestrians, motorist and cyclist	RA	

7.1.2 Environmental and Social Monitoring Plan

The Environmental and Social Monitoring Plan identifies the monitoring objectives and specifies the type of monitoring required. It describes environmental performance indicators, which provide linkages between impacts and mitigation measures identified in the ESIA report such as parameters to be measured, methods to be used, sampling location and frequency of measurements, detection limits (as appropriate) and definition of thresholds to signal the need for corrective actions. Table 22 provides more details on the Environmental and Social Monitoring Plan.

Monitoring and supervision should be done to: ensure timely detection of conditions requiring remedial measures in keeping with good practice; furnish information and the progress and results of mitigation and institutional strengthening measures; and, assess compliance with relevant policies. Such arrangements are specified in the environmental monitoring programme.

7.1.3 Bidding and Contract Documents

The Roads Authority (RA) shall ensure:

- The ESMP is passed on to the Contractor and the Supervising Consultant during bidding;
- The Contracts and bidding documents contain all required mitigation measures to be implemented during the construction period and obligation for the Contractor to implement ESMP at construction period;
- Construction permits and required licenses are obtained prior to granting any civil works contract;
- Monitoring ESMP implementation is undertaken on a regular basis as required;
- Semi-annual reports on ESMP implementation should be well documented and submitted routinely to EAD;
- Coordination with other parties and government agencies to effectively implement ESMP at all Project stages; and
- Remedial actions are undertaken for unpredicted environmental and social impacts.

Table 23: Environmental and Social Monitoring Plan

Time frame/ phase	Environmental Impact	Monitoring Indicator	Perfomance Indicator	Responsible Organisation for Monitoring	Frequency of Monitoring	Estimated Cost (MK)
Pre-construction phase	Land acquisition and legal clearance for site establishment	• Number of traditional leaders (headmen, chiefs) introduced project, • Number of authorisations requested to operate on project sites • Permits obtained from Department of Mines	Permits issued Contractor has established clear channels to liaise with authorities. Environmental issues are included in the design and Bill of Quantities (BoQ).	RA, Local government administrations, Department of Mines. Local Chiefs in the area, Contractor	Quarterly	4
Pre-construction phase	Heritage, buildings and equipment	• RAP in place and implemented	List of all affected parties, Compensation bills	RA, Contractor, Local administration, utility network providers.	Quarterly	6

Construction phase	Water contamination and public health	• Number of water points provided to camps • Number of waste collection points • Number of waste disposal facilities provided , garbage disposal and sanitation facilities including septic and soak tanks (provide sanitary landfill, recycling facilities) at camps	Established own improved water source in the camps and work places. Waste is properly collected and disposed of safely. Garbage containers at camp sites. Sanitary landfills established.	RA, Contractor and RE, EAD	Quarterly	6

Time frame/ phase	Environmental Impact	Monitoring Indicator	Perfomance Indicator	Responsible Organisation	Frequency of Monitoring	Estimated Cost
		• Number of sensitization with District Councils and Village headmen to ensure waste management practices are in place to reduce road side littering, especially in towns and villages.	District Councils and Village headmen to ensure waste management practices are in place to reduce road side littering,		Quarterly	6

		• Number of won water points provided • Number of regular monotirings and supervisions on oil spills and vehicle leakages • Number of vehicles checked conditions regularly. • Oil and bituminous products contained location away from drainage lines and in appropriate manner. • Adequate flow dispersal structures provided to maintain the natural flow direction and to avoid flow concentration to specific sites; • Programme excavation activities at river crossing areas during dry season in place; • Mulching sensitive surface or fabrics, stone ripraps, gabions, etc. • Number of proper dumping sites.	Own water points for construction provided from non competing sources. Drainage facilities are provided. Remove waste before containers become too full.	RA, Department of Water Affairs and Irrigation. District Councils and Traditional Local leaders.	Quarterly	3

Construction	Soil erosion &	• Number of sites where vegetation clearing is minimized;	Erosion and slope	RA, Contractor and	Quarterly	

Time frame/ phase	Environmental Impact	Monitoring indicator	Perfomance Indicator	Responsible Organisation	Frequency of Monitoring	Estimated Cost
phase	contamination of soils and underground resources	• Number of erodible soil surfaces re-vegetated; • Number of clean culverts and other drainage infrastructure to maintain the normal flow of water; • slopes and graded ground covered with grass • control measures for transportation of hazardous chemicals ; • Number of vehicles Maintained for leaking equipment and vehicle parts, avoid fuel and oil spillages while refuelling, collect and properly treat used oil; and • Timing Schedules of construction so that large areas of soil are not exposed during the wet season.	protection measures and constructions undertaken on time. Excavated areas (quarries and borrow pits) reclaimed and vegetable cover returned.	RE	Quarterly	3
Construction phase	Air pollution	• Normal timing of construction activities	No night time work at quarries	RA, Contractor, RE	Monthly	

Time frame/ phase	Objective	Monitoring Indicator	Performance Indicator	Responsible Organisation		Estimated Cost
	is minimised and does not pose a health risk or inconvenience to workforce and surrounding communities.	• Safety warning in place; • Number of workers provided with PPE in high noise areas; • Number of times water is Sprayed on exposed surfaces during dry season (deviations, access roads etc); • Number equipment Installed with dust and smoke suppression accessories on asphalt plant and crusher equipment; • locations of quarries and borrow pits not close to settlements; and • Number of times maintenance of machinery and vehicles is carried out to reduce excessive gaseous emissions.	Employment of dust suppression means			2
Construction phase	To minimise loss of farmland and livestock grazing areas; Minimise livestock accidents due to road works	• Replacement land assessed. • RAP implemented • Number of safe and convenient passage provided for vehicles, pedestrians and livestock passing through the works.	Detailed list of affected landholders, crops affected and size. List of reallocations – Size and location List of Compensations and criteria	RA, Contractor, RE and Department of Agriculture		7

Construction phase	Minimise infections and spread of STIs, HIV to workforce and local population	• STI and HIV Action plan developed to be approved by RE, which should include: • Number of awareness undertaken on STIs, HIV and AIDS and anti-stigma education programmes;	HIV in the Workplace policy in place prior to commencement of the project; Attendance of HIV and AIDS awareness programs by 80% of workers;	RA, Contractor, District health staff, Local NGO, peer educators, Traditional health provider from the project area.	Monthly	

		• Number of Environmental sanitation education programmes for workers conducted at workers induction and every 2 months; • Number of KAP (Knowledge, Attitude and Perception) taken at induction and following completion of the programme; • Number of workers provided with condoms (both male and female condoms) • availability of a clinic for workers for the duration of the contract; and • Number of Peer educator training conducted • Number of quarry sites and borrow pits rehabilitated to avoid mosquito breeding	At least, 2 KAP surveys carried out assess the impact of the HIV awareness programme; 80% of staff receiving HIV counselling and testing; 20% of the workforce become HIV/AIDS Peer Educators; Number and content of STIs / HIV Education programmes; Clinic and first aid boxes at camp site and other workers sites; Condom distribution; HIV Counselling and testing; and Records of counselling and testing of STIs / HIV.	RA, Contractor, District health staff, Local NGO, peer educators, Traditional health provider from the project area (EAD on rehabilitation of quarry and borrow pits)	Monthly	5

Construction phase	Road safety of pedestrians, motorists and cyclists	• Number of road safety campaigns delivered; • Number of traffic and transport regulations Implemented to minimise vehicular accidents; and • Number of Post warning signals and bumps at critical locations installed.	Speed limit and other appropriate signs erected,	RA and Contractor, Dpt of Road Safety	Monthly	2
Construction	Employment	• contractual commitments in place to	Number of local people	Contractor, Ministry of Labour, Community Development Officer	Monthly	4

Time frame/ phase	Environmental	Monitoring Indicator	Performance Indicator	Responsible Organisation	Frequency Of Monitoring	Estimated cost
phase	and income generating activities	respect social factors for temporary employees. • Number of local people to be Employed and trained as part of the activity. • Number of women and other community groups included in the activity whenever possible. • Number of entrepreneurs supplying of basic consumable items in the project areas.	Employed; Payment rates; No. of women hired and involved in road activities; No. of informal markets and people selling agriculture and other products close to camps and working areas; and Training manuals.	Local Authorities	Quarterly	6
Time frame/ phase **phase**	Quality of life, noise and air pollution	• Number of camps located away from sensitive sites like villages; • Number of quarries in the proximity of settlements; and • Number of Water gravel points accessed during dry season.	Location of quarries and campsites relative to villages; Watering of gravel access roads should be checked weekly during dry season	RA, Contractor, Engineer, Mines Department	Quarterly	

CHAPTER EIGHT: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSIONS

The sustainable improvement of the transport system is one of the Malawian government's declared development-policy goals. Besides energy supply, the lack and poor quality of roads place a major constraint on national socio-economic development. By rehabilitating a major stretch of the M1 road, the project will make an important contribution to improving the national transport system. Further, the road rehabilitation will improve access to social and economic infrastructure and with that make a contribution to growth and poverty reduction. The upgraded road will assist to provide quicker access for the transportation of agricultural inputs and produce and access to health, school, markets and other social amenities.

The community members and traditional leaders unanimously accepted the proposed project and it was envisaged that it will generate a lot of positive impacts. The stakeholders requested the authorities to speed up construction of the Road.

A range of negative construction related impacts were identified, but these may be considered as temporary or can be mitigated. Mitigation measures for all of these have been identified and are included in the Environmental Management Plan (ESMP). The expected social and economic benefits to the affected communities have been clearly identified and will compensate for the temporary negative impacts during construction.

8.2 RECOMMENDATIONS

The following recommendations are made:

- Contractor to update (as necessary) and implement the proposed ESMP and monitoring plan;
- The project tender and construction contract must include appropriate environmental clauses and ensure independent environmental supervision through recruitment of Environmental Manager and Community Liaison Officer with RAP expertise as part of the supervision consulting service for effective implementation of proposed mitigation management and monitoring measures; and
- The Roads Agency to ensure that the RAP is implemented.

It is recommended that project road should be upgraded and rehabilitated provided the ESMP is implemented and that strict monitoring measures are instituted both from engineering and environmental standpoints, considering the need to protect the environment while achieving economic development.

REFERENCES

National Statistical Office (NSO) [Malawi] and ICF International (2016**), Malawi Demographic and Health Survey 2015-16:** Key Indicators Report. Zomba, Malawi, and Rockville, Maryland, USA. NSO and ICF International

SATCC. (2001), **Draft Code of Practice for the Geometric Design of Trunk Roads** (September 1998 – Reprinted July 2001)

United Nations Development Programme (UNDP) (2007), **Measuring Human Development:** A Primer. New York: UNDP

Welfare and Monitoring Survey (WMS) (2014**), Agriculture Statistics Division of the National Statistical Office** (NSO)

Government of Malawi (2016), **Land Act;** Ministry of Lands and Urban Development

Government of Malawi (1968), **Public Health Act;** Ministry of Health

Government of Malawi (2016), **Forestry Policy;** Ministry of Natural Resources, Energy and Mining, Lilongwe

Government of Malawi (1997), **Forestry Act;** Ministry of Forest, Fisheries and Environmental Affairs, Government Press, Zomba

Government of Malawi (2013), **Water Resources Act;** Ministry of Agriculture, Irrigation and Water Development, Lilongwe

Government of Malawi (1994**);** National **Environmental Action Plan Volume 1,** Department of Research and Environment Affairs

Government of Malawi (1995), **Constitution of the Republic Of Malawi**

Government of Malawi (1995), **Water Works Act**, Number 17. Ministry of Water Development

Government of Malawi (1996), **Environment Management Act**, Number 23. Department of Environmental Affairs

Government of Malawi (2015), **National Gender Policy;** Ministry of Women and Community Development, Lilongwe

Government of Malawi (2000), **Parks and Wildlife;** Ministry of Natural Resources, Energy and Mining, Lilongwe

Government of Malawi (1997), **Occupational Health, Safety and Welfare Act;** Ministry of Labour, and Vocational Training, Lilongwe

Government of Malawi (1997); **Guidelines for Environmental Impact Assessment (ESIA) In Malawi;** Department for Environmental Affairs

Government of Malawi (2004); **National Environmental Action Plan;** Department of Environmental Affairs, Lilongwe

Government of Malawi (1994); **National Environmental Action Plan;** Department of Environmental Affairs, Lilongwe

Government of Malawi (2002); **Malawi National Land Policy;** Ministry of Lands, Physical Planning and Surveys

Government of Malawi (2004); **National Water Policy;** Ministry of Agriculture, Irrigation and Water Development

Government of Malawi (1981); **Mines and Minerals Act;** Ministry of Forestry, Fisheries and Environmental Affairs, Lilongwe.

Government of Malawi (1968); **Explosives Act;** Ministry of Forestry, Fisheries and Environmental Affairs, Lilongwe

Government of Malawi (2012); **National HIV and AIDS Policy;** OPC, Lilongwe

Government of Malawi (2015); **National Gender Policy;** Ministry of Women and Community Development, Lilongwe

ANNEXES

ANNEX A: TERMS OF REFERENCE FOR PREPARING THE ESIA

ESIA TERMS OF REFERENCE FOR ROAD INFRASTRUCTURE PROJECT

1. Provide a full description of the nature/components of the proposed project with respect to the name of the proponent, postal and physical address, aim and objectives of the project, the estimated cost of the project, the size of land for the project site, the number of people to work on the area (provide a breakdown of males and females, locals and non-locals), nature of roads works source of raw materials (borrow pits and quarries to be developed) and waste types to be generated, and waste disposal.
2. Describe main activities to be undertaken in the construction (or rehabilitation and upgrading) of the road. Identify the main construction and operation activities of the project including access roads, source of raw materials (quarries and borrow pits), storm water drainage, road works, road safety features, drainage systems (soil and water measures) and sanitary facilities. In the description also include the type of machinery to be used, nature and quantity of wastes that will be generated, facilities for appropriate waste disposal and management of waste and estimated costs for the activities.
3. Provide a site specific map of the area (Scale 1:50,000) showing the proposed project site and (1:10,000) showing existing establishment in the proposed area and surrounding areas. A site plan of the project should also be provided.
4. Provide a concise description of the existing biophysical characteristics and the socio-economic environment status of the proposed area by identifying and analyzing:
    - Physical conditions: soil, geology, site topography, temperature, rainfall patterns and drainage system (water courses);
    - Biological Resources: scope of vegetative resources of the project area including riparian vegetation, extent of terrestrial and aquatic fauna;
    - Socio-economic conditions: demographic trend within and around the project area, main land uses, business activities, basic infrastructure and health situation; and
    - Any changes anticipated during implementation of the project area. Provide a description of HIV/AIDS prevalence rates in the proposed project sites.
5. State the reason for selecting the proposed site of the project as opposed to other sites. Consider alternatives to the project, such as alternative sites and the reason for selecting the preferred option including the 'no project' alternative. The ESIA should also consider 'within – project' alternatives e.g. designs, technology etc.
6. Predict environmental and social impacts associated with the activities at and around the site, focusing on both the positive and negative impacts. The impacts should include:
    - Project location (e.g. loss of forest reserves, loss of agricultural land, loss of grazing pastures, impact on water resources, impact on flora and fauna, impact on cultural site, and resettlement of people);

- Project design (e.g. drainage problem, fire safety designs, and other structures);
- Construction works (e.g. soil erosion, dust pollution, noise, disposal of construction spoils); and
- Project operation (e.g. pollution by stored oil, fire risks to surrounding community, impacts on soil such as surface erosion and runoff, conflict of use) through its projected life.

7. Prescribe the measures to eliminate, reduce or mitigate the negative effects identified and the measures to enhance the positive effects.
8. Propose an Environmental and Social Management Plan by which all of the measures prescribed in 7 above, will be carried out. Indicate the budget for the recommended mitigation measures, specifications of who will be responsible for these measures and the schedule when these measures will take place during construction and operation of the project.
9. Propose an Environmental and Social Management and Monitoring Plan by which all mitigation measures recommended in Environmental Management Plan will be monitored. The plan should include the activities, frequency of monitoring, the key monitoring indicators, resources required and the authorities responsible for monitoring the exercises.
10. Review the legal framework pertaining to the proposed project and indicate their impacts on the project. Reference should at least be made to the Environment Management Act, Forestry Act, Water Resources Act, National Water Policy, National Environment Policy, Malawi National Land Policy, Public Health Act, Occupational Safety, Health and Welfare Act, Malawi Development and Growth Strategy, other relevant policies and piece of legislation. Furthermore provide an account of all regulatory licences and approvals obtained for the proposed project to ensure that they are in line with sound environmental management practices and are in compliance with relevant existing legislation.
11. Undertake stakeholder consultation to ensure key interested and affected stakeholders are involved in the Environmental and Social Impact Assessment process. Incorporate their views in the report and indicate a record of consultations in the appendices parts of the report.
12. Ensure that EDOs for Lilongwe, Dowa and Mzimba and District Commissioners are consulted on the project.
13. The preparation, presentation and structure of the EIA report should follow the format in the Guidelines of Environmental Impact Assessment for Malawi (1997) as stipulated on pages 33-37. The minimum content of required information in an EIA Report is outlined in pages 53-59.
14. The ESIA team should include the following experts:
    - Environmental Impact Assessment Expert;
    - Social Expert; and
    - Civil Engineer;
15. Submit 2 draft ESIA reports for preliminary preview by the department and thereafter submit 15 hard copies for Technical review and a soft copy of the ESIA report to the Director of Environmental Affairs.
16. Provide the names of the ESIA Team and their respective fields.

ANNEX B: ESIA TEAM AND EXPERTISE

TECH-6: Curriculum Vitae (CV)

Environmental and EIA Expert

Name of Expert:	**Melissa Moffett**
Date of Birth:	9th September 1965
Country of Citizenship/Residence:	South African

Education:

Master of Science, Botany Department, Institute for Coastal Research, University of Port Elizabeth, South Africa, 1993 - 1994;
Bachelor of Science, Botany, Zoology and Geography), University of Natal, Pietermaritzburg, South Africa, 1984 – 1989;
Bachelor of Science Honours, Geomorphology, University of Natal, Pietermaritzburg, South Africa, 1984 – 1989;
Diploma in Higher Education, University of Natal, Pietermaritzburg, South Africa, 1984 – 1989.

ESMPloyment Record Relevant to the Assignment:

Period	ESMPloying organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
2006 – Present	**Employing Organization:** African Litany **Title/Position:** Owner **Contact Information for References** **Name:** Simon Gillett **Telephone:** +44 23 80 278600 **Email:** simon.gillett@roughton.com	South Africa	Carried Environmental and social Impact Assessments studies and preparation of ESMP's
1999 – 2006	**Employing Organization:** PUlles Howard and de Lange,SA **Title/Position:** Environmental Manager **Contact Information for References** **Name:** William Pulles **Telephone:** +27 82 690 7599 **Email:** William@phd.co.za	South Africa/Lesotho	Carried Environmental and social Impact Assessments studies and preparation of ESMP's
1997 – 1999	**Employing Organization:** Molosiwa Bruin and Associates, SA **Title/Position:** Environmental Manager **Contact Information for References** **Name:** Robert Bruin **Telephone:** N/A **Email:** robruin.co@gmail.com	South Africa/Lesotho	Carried Environmental and social Impact Assessments studies and preparation of ESMP's
1995 – 1997	**Employing Organization:** Eastern Cape Nature Conservation **Title/Position:** GIS Officer (Mapping of alien invader tree species) **Contact Information for References** **Name:** Director **Telephone: +27 21 799 8874** **Email:** info.cape@sanbi.org.za	South Africa	
1993 – 1995	**Employing Organization:** University of Port Elizabeth **Title/Position:** Research Officer (Impacts on sandy beach ecosystems and GIS Mapping) **Contact Information for References** **Name:** Nozuho Ngcuhana **Telephone:** +27 41 504 1111 **Email:** info@nmmu.ac.za	South Africa	

Membership in Professional Associations and Publications: International Association Impact Assessment (RSA);
Southern African Institute of Ecologists and Environmental Scientists (SAIEES).

Language Skills (Indicate only languages in which you can work):

		Reading	Speaking	Writing
	English	Excellent	Excellent	Excellent

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capacity to Handle the Assigned Tasks
• Environmental/Social impact assessments • Environmental Terms of Reference • Description of the baseline environment; • Legislative and Regulatory Framework; • Identify potential environmental impacts that could result from the project; • Occupational Safety & Health concerns; • Carry out public participation and consultations on the positive and negative impacts of the project; • Propose Mitigation Measures to the identified environmental and social impacts; • Development of Environmental Management Plan to mitigate negative impacts, and; • Development of Environmental Monitoring Plan. • Environmental Management Plan • Preparation of reports	**Name of assignment or project:** Environmental Management Programme in support of limestone quarrying activity **Year:** 2013 - 2013 **Location:** Koedoeskop near Thabazimbi in Limpopo Province, South Africa **Client:** Continental Cement **Main project features:** Compile and submit an Environmental Management Programme Report (ESMPr) in support of Mining Right application to the Department of Mineral Resources (DMR). **Positions held:** Project Manager **Activities performed:** Undertake public consultation; Reviews specialist studies undertaken; collate findings of all specialist studies; and prepare ESMPr for submission to the DMR.
	Name of assignment or project: Environmental Impact Assessment and Waste Licence Application for movement of Hazardous Waste Material in southern Africa **Year:** 2012 - 2013 **Location:** Gauteng and Mpumalanga Provinces in South Africa and Maputo in Mozambique **Client:** Starex **Main project features:** Submit environmental authorisation application to Environmental Authorities. Submit Waste Licence Application to Department of Environment Affairs **Positions held:** Project Manager **Activities performed:** Site visits, meeting with Clients, Compile and submit Environmental Impact Assessment and Waste Licence Applications.
	Name of assignment or project: Cambria Coal Mining Project – specialist ecological study **Year** : 2011 - 2013 **Location:** Northern KwaZulu-Natal, South Africa **Client:** Hydroscience **Main project features:** Undertake specialist ecological investigation of area earmarked for coal mining project **Positions held:** Ecological Specialist **Activities performed:** Site visit, literature review and impact assessment of coal mining activities on ecology of area.
	Name of assignment or project: Resettlement action Plan for Storm Mountain Diamond Mine **Year:** 2013- 2013 **Location:** Lesotho **Client:** Storm Mountain Diamond Mine **Main project features:** Compile a draft Resettlement Action Plan for review by Client **Positions held:** RAP Consultant **Activities performed:** Undertake site visit with Client, collect relevant data; meet with representative from Lesotho Land Administration Authority (LAA); compile draft report for submission to Client.
	Name of assignment or project: Marakabei to Monontsa Road EIA and ESMP **Year:** 2012-2013 **Location:** Lesotho **Client:** Roughton International **Main project features:** Compile an Environmental Management Plan (ESMP) to address environmental and social impacts, undertake public participation process and Social Impact Assessment **Positions held:** Project Manager **Activities performed:** Undertake site visit with Client and subconsultants; manage public consultation process, liaise with Lesotho Department of Environment and with Roads Directorate; Compile contributions to Project Inception Report and Project Technical report; Review Issues and Response Report in support of public consultation process; Review Social Impact Assessment findings for incorporation in ESMP; and compile and submit ESMP

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capacity to Handle the Assigned Tasks
	Department of Environment.
	Name of assignment or project: Metolong Dam & Water Supply Programme **Year:** Sep 2008 – January 2013 (Part Time Contract) **Location:** Lesotho **Client:** Metolong Authority/Metolong Project Management Unit **Main project features:** Key focus areas include supervision and management of the Integrated Catchment Management, Instream Flow Requirements, Cultural Heritage Development Programme, Water Treatment Works (WTW) Contractor and Downstream Conveyance Contractors (pipelines, pump stations, access roads and storage reservoirs). **Positions held:** Environmental and Social Specialist **Activities performed:** Assisting the Metolong Authority/Metolong Project Implementation Unit (MPIU) to manage the Metolong Dam and Water Supply Programme. Tasks include the review of proposals, review of tender documentation, development of Terms of Reference, manage appointed consultants for various project components (including resettlement and compensation plan, cultural development programme, HIV/AIDS, Integrated Catchment Management, Instream Flow Requirements, etc.). Review consultancy reports. Undertake ad hoc audits of various project components such as construction of new Ha Seeiso Motsoeneng Road. Ensuring Environmental and Health Safety compliance by Water Treatment Works and Downstream Conveyance Contractors. Ongoing liaison with National Regulators and with Funders and Panel of Experts.
	Name of assignment or project: Nacala Dam Feasibility Study, Environmental and Social Impact Assessment, Design and Supervision Study **Year:** Jul 2009 – Jun 2011 **Location:** Mozambique **Client:** Subcontracted to Jeffares and Green (South Africa) – funded by the Millennium Challenge Account-Mozambique **Main project features:** Include management and integration of all ESIA components including both environmental (biophysical) and social (socio-economic, public participation, trafficking in persons, HIV/AIDS, Resettlement and Compensation Framework and Action Plan) aspects. Project includes the raising of the Nacala Dam and the realignment of the national N12 highway between Nacala and Nampula as a result of the raising of the wall. **Positions held:** Project Manager **Activities performed:** Compile EIA for submission to MICOA. Compile a detailed Environmental Management Programme (ESMP) to address and manage all identified project impacts. Review Health and Safety and Environmental Sections of Bidding documents submitted by contractors, revise and update Resettlement Action Plan.
	Name of assignment or project: Storm Mountain Diamond Mine (previously Kao Mine) **Year:** January 2011 on-going (ad hoc) **Location:** Lesotho **Client:** Storm Mountain Diamonds **Main project features:** Construction of new fresh water dam, new tailings (slimes) disposal facility and upgrading of Process Plant. **Positions held:** Environmental Specialist Advisor **Activities performed:** Advise the Mine on Environmental and Social aspects to ensure compliance with ESMP. Provide specialist advice on an as-needed basis for aspects including integrated water and waste management plan; HIV and AIDS management plan; environmental monitoring and reporting including water quality monitoring; closure costing; wetland rehabilitation and water use licence applications.
	Name of assignment or project: Environmental Impact Assessments for Lesotho Lowlands Bulk Water Supply Scheme **Year:** Jul 2007 – Mar 2010 **Location:** Lesotho **Client:** Lowlands Water Joint Venture EU funded project **Main project features:** Three separate EIA's for the Lesotho Lowlands Water Supply Project. Assess impacts of Infrastructure such as reservoirs, abstraction

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capacity to Handle the Assigned Tasks
	points, access roads, pipelines, pumping stations, etc. **Positions held:** Assistant Project Manager **Activities performed:** Collated findings of all specialist studies (Instream Flow Requirements, Social Impact Assessment, Public Participation Process, Geotechnical Studies, Cultural and Heritage Studies, Ecological Surveys, etc.) into three separate ESIA and developed a stand alone ESMP for each ESIA.
	Name of assignment or project: Sedibeng Regional Sanitation Scheme ESIA and Waste Licence Application **Year:** May 2010 – November 2011 **Location:** South Africa **Client:** MSA Group Services subcontracted to Arcus Gibb **Main project features:** Project entails liaising with Authorities, Interested and Affected Parties and Client on a regular basis. Collate findings of all specialist studies undertaken and compile the final ESIA and ESMP reports. **Positions held:** Project Manager **Activities performed:** Manage and finalise submission of an ESIA undertaken for the proposed Sedibeng Regional Sanitation Scheme in Gauteng Province,
	Name of assignment or project: Kawambwa Mushota Luwingu Road Upgrade **Year:** Jul 2011 – June 2012 **Location:** Zambia **Client:** Zambian Roads Development Agency (RDA) **Main project features:** Undertake ESIA for proposed upgrade of Kawambwa Mushota Luwingu road in northern Zambia. **Positions held:** Environmental and Social Specialist **Activities performed:** Conduct field investigations along project route including potential infrastructure that may need to be resettled/compensated, undertake public consultation process with affected stakeholders, compile Environmental Impact Statement and ESMP, provide input into Health and Safety and
	Name of assignment or project: Oxbow to Mokhotlong Road Upgrade ESMP **Year:** Oct 2009 – Nov 2010 **Location:** Lesotho **Client:** Lesotho Road Directorate, Ministry of Public Works and Transport **Main project features:** Compilation of Environmental Management Plan for Oxbow to Mokhotlong Road Upgrade ESMP. **Positions held:** Project Manager **Activities performed:** Manage project and compile final ESMP report. Collate public consultation, biophysical studies and socio-economic impact findings of
	Name of assignment or project: Amendment to Environmental Management Programme Report for Tselentis Colliery, Mpumalanga **Year:** Mar 2007 – Feb 2010 **Location:** South Africa **Client:** Xstrata Coal South Africa **Main project features:** Compilation of Amended Environmental Management Programme for Tselentis Opencast Coal Mine in Mpumalanga, South Africa. **Positions held:** Project Manager **Activities performed:** Manage specialist studies (biophysical, socio-economic and public consultation) and compile final report for submission to regulatory authorities. Liaise with Regulatory Authorities. Undertake public consultation process with all affected stakeholders.
	Name of assignment or project: Zincor New Residue Disposal Facility EIA **Year:** Jul 2004 – Jun 2010 **Location:** South Africa **Client:** Exxaro Resources **Main project features:** Submission of EIA for new hazardous waste residue disposal facility, Waste Permit application and Integrated Water Use permit application for the Zinc Corporation (Zincor) refinery near Springs in Gauteng. **Positions held:** Project Manager and Coordinator

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capacity to Handle the Assigned Tasks
	Activities performed: Extensive consultation with the various regulatory authorities (Environmental, Hazardous Waste and Water Use), compile technical reports in support of licence and permit application process, liaise with Regulators and Client. Compile final EIS for submission to Regulators (collate all specialist studies and public consultation process).
	Name of assignment or project: Semonkong Water Supply EIA **Year:** Dec 2010 – Jan 2011 **Location:** Lesotho **Client:** Millennium Challenge Corporation (MCA-Lesotho) **Main project features:** Design and Feasibility study for Water Supply system for Semonkong area in Lesotho Highlands. **Positions held:** Technical Reviewer **Activities performed:** Technical reviewer of Semonkong Water Supply Environmental and Social Impact Assessment for submission to Lesotho Department of Environment. Edit EIS, liaise with Regulators and submit final EIS.
	Name of assignment or project: Environmental Impact Assessments for Botšabelo Medical Complex, Maseru **Year:** Jul 2009 – Mar 2010 **Location:** Lesotho **Client:** MCA-Lesotho **Main project features:** Environmental and Social Impact Assessment for construction of medical laboratory, blood transfusion centre and accommodation facilities for Botšabelo Medical Complex, Lesotho. **Positions held:** Deputy Project Manager **Activities performed:** Compile EIS and ESMP, biophysical studies, manage public consultation and social impact assessment components. Liaise with Regulatory Authorities.
	Name of assignment or project: Review ESMP for Goldfields Driefontein Gold Mine **Year:** May 2009 – Jul 2009 **Location:** South Africa **Client:** Subcontracted to Golder Associates Africa **Main project features:** Review and update the Environmental Management Programme (ESMP) for Driefontein Gold Mine in Gauteng. **Positions held:** ESMP Reviewer **Activities performed:** Meet with Client and with Regulator, revise document to ensure it meets required standard set by Regulator.
	Name of assignment or project: Basic Assessment (Scoping) for proposed upgrading of existing gravel road between Schweizer-Reneke and Myra, South Africa **Year:** Aug 2008 – Jul 2009 **Location:** Schweizer-Reneke to Myra **Client:** Department of Transport, Roads and Community Safety, North West Province **Main project features:** Upgrade road from gravel to tar. **Positions held:** Project Manager **Activities performed:** Responsible for management and undertaking Scoping studies (biophysical, socio-economic and public consultation) associated with the proposed road upgrade project. Fieldwork and writing up of reports, meet with Client.

	Name of assignment or project: Compile ESMP for Diamond Mine (Prospecting Phase) **Year:** Jan 2008 – Oct 2008 **Location:** South Africa **Client:** Virginia Diamond Fields **Main project features:** Environmental Management Plans for several diamond prospecting applications. **Positions held:** Project Manager **Activities performed:** Compile and submit Environmental Management Plans for several diamond prospecting applications in Free State Province for Virginia Diamond Fields.

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capacity to Handle the Assigned Tasks
	Name of assignment or project: Environmental Due Diligence for proposed MCC-funded Health Care Facilities **Year:** Jan 2007 – Feb 2007 **Location:** Lesotho **Client:** Jacobs (USA) **Main project features:** Environmental due diligence for proposed Health Care facilities in Lesotho. Detail extent of environmental assessment required for each health care facility project. **Positions held:** Environmental Specialist **Activities performed:** Assess status of existing facilities including medical waste treatment facilities. Identify potential environmental impacts associated with proposed upgrading of health care facilities.
	Name of assignment or project: Kao Diamond Mine Resettlement Action Plan **Year:** Jan 2007 – Jan 2008 **Location:** Lesotho **Client:** Seriousview Diamonds (Kao Diamond Mine) **Main project features:** Start up of diamond prospecting operations in Lesotho Highlands area including establishment of all facilities such as process plant, tailings facility, office and residential complexes, process water dams. **Positions held:** Environmental (biophysical) Specialist **Activities performed:** Compilation of environmental (biophysical) component of the Kao Diamond Mine Resettlement and Compensation Action Plan involving resettlement of several households.
	Name of assignment or project: Environmental Audit of Tarlton Depot Intermixture Refractionator Project - Construction Phase **Year:** Jan 2007 – 2013 (annual audit) **Location:** South Africa **Client:** Transnet Pipelines **Main project features:** Environmental and Occupational Health and Safety Audits. **Positions held:** Environmental Auditor **Activities performed:** Undertake monthly environmental and Occupational Health and Safety Audits of the construction activities of the IRP. Subsequently appointed to undertake annual environmental audits of the site (ongoing process).
	Name of assignment or project: Sishen Iron Ore Mine Sinkhole Investigation **Year:** Jul 2006 – Jun 2007 **Location:** South Africa, Kathu, Northern Cape Province **Client:** Kumba Resources **Main project features:** Investigation to complaints regarding impacts of mining operations causing sinkhole formation and negatively affecting farmers water supply. **Positions held:** Project Manager **Activities performed:** Collate findings of all specialist investigation relating to complaints raised by farmers regarding impacts on their operations related to sinkhole formation allegedly caused by Sishen Iron Ore Mine operations. Manage public consultation process.

Expert's contact information:	Email: info@roughton.com Telephone: +44 (0) 2380 278600

Certification:

I, the undersigned, certify to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

Melissa Moffett		20/04/2015
Name of Expert	Signatur	Dat

Simon Gillett		20/04/2015
Name of Authorized Representative of the Consultant (the same who signs the proposal)	Signature	Date

Curriculum Vitae for Rex M. Kanjedza

1.0 Bio data

Position and Title	**EIA Consultation Expert**
Name of Expert	Rex Kanjedza
Date of Birth	1st June 1971
Country of Citizenship/Residence	Malawi

2.0 Education

University	**Dates Attended**	**Degree Awarded**
University of Malawi – Chancellor College	2004-2006	Master of Science in Environmental Sciences
University of Malawi – Chancellor College	1989-1993	Bachelor of Education Sciences

Other Qualifications

- University Certificate in Environmental Impact Assessment

3.0 Membership in Professional Associations and Publications:

- Association for Professional Chemist and Chemical Engineers of Malawi (APCEM).
- Directory of Environmental Impact Assessment Experts.

4.0 Language Skills

Language	Speaking	Reading	Writing
English	Fluent	Excellent	Excellent
Chichewa	Native	Excellent	Excellent

5.0 Related Consultancy Experience

	Name of assignment	Contact Details of the Client
1	Conducted an Environmental Impact Assessment for a dam for Shayona Cement Factory in Kasungu (December 2013-August 2014)	The Managing Director Shayona Cement Corporation, P.O. Box 769, Lilongwe Telephone:+2651 756553 **E-Mail:** jeetu@shayonacorporation.com
2	Millennium Challenge Account infrastructure Development Project; Resettlement Action Plan for Transmission Lines and Substations from Phombeya to Nkhoma; and from Chintheche to Nkhoma	Client was ESCOM but was employed by SMEC; Address for SMEC: Area 14, P.O. Box 30348, Lilongwe 3
3	Conducted an Environmental Impact Assessment for Luwani Irrigation project in Neno for the United Nations High Commissioner for Refugees (Malawi)in 2007;	The Resident Representative, UNHCR Lilongwe 3
4	Member of a team that Developed of an Environmental Management Plan for the maintenance and rehabilitation of urban Roads for Lilongwe funded by European Union in 2007;	The Chief Executive Officer The Roads Authority Private Bag B 346 Lilongwe. **Contact Person:** Allan Kaziputa Cell: +265 888 639 441
5	Team Member for the preparation of an Environmental Impact Assessment for wastewater treatment facility at JTI (May 2012);	JTI Leaf Malawi Limited P. O. Box 40012, Kanengo.

	Name of assignment	Contact Details of the Client
		Contact Person: Mr. Kachilele Cell: +265 999 221 483
6	Carried out an Environmental and Social Impact Assessment for the upgrading of the Nsipe-Mangochi Road Via Liwonde (May 2013)	The Chief Executive Officer The Roads Authority Private Bag B 346 Lilongwe Contact Person: Allan Kaziputa Cell: +265 888 639 441
7	Carried out an Environmental Audit for Kanengo Tobacco Processors Limited(December 2013-August 2014)	The General Manager Kanengo Tobacco Processors Limited P.O. Box 40075 Kanengo Contact Person: Mike Lupia Cell: +265 999 381 814
8	Part of the team that carried an Environmental Management system for Alliance One	Alliance One Malawi Limited; P.O. Box 30522 Lilongwe 3. Contact Person: Mr Numeri Mitawa Cell:+265 881 389 284
9	Carried out an Environmental Audit for EthCo (March 2014)	The General Manager, Ethanol Company of Malawi, P.O. Box 50, Dwangwa Telephone: +265 1 295 200

	Name of assignment	Contact Details of the Client
		Contact Person: Dickson Chakale Email: DChakale@ethanolmw.com
10	Part of the team that carried out an environmental impact assessment for Tobacco Industry waste dumping site (December 2010)	Tobacco Exporters' Association of Malawi (TEAM) Processing Industry P. O. Box 40012, Lilongwe 4. Contact person: Mr. P. Chisala Cell: +265 888 823 439
11	Part of the team that carried out an Environmental and Social Impact Assessment for Kanyika Niobium Mine	**Globe Metals and Mining Africa,** **Kanyika Niobium Project** **Private Bag A 201** **LILONGWE** **Contact Person: Crispin Ngwena** **Tel: +265 1 794070** **Fax: +265 1 794070** **Email:** **Chris.ngwena@globemetalsandmining.com.au**
12	Conducted an Environmental Impact Assessment for Thabwa Quarry Mine in Chikhwawa (March 2014)	**Zunguziwa Quarry Limited** **P. O. Box 1259** **Lilongwe** **Malawi** **Contact Person: Mr Flemings Kapunda** **Cell: +265 999 838 985** **Email: kapundaf@plemconstruction.com**
13	Conducted an Environmental Impact Assessment for Quarry Mine in Nathenje, Lilongwe (September 2012)	**Z. Z. T. H WEALTH COMPANY** **P. O. Box 40282** **Lilongwe 4** **Malawi.** **Contact Person: Huang Wu** **Cell : +265 999 090 078** **E-mail: 894103660@qq.com**
14	Conducted an Environmental Impact Assessment for Thabwa Quarry Mine in Chikhwawa (March 2014)	**Zunguziwa Quarry Limited,** **P. O. Box 1259** **Lilongwe** **Contact Person: Mr Flemings Kapunda** **Cell: +265 999 838 985** **Email: kapundaf@plemconstruction.com**

	Name of assignment	Contact Details of the Client
15	Conducted an Environmental Impact Assessment for Proposed Mwankenja Coal Mine; Karonga (September, 2005)	**Premier-Teamwork Mining Company Limited (PTML),** **P.O. Box 30182, Lilongwe** **Contact Person : Mr Weston James Chinula** **Cell: +265 888 506 004** **E-Mail : wchinula@hotmail.com**
16	Conducted an Environmental Impact Assessment for Hara Coal Mine in Karonga (March, 2004)	**Njati Mining Corporation,** **P.O. Box 28, Chitimba, Rumphi** **Contact Person: Magola Gondwe** **Cell : +265 999 688 425** **E-Mail : njati10@gmail.com**

Expert's Contact Information:

E-mail:
rexkanjedza@gmail.com
Phone: +265 888 876 595/+265 993 189 359

Certificati on:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

Rex Montgomery Kanjedza _____ Date: 4h December 2015

Name of EIA Consultation Expert *Signature*

ANNEX C: LIST OF STAKEHOLDERS CONSULTED AND VIEWS RAISED

Public Consultation Meeting Minutes, Background Information Document and List of Stakeholders Consulted

ANNEXURE C1 – MEETING MINUTES

Minutes of the consultation meeting held at DOWA District Council offices on 11th January 2019

1.0 List of participants

	Name	Position	Department/Organization	Phone Number	E-Mail address
1	Rex Kanjedza	Public Consultation Expert	Roughton International/ Wataya Consulting	0888876595	rexkanjedza@gmail.com
2	Kingsley Wataya	Director	Wataya Consulting Engineers	088889602	otiswataya@yahoo.com
3	Georgina Chunga	councilor	Mponela ward	0991747194	
4	Martin Luka	Council Chair	Msakambewa East	0999702388	Martinlukaphiri01@gmail.com
5	Lephas Kafumbula	Council vice Chair	Dzoole Northward	0991383149	
6	Jeremoti M. Jmbe	Councilor	Chakhaza SW Ward	0994863233	
7	Brecious Mageni	Councilor	Msakambewa West	0993033817	
8	Madalo	Councilor	Dzoole South	0884110956	
9	Racheal M. Meke	Councilor	Chakhaza South	0996101618	
10	Sam Kawale	Member of Parliament	Dowa North East	0999600345	skawale@gmail.com
11	Lufeyo Malodza	Councilor	Mkukula East	0999443082	
12	Inkosi Chiwere	Traditional Authoriy	Dowa East	0999928111	
13	Harrid Mkono	Monitoring and Evaluation Officer			
14	Hopson P. Sosola	AOOF	DC`s office	0999375957	hopsonsosola@gmail.com
15	Cheukani Madeya	Councilor	Chiwere East	0999722929	
16	F. Sidira	Environmental District Officer		0999123129	sidirafrancis@yahoo.co.uk
17	Vincent Gunde	Reporter	FM 101 radio	0999043905	vincentgunde@gmail.com
18	Mathews Kumukumu	AVT	Information	0995223221	
19	M.N. Ionas	DIO (OPC)	OPC	0996968650	
20	T. L Khonje	BS (DC`s)	DC`s	0999471992	
21	P.R Kachitifu	DRHO	Rural Housing	0997704290	

22	Ellis Tembo	Director of Public	Dowa D/C	0995616501	ellisdpw@yahoo.com
23	Frank Kamchacha	DIO/Reporter	Information (MANA)	0881269828	frankkamchacha@gmail.com
24	Albert Kumwenda	SALRCO	Agriculture	0999823418	albertkumwendabd@gmail.com
25	Deborah	District Forestry	Forestry	0999271956	mushalidebora@yahoo.

	Name	Position	Department/Organization	Phone Number	E-Mail address
	Mushali	Officer			co.uk
26	E. Kalele	Clerk	DC HQS	0884068156	esaukalele@ymail.com
27	J.F.K Manda	DIE	Irrigation	0999615073	jacksonmanda@yahoo.com
28	Josophine Chintengo	Assistant public consultations expert		0993121044	Josochintengo@gmail.com
29	Fannie Msimuko	District Commissioner	Dowa D. Council	0999238589	fmsimukos@gmail.com
30	Cecilia Chimbuzi	Human Resources	Dowa D. Council	0991273330	ceciliac1986@gmail.com
31	Emmmanuel Bulukutu	Director of Planning and Development	Dowa D. Council	0884526199	ebulukutu@gmail.com

2.0 Opening Remarks

The meeting started with a word of prayer thereafter participants were asked to introduce themselves, then the DC welcomed everyone and introduced the agenda. The meeting was chaired by Mrs. G. Chunga, the chairperson of public works committee for Dowa District Council.

The chairperson welcomed all the participants and urged them to actively participate in the deliberations. Later, the chairperson invited the representative from Roughton International in association with Wataya Consulting Engineers to make his presentation.

3.0 Presentation on the Road Project

Mr. Kanjedza started by thanking the management of Dowa District Council for making it possible for the meeting to be convened. He later indicated that the objective of the meeting was two-fold: Firstly, to inform the Dowa District Executive Committee about the M1 Road project which is in the design phase; and secondly, to get input from members of the committee on issues that should be considered in the planning, designing and implementation of the proposed project.

In his presentation Mr. Kanjedza indicated that the Government of Malawi, through the Roads Authority intends to rehabilitate the 234 km stretch of road starting at the M1/Kamuzu International Airport (KIA) turn-off to the Mzimba/Boma turn-off on the M1.

Further, informed the gathering that COMESA through the Road Authority (RA) awarded Roughton International Ltd in association with Wataya Consulting Engineers Ltd (Malawi) and African Economic Group (Malawi) the contract to prepare an ESIA and a Resettlement Action Plan (RAP) for the proposed road upgrade project. He indicated that the Road will be upgraded so that it is wider enough for safe travel for all road users including cyclists and pedestrians.

Later, Mr. Kingsley Wataya gave a presentation on detailed rehabilitation works (the construction of safety barriers, widening of the road and pedestrian walk ways) that will be done on the road. Further he indicated that the road project will be split into three homogenous sections for design purposes and for tendering, namely: Section 1-KIA turn-off to Kasungu (before BP Filling Station): 100.2 km; Section 2-Kasungu to Jenda: 62.0 km; and Section 3-Jenda to Mzimba turn-off: 71.6 km.

4.0 Issues Raised for Consideration

Sector/Name	Issue raised	Response
Mr. H. Mkhoma; the Monitoring and Evaluation Officer for Dowa District Council	How substantial is the construction of climbing lanes in relation to the number of trucks? Is this not a set back	There are no climbing lanes in the design as the traffic levels are too low to justify them. However, safety barriers (concrete type will be used to avoid theft) will be in the design.
	Will people whose property will be affected by the project be compensated?	They will be compensated and the details of the affected people and their property will be included in the Resettlement Action Plan for the project.
	Possibility on widening the road even more from its estimation, as trucks cause hindrance in-terms of movement? Unchangeable	The design is dictated by COMESA. However, it has been proposed that roads in trading centers be wider so as to avoid accidents.
Mr. S. Kawale; Member of Parliament.	When will results of the feasibility study be given to government?	The results will be submitted to government by August this year, so that by September Government will have started reviewing the feasibility reports.
	When will the project start?	The date for the start of the project is not known. However the Government is very keen to start the project as soon as possible.
	It was recommended by the MP that the project affected people should be compensated as some people will lose property and land; There is also need to consider installing culvert bridges in places where there is an access road adjoining to the main road; Further the Member of Parliament recommended that sign posts be installed to minimize accidents.	The recommendations were well taken and will be included in the Environmental and Social Management plan

Mrs. F Msimuko; District Commissioner	The DC recommended that during project design, the drainage system be well considered as there have been cases where this was ignored thereby leading to loss of property and land especially during rainy season. The DC gave an example of Chitete area in Mponela, a long the M1 road. Further, she recommended that traditional leaders around the area be consulted on the issue before drainage construction begins so that the traditional leaders sensitize their subjects especially those that will be affected by the drainage construction.	The recommendation well noted and this will be included in the design of the road. An investigation will also be carried out to determine the area that will be required to construct the proposed drainage.

Sector/Name	**Issue raised**	**Response**
Mr. C. Kafumbula; Council Vice Chair	He gave a recommendation that the road should have a good drainage system design as this will warrant the durability if the road.	Recommendation well noted but will depend on availability of resources.
Mrs G. Chunga Councilor	The councilor recommended that there is need to design good drainage systems for the project as poor drainage systems lead to gullies that in-turn have adverse effects on the people and environment. An example is the Chitete road which has poor drainage system hence there is need to elevate it so that the problems are lessened.	Recommendation well taken.
The DPD	The DPD recommended that it is better to build a road that will take a longer time than one that will only take a few years before it starts deteriorating. As such the recommendation is to construct it in phases rather than covering a longer distance with poor quality	Recommendation well taken. However this will depend on availability of financial resources.
	He also proposed that a service road be built where travellers can rest.	Recommendation well noted however this will again depend in availability of financial resources.
Mr. J.M Jumbe; councilor	How long will it take to finish the feasibility study?	The feasibility study will be finalized by August.

5.0 Conclusion

The Project is good indicator of development in rural areas as this will improve the road network and make travelling easy, provide safe walkways for pedestrians, reduce accidents that cyclist met and at the same time making sure there is enough parking space for vehicles like trucks and minibuses.

6.0 Pictorial Coverage of the meeting

Minutes of the consultation meeting held at Kasungu District Council offices on 7th January 2019

1.0 List of participants

	Name	Position	Department / Organization	Phone Number	E-Mail address
1	Rex Kanjedza	Public Consultation Expert	Roughton International/ Wataya Consulting Engineers	0888876595	rexkanjedza@gmail.com
2	Kingsley Wataya	Director	Wataya Consulting Engineers	088889602	otiswataya@yahoo.co
3	Earnest Kaphuka	Director of Planning and Development	Kasungu District Council	0888142981	
4	Anne Salama	Monitoring and Evaluation	Kasungu District Council	0999309076	anniesalama@yahoo.c
5	Linda Lungu	District Elections	Malawi Electoral Commission	0997931605	lindalungu@gmail.com
6	Leonard Siula	Service Centre Manager	National Bank of Malawi	0999950615	lsiula@nationalbank.m
7	Rocky Hausi	District Educational Manager	Ministry of Education	0888340591	rockyhausi@yahoo.co. uk
8	Lucius Njobvu	District Aids Coordinator	Kasungu District Council	0888176388	njobvulucius@yahoo.c
9	Keniard	Marketing	SACCO	0881779782	bkenird@gmail.com
10	Davie Chigwenemb	District Public Works Officer	Kasungu District Council	0888357071	daviechigwenembe@y
11	M.J. Chimtsimbo	Scheme Manager	Central Region Water	0997290737	chimtsimbo@yahoo.co
12	Ben Mitochi	District Environmental Health Officer	District Health Office	0999930517	mitochiben@yahoo.co m
13	Doris Mabeti	Clerk Officer	Kasungu District Council	0888129084	
14	Paul Phiri	Messenger	Kasungu District Council		
15	Boyd Banda	Messenger	Kasungu District Council		
16	Wellington Mmora	Officer - Management Informatio	Kasungu District Council	0999551488	Wwellingtonmmora@gmail.com
17	Joseph Mwera	DRS	Department of Roads	0999333688	josephmwera@gmail.c
18	James Mathiya	District Youth Officer	Department of Youth	0995509453	jamesmathiya@gmail.c
19	Sophlet Chimbeleko	Clerk Officer	Treasury	0996583744	

20	Vincent Khonje	District Information Officer	Information Department	0999947168	vkhonje@gmail.com
21	Misolo Alex	Administrative	Standard Bank	0888671341	alexander.misolo@st

	Name	Position	Department / Organization	Phone Number	E-Mail address
		Officer			dardbank.mw
22	D.Kachilonda	Head of Programs	Plan International	0992768637	daffukachilonda@plani
23	Clackin Nyasulu	DRHO	Housing Department	0888644788	lacksonnyasulu@yahoo
24	Davie Mwale	Hospital Administrator	Kasungu District Hospital	0997343610	siphomwale@yahoo.co
25	Matias Gondwe	District Forestry Officer	Department of Forestry	0999298880	matgondwe@gmail.co
26	Masautso	ADMO	DCCMS	0881945886	zabulamp@yahoo.c
27	Sam Kamalonda	Social Welfare Officer	Department of Social	0994882123	Smocky17@yahoo.com
28	Adams Lupale	Program Manager	Good Neighbors (NGO)	0991519158	adamlupale@gmail.co
29	Benrad Chanachi	District Community Development Officer	Community Development	0999478703	chanachebenard@yaho o.com
30	Warren Ndhlovu	Assistant District Agriculture Development	Ministry of Agriculture	0884310011	warrenndhlovu@gmail. com
31	David Zopangana	Supervisor	MTC	0111967573	zopanganadavid@yaho
32	Levison Makombe	DIO	OPC	0884154474	
33	M. Chitsamba	Prison D/O	Prison	0888373006	
34	Clifford	Program	CSCB	0999072320	
35	Loveness Bango	HTC Counselor	Banja La Mtsogolo	0997373336	
36	Rose Chindebvu	Field Officer	CADECOM	0999691887	rosechindebvu@gmail.
37	Andrew Mandolo	Land Surveyor	Survey Office	0999450282	andrewmandolo@gmai
38	Gerald	DEO	NICE	0999255178	
39	Limited Mwango	DM	FPAM	09992295751	
40	Francis Chiwanga	DC	CEYCA	0999688964	
41	Cecilia Banda	Administrative Officer	NASFAM	0995444380	cecilia.banda@nasfam.
42	Kelvin Mtantho	PO	PASI	0999311272	kelvinmtantho@gamil.
43	Erick Nema	DPF	Kasungu District Council	0995586653	
44	Josophine Chintengo	Assistant public consultations expert		0993121044	josochintengo@gmail.com
45	G. Mkweza	FTO	Pump Aid	0999695868	gautimkweza@gmail.co
46	Blessings Mzingwitse	Senior Traffic Officer	Kasungu Police	0993629131	
47	James	Administrative	Good Health	0999426663	mulindajames@yah

	Name	Position	Department / Organization	Phone Number	E-Mail address
		officer	Organization		com
48	Doreen Phiri	ACLO	Ministry of Trade	0999616962	phiridoreen@gmail.co
49	Joshua Thom	Lands Officer	Lands	0999359844	joshuathom@gmail.co
50	Richard Mjuweni	DPC	National Registration	0999147698	
51	Alex	Chairperson	MEJN	099876939	
52	Olive Panyanja	District Labour Officer	Labour	0999285554	Olive.panyanja@yahoo,
53	A.R. Kalazi	DEC	Kasungu District Council	0999094210	

2.0 Opening Remarks

The meeting started with a word of prayer thereafter participants were asked to introduce themselves. The meeting was chaired by Mr Kaphuka, Director of Planning and Development for Kasungu District Council. The chairperson welcomed all the participants and urged them to actively participate in the deliberations. Later, the chairperson invited the representative from Roughton International in association with Wataya Consulting Engineers to make his presentation.

3.0 Presentation on the Road Project

Mr Kanjedza started by thanking the management of Kasungu District Council for making it possible for the meeting to be convened on short notice. He later indicated that the objectives of the presentation were two-fold: Firstly, to inform the Kasungu District Executive Committee about the M1 Road project which is in the design phase; and secondly, to get input from members of the committee on issues that should be considered in the planning, design and implementation of the proposed project.

In his presentation Mr Kanjedza indicated that the Government of Malawi, through the Roads Authority intends to rehabilitate a 234 km stretch of road starting at the M1/Kamuzu International Airport (KIA) turn-off to the Mzimba/Boma turn-off on the M1. Further, informed the gathering that COMESA through the Road Authority (RA) awarded Roughton International Ltd in association with Wataya Consulting Engineers Ltd (Malawi) and African Economic Group (Malawi) the contract to prepare an ESIA and a Resettlement Action Plan (RAP) for the proposed road upgrade project. He indicated that the Road will be upgraded so that it is wider enough for safe travel for all road users including cyclists and pedestrians.

Later, Mr Kingsley Wataya gave a presentation on detailed rehabilitation works that will be done on the road. He indicated that the horizontal alignment is adequate for the proposed design speed and it is unlikely that significant changes to the horizontal realignment will be required.

Further he indicated that in sections that have been heavily damaged, there will be total re-construction. In addition, he indicated that the road project will be split into three homogenous sections for design purposes and for tendering, namely:

Section 1-KIA turn-off to Kasungu (before BP Filling Station): 100.2 km;

Section 2-Kasungu to Jenda: 62.0 km; and

Section 3-Jenda to Mzimba turn-off: 71.6 km.

4.0 Issues Raised for Consideration

Sector/Name	Issue raised	Response
Mr L. Njobvu, District Aids Coordinator	How does the project intend to reduce risks of HIV transmission due to the presence of migrant workers on the project?	The project will endeavor to ESMPloy most of the unskilled laborers' from within the project site as these will be operating from their houses; in addition the project will liaise with District AIDS Coordinator to give periodic talks on AIDS to the workers; AIDS awareness materials (Information, Education and Communication) and Condoms will be made available to workers.
Mr. Duff Kachilonda from PLAN Malawi	It was recommended that PLAN International should also be given time to give a talk to the contractor on the issue of child protection, as the implementation of the project will disturb the flow of their programmes that PLAN international is implementing in the 47 km stretch of the M1 Road in Kasungu District.	Recommendation will be included in the ESIA Report.
	Traditional leaders in the area be consulted and engaged as to reduce cases of vandalism of property.	The recommendation will be included in the Environmental and Social Management plan
Mr Levison Makombe, Office of the president and Cabinet	Which part of the road will be rehabilitated, is it the outer road, the inner road or both?	The outer Road (the road that does not pass through the town centre).
Erick Nema, Kasungu District Council	Will people whose property will be affected by the project be compensated or not since they encroached the road reserve?	People whose property will be affected by the project will be compensated. The details of the affected people and their property will be include in the Resettlement Action Plan for the project
Anne Salama; Monitoring and Evaluation Officer for Kasungu District Council	Raised concern on the durability of most of the road projects in the country. It was proposed therefore that the design of the road should be good to ensure durability.	The consultants indicated that there are a number of factors that contribute to durability of the road. Sometimes the design could be good but the resources for the proposed design may be inadequate. Sometimes the durability is poor because there is laxity by the supervising consultants. Roughton International indicated that they are going to come up with a good design that will make the road durable however the project may be subjected to other factors that Roughton may not have control over.

Sector/Name	Issue raised	Response
Francis Chiwanga, representative from one of the Non-Governmental Organizations	Will the design of the road accommodate for climbing lanes?	Roughton indicated no climbing lanes will be in the design as the number of trucks re to low to justify the cost.
Anne Salama(Kasungu DC); Mr. Duff Kachilonda from PLAN Malawi	Most of the contractors in Road construction are international not local, why is it so?	Most of the projects are advertised internationally and those that succeed are based on merit i.e. good technical proposals.
James Mulinda; from Good Health	Recommended that if the proposed design for the Road would be too expensive it is better to develop the road in phases to suit the budgetary allocation rather than constructing a road with poor durability.	Roughton indicated that the recommendation is well taken and it will be up to the Roads Authority to make a decision.

5.0 Conclusion

The Project is good as it gives the district an opportunity to improve its road network and make travelling easy, provide safe walkways for pedestrians, reduce accidents that cyclist encountered and parking space for vehicles like trucks and minibuses will be made available.

6.0 Pictorial Coverage of the meeting

Figure 6.1a: Cross section of participants

Figure 6.1b: Cross section of participants

Minutes of the consultation meeting held at Mzimba District Council offices on 12th January 2019

1.0 List of participants

	Name	Position	Department / Organization	Phone Number	E-Mail address
1	Rex Kanjedza	Public Consultation Expert	Roughton International / Wataya Consulting Engineers	0888876595	rexkanjedza@gmail.com
2	Kingsley Wataya	Director	Wataya Consulting Engineers	088889602	otiswataya@yahoo.com
3	Z.W. Mhango	Head teacher	Mzimba secondary school	0888517160	
4	G. Gopani	DIO	Irrigation	088869444	
5	Steve Masoo	DCDO	Gender	088846874	
6	Laston D.G Phiri	DFO	Forestry	088214289	
7	Henry Nkhata	DIO	Information	088885604	
8	Wilfred Chimbayo	S.E	NRWB	088451752	
9	Jonait Ngulube	DIS	M.H.C	088842601	
10	K. W Mkhulu	DWDO	Water	088866295	
11	Lilian Chimphepo	EDO	Environment	088889090	
12	Evelyn Mwelebanda	M & E	COIDA	088861301	
13	Modester	PO	COIDA	088871003	
14	Samuel Nkhata	Accounts	COIDA	088854617	
15	Jolly Mulima	MPC	MPC	088838477	
16	Haward Msewa	DMO	MET	088279310	
17	S.S Kalinde	DIO-OPC	OPC-MB	088493374	
18	Clement Mseteka	Stu-Manager	M.C. Radio	088457921	
19	Y.J Kazembe	DRS	P. Works	088853688	
20	John Chipeta	Building Foreman	Rural Health	0999123360	
21	Sopani Shaba	BELIFA/ADMI	BELIFA	088867818	
22	Pauline H. Masekese	Project Officer	Mzuzu CCJP	099961892	
23	Q.J Masina	GD.O	Police	088886648	
24	Loyness Gumbo	Magistrate	Judiciary	099541845	
25	Tiwonge Mwakalenga	District Supervisor	MEDF	0999309756	
26	James Pelani	DFO	Fisheries	088855489	
27	Jackson Chimowa	Rehab Officer	MACOHA	088832189	
28	Chimwemwe	ACLO	OVOP	099521297	
29	Omk Banda	Commissioner	CCJP	088106990	
30	Martin Mazunda	P.O	PASI	088111643	
31	Frank Mfune	DAC	M`belwa D. Crunes	099936619	
32	K. Kkhata	ADR	DRO-MDC	099927941	
33	Precious Nkoka	Acting Program	World vision	0993251327	
34	Cecilia Mhone	CPW	DSWO	088856892	
35	Kondwani Ndambi	HTC Coordinator	TOVWIRANE	0999032845	
36	Funny Glory Chumbi	Project Officer	Church Society	088869378	
37	Lucy Muyafula	DLO (Lands)	MDC	088191242	

38	Sunday Kondowe	LA	Youth	0888008765	
39	M. Nyironga	F.O	CCJP	088859928	

	Name	Position	Department / Organization	Phone Number	E-Mail address
40	Amon V. Sibande	CARER MW	CARER MW	099937807	
41	LE Mvula	DEM	EDU (S)	099993834	
42	LAP. Munthali	DADO	AGRIC	088839376	
43	John Nyondo	ST	COIDA	088423473	
44	Albert Chidembo	Project Officer	CCJP	099912337	
45	A. Msimuko	D. Secretary	CCJP. Mzuzu	088839388	
46	Dofinas W. Ndodo	ASS	MDC	099971901	
47	Moses Manda	ADCEO	NICE	099960043	
48	Jones Moyo	COIDA	ED	099619391	
49	John Chirwa	The Nation	Reporter	088803982	
50	Cleaversen Nyando	DOW	MDC	088832281	
51	Vamani Nyirenda	Journalist	ZBS	099934371	
52	Moses Mwakhiwa	Immigration Officer	Immigration	0881791853	
53	Kelvin Tembo	Journalist	Capital Radio	088424789	
54	Michael Mwachilale	IA	MDC	088167015	
55	Dan Phiri	OYM	Labour	088413076	
56	RKM. Mutali Mhone	DLO	Labour	01342269	
57	Josophine Chintengo		Assistant public consultation	0993121044	josochintengo@gmail.com

2.0 Opening Remarks

The meeting started with a word of prayer thereafter participants were asked to introduce themselves. The chairperson welcomed all the participants and urged them to actively participate in the deliberations. Later, the chairperson invited the representative from Roughton International in association with Wataya Consulting Engineers to make his presentation.

3.0 Presentation on the Road Project

Mr Kanjedza started by thanking the management of Mzimba District Council for making it possible for the meeting to be convened on short notice. He later indicated that the objectives of the presentation were two-fold: Firstly, to inform the Mzimba District Executive Committee about the M1 Road project which is in the design phase; and secondly, to get input from members of the committee on issues that should be considered in the planning, design and implementation of the proposed project.

In his presentation Mr Kanjedza indicated that the Government of Malawi, through the Roads Authority intends to rehabilitate a 234 km stretch of road starting at the M1/Kamuzu International Airport (KIA) turn-off to the Mzimba/Boma turn-off on the M1. Further, informed the gathering that COMESA through the Road Authority (RA) awarded Roughton International Ltd in association with Wataya Consulting Engineers Ltd (Malawi) and African Economic Group (Malawi) the contract to prepare an ESIA and a Resettlement Action Plan (RAP) for the proposed road upgrade project. He indicated that the Road will be upgraded so that it is wider enough for safe travel for all road users including cyclists and pedestrians.

Later, Mr Kingsley Wataya gave a presentation on detailed rehabilitation works that will be done on the road. He indicated that the horizontal alignment is adequate for the proposed design speed and it is unlikely that significant changes to the horizontal realignment will be required. Further he indicated that in sections that have been heavily damaged, there will be total re-construction. In addition, he indicated that the road project will be split into three homogenous sections for design purposes and for tendering, namely: Section 1-KIA turn-off to Kasungu (before BP Filling Station): 100.2 km; Section 2-Kasungu to Jenda: 62.0 km; and Section 3-Jenda to Mzimba turn-off: 71.6 km.

4.0 Issues Raised for Consideration

Sector/Name	Issue raised	Response
Mr. C Nyando; the DOW	Is it possible to change the road alignment? As the current one tends to cause a lot of accidents.	No it is not possible as the project is only to rehabilitate the road such that it is unlikely that realignment will be required.
Mr. S Masoo; the DCDO	What measures have been put in place to address issues of Gender, HIV and the Environment due to the presence of migrant workers in the project site?	The project will endeavour to employ most of the unskilled labourers' from within the project site as these will be operating from their houses; in addition the project will liaise with District AIDS Coordinator to give periodic talks on AIDS to the workers; AIDS awareness materials (Information, Education and Communication) and Condoms will be made available to workers.
		In areas where trees will be cut down reforestation will take place. And in cases were burrow pits will be created the contractor will rehabilitate the pits before leaving. In-terms of gender, the contractor will be recommended to be gender balance even though in most cases relating to construction women are less likely to get attracted than men.
Mr. F Mfune; the DAC	Will the road be finished especially in Mzimba? As there are many road projects in the area that never been completed	Concern taken and will be forwarded to the right people, however take note that funding for the project is yet to be sourced.
Mr. K.W Mkhulu; the District water development officer	Time period when the project will start after the briefing at the council?	Latest known time is September
	How will the offices of the council be involved with the implementation of the project?	The office of the District Commissioner will be actively involved in the monitoring of the implementation of the environmental Management Plan-This will come out clearly in the Environmental Management and Monitoring Plan that will be developed.
	How much money was allocated to the feasibility study?	The approximate cost can be estimated to be one hundred and fifty United States dollars.

Sector/Name	Issue raised	Response
Z.W Mhango; Head teacher of Mzimba secondary school	Recommended that there is need to change the perspective of government in-terms of the people that live far from the road area in relation to compensation, as these are indirectly affected through gully formation that form due to the contractor sourcing gravel to be used for the project.	Recommendation well noted. This will be incorporated in the RAP that will be developed
Mr. G. Gopani; the DIO	Recommended that the council be consulted on where the camp site of the contractor can be located and on the type of materials that will be used to build structures, as these can be later used as schools when the project is done.	Recommendation well taken.
	Will widening of the road not cause more accidents?	One of the negative impacts of improving the road is that accidents will take place however, there is need to propose mitigation measures as to lessen the number of accidents bound to take place.
	Where will the construction start? Mzimba or Lumbadzi?	The construction will start in the most damaged part i.e. Lumbadzi.
	Recommended that Mzimba be considered in-terms of completing the road and if the road can be completely reconstructed? Most of the roads in the area are not completed.	Mzimba is not the only district facing this problem nonetheless it depends on government to do as recommended.
Mr. W Chimbayo; the S.E	What type of material will be used for resealing?	Malawi has problems when it comes to sourcing materials but laterite is the material proposed for the project. However cement and crusher run aggregate can be used.
	As part of project appraisal, will widening of the road be economical? As most cyclist use the road instead of the shoulders	It is economical as cyclists are not supposed to use the road. In addition to this the diameter estimates are set up by COMESA and since Malawi is one of its member states, it is obliged to use the given standards though in other cases like trading centres the standards have been compromised a little.
	Which of the COMESA options will the government use or will be used?	This will depend on funds that government will get

Sector/Name	Issue raised	Response
Mrs. L Chimphepo; the Environmental District Officer	The EDO recommended that its high time the council has high standards when it comes to development especially with the road project instead of complaining that widening the road will affect cyclist as these are not allowed to road but the shoulders.	Recommendation concurred.
Mr. P Nkoka; the Acting Program Manager	How much coordination efforts are there with other countries that are to also implement the project?	There is no coordination effort among the countries as Malawi is a member of COMESA and so are the other countries implementing the project henceforth COMESA is the one coordinating with the countries; it comes up with the terms of reference and all consultants' report to it.
	Is there any joint coordination among the countries implementing the project when it comes to choosing the COMESA options? (Do nothing, period of 10 years or period of 20 years).	Given the three options, government will opt for the best unfortunately all the parameters will depend on funding gained. As such there is no joint coordination among the countries as they will get funding from different donors.

5.0 Conclusion

The Project is good as it gives the district an opportunity to improve its road network and makes travelling easy, provide safe walkways for pedestrians, reduce accidents that cyclist encountered and parking space for vehicles like trucks and minibuses will be made available.

ANNEXURE C2 –LIST OF STAKEHOLDERS CONSULTED

PREPARATION OF FEASIBILITY STUDIES, DETAILED ENGINEERING DESIGNS AND TENDER DOCUMENTS FOR THE 234 KM KIA TURN-OFF TO MZIMBA TURN-OFF SECTION OF THE M1 IN MALAWI - LIST OF STAKEHOLDERS CONSULTED

This Stakeholder Database has been prepared as part of the public consultation process. Identified stakeholders include government representatives, District Authorities (DAs), Traditional Authorities (TAs) and/or headmen/women, Community Based Organisations (CBOs), NGOs, Client, Consultant and other interested parties.

Nam	Positio	Organisation	Telephone	Email / Address
NATIONAL LEVEL				
Allan Kazimputa	Environmental Manager	Roads Authority		
		Electricity Supply Cooperation of	+(265) 1 773 463	Magetsi House PO Box 768, Lilongwe info@escom.mw
Catherine Moosa	Environmental Officer	Environment Affairs	+(265) 1771 111	Lingadzi House, City Centre, Lilongwe
Joanna Mbeye	Environmental Inspector	Environmental Affairs Department	0991337764 / 0884627722 +(265) 1771 111	mbeyejoanna@yahoo.co.uk Private Bag 394 Lilongwe 3
Abell Mhango	Planning and Implementation	Malawi Telecommunications Limited	+(265) 111 968	Abell.Mhango@mtl.mw
J. Brian Chisi		Department of Physical	099 444 7232	chisibrian@gmail.com
Salima Phiri		Department of Forestry	0888 185 254	Capital Hill, Headquarters
Peter Chilumanga	Chief Mining Engineer	Department of Mines	0888 862 887	peterchilumang@gmail.com
P. Kaliba		Department of Antiquities	0999 208 288	pkaliba@yahoo.com PO Box 264, Lilongwe, 3
E. Gomani Chindevu		Department of Antiquities		PO Box 264, Lilongwe, 3
Dunstan Matekenya		National Statistical Office	991 373 300	dmatekenya@gmail.com
DISTRICT LEVEL				
Linda Lungu	District Elections Clerk	Malawi Electoral Commission	0997931605	lindalungu@gmail.com
Leonard Siula	Service Centre Manager	National Bank of Malawi	0999950615	lsiula@nationalbank.mw

Rocky Hausi	District Educational Manager	Ministry of Education	0888340591	rockyhausi@yahoo.co.uk

Nam	Positio	Organisation	Telephone	Email / Address
Lucius Njobvu	District Aids Coordinator	Kasungu District Council	0888176388	njobvulucius@yahoo.com
Keniard Banda	Marketing Officer	SACCO	0881779782	bkenird@gmail.com
Davie Chigwenembe	District Public Works Officer	Kasungu District Council	0888357071	daviechigwenembe@yahoo.com
M.J. Chimtsimbo	Scheme Manager	Central Region Water Board	0997290737	chimtsimbo@yahoo.com
Ben Mitochi	District Environmental Health Officer	District Health Office	0999930517	mitochiben@yahoo.com
Wellington Mmora	Management Information Services	Kasungu District Council	0999551488	Wwellingtonmmora@gmail.com
Joseph Mwera	DRS	Department of Roads	0999333688	josephmwera@gmail.com
James Mathiya	District Youth Officer	Department of Youth	0995509453	jamesmathiya@gmail.com
Clackin Nyasulu	DRHO	Housing Department	0888644788	lacksonnyasulu@yahoo.com
Davie Mwale	Hospital Administrator	Kasungu District Hospital	0997343610	siphomwale@yahoo.co.uk
Matias Gondwe	District Forestry Officer	Department of Forestry	0999298880	matgondwe@gmail.com
Masautso Phiri	ADMO	Department CCMS	0881945886	zabulamp@yahoo.com
Sam Kamalonda	Social Welfare Officer	Department of Social Welfare	0994882123	Smocky17@yahoo.com
Benrad Chanachi	District Community Development	Community Development	0999478703	chanachebenard@yahoo.com
Warren Ndhlovu	Assistant District Agriculture Development	Ministry of Agriculture	0884310011	warrenndhlovu@gmail.com
M. Chitsamba	Prison District Officer	Prison	0888373006	M. Chitsamba
Andrew Mandolo	Land Surveyor	Survey Office	0999450282	andrewmandolo@gmail.com
Blessings	Senior Traffic Officer	Kasungu Police	0993629131	
Harrid Mkono	Monitoring and Evaluation Officer	Dowa District		
Hopson P. Sosola	AOOF	Dowa DC office	0999375957	hopsonsosola@gmail.com
Cheukani Madeya	Councillor	Chiwere East (Dowa District)	0999722929	
Georgina Chunga	Councillor	Mponela Ward (Dowa District)	0991747194	
Martin Luka	Council Chair	Msakambewa East (Dowa	0999702388	Martinlukaphiri01@gmail.com
Lephas Kafumbula	Council vice Chair	Dzoole Northward (Dowa	0991383149	
Jeremoti M. Jmbe	Councillor	Chakhaza SW Ward (Dowa	0994863233	
Brecious Mageni	Councillor	Msakambewa West (Dowa	0993033817	
Madalo Dzukia	Councillor	Dzoole South (Dowa District)	0884110956	
Racheal M. Meke	Councillor	Chakhaza South (Dowa	0996101618	
Sam Kawale	Member of Parliament	Dowa North East	0999600345	skawale@gmail.com

Nam	Positio	Organisation	Telephone	Email / Address
Lufeyo Malodza	Councillor	Mkukula East (Dowa District)	0999443082	
Inkosi Chiwere	Traditional Authority	Dowa East	0999928111	
F. Sidira	Dowa District Environmental Officer	Environment Affairs	0999123129	sidirafrancis@yahoo.co.uk
Vincent Gunde	Reporter	FM 101 radio	0999043905	vincentgunde@gmail.com
P.R Kachitifu		Rural Housing (Dowa District)	0997704290	
Ellis Tembo	Director of Public Works	Dowa District	0995616501	ellisdpw@yahoo.com
Frank Kamchacha	Reporter	Information (MANA)	0881269828	frankkamchacha@gmail.com
Albert Kumwenda	SALRCO	Agriculture	0999823418	albertkumwendabd@gmail.com
Deborah Mushali	Forestry Officer	Dowa District	0999271956	mushalidebora@yahoo.co.uk
J.F.K Manda	Irrigation Officer	Dowa District	0999615073	jacksonmanda@yahoo.com
Fannie Msimuko	District Commissioner	Dowa District Council	0999238589	fmsimukos@gmail.com
Cecilia Chimbuzi	Human Resources Officer	Dowa District Council	0991273330	ceciliac1986@gmail.com
Emmmanuel	Director of Planning and Development	Dowa District Council	0884526199	ebulukutu@gmail.com
Earnest Kaphuka	Director of Planning and Development	Kasungu District Council	0888142981	
Anne Salama	Monitoring and Evaluation Officer	Kasungu District Council	0999309076	anniesalama@yahoo.com
Linda Lungu	District Elections Clerk	Malawi Electoral Commission	0997931605	lindalungu@gmail.com
Leonard Siula	Service Centre Manager	National Bank of Malawi	0999950615	lsiula@nationalbank.mw
Rocky Hausi	District Educational Manager	Ministry of Education	0888340591	rockyhausi@yahoo.co.uk
Lucius Njobvu	District Aids Coordinator	Kasungu District Council	0888176388	njobvulucius@yahoo.com
Keniard Banda	Marketing Officer	SACCO	0881779782	bkenird@gmail.com
Davie Chigwenembe	District Public Works Officer	Kasungu District Council	0888357071	daviechigwenembe@yahoo.com
M.J. Chimtsimbo	Scheme Manager	Central Region Water Board	0997290737	chimtsimbo@yahoo.com
Ben Mitochi	District Environmental Health Officer	District Health Office	0999930517	mitochiben@yahoo.com
Doris Mabeti	Clerk Officer	Kasungu District Council	0888129084	
Paul Phiri	Messenger	Kasungu District Council		
Boyd Banda	Messenger	Kasungu District Council		
Wellington Mmora	Management Information Services	Kasungu District Council	0999551488	Wwellingtonmmora@gmail.com
Joseph Mwera	DRS	Department of Roads	0999333688	josephmwera@gmail.com
James Mathiya	District Youth Officer	Department of Youth	0995509453	jamesmathiya@gmail.com

Nam	Positio	Organisation	Telephone	Email / Address
Sophlet Chimbeleko	Clerk Officer	Treasury	0996583744	
Vincent Khonje	District Information Officer	Information Department	0999947168	vkhonje@gmail.com
Misolo Alex	Administrative Officer	Standard Bank	0888671341	alexander.misolo@standardbank.
D.Kachilonda	Head of Programs	Plan International	0992768637	daffukachilonda@planinternational
Clackin Nyasulu	DRHO	Housing Department	0888644788	lacksonnyasulu@yahoo.com
Davie Mwale	Hospital Administrator	Kasungu District Hospital	0997343610	siphomwale@yahoo.co.uk
Matias Gondwe	District Forestry Officer	Department of Forestry	0999298880	matgondwe@gmail.com
Masautso Phiri	ADMO	DCCMS	0881945886	zabulamp@yahoo.com
Sam Kamalonda	Social Welfare Officer	Department of Social Welfare	0994882123	Smocky17@yahoo.com
Adams Lupale	Program Manager	Good Neighbors (NGO)	0991519158	adamlupale@gmail.com
Benrad Chanachi	District Community Development	Community Development	0999478703	chanachebenard@yahoo.com
Warren Ndhlovu	Assistant District Agriculture Development	Ministry of Agriculture	0884310011	warrenndhlovu@gmail.com
David Zopangana	Supervisor	MTC	0111967573	zopanganadavid@yahoo.com
Levison Makombe	DIO	OPC	0884154474	
M. Chitsamba	Prison D/O	Prisons	0888373006	
Clifford Kachali	Program Manager	CSCB	0999072320	
Loveness Bango	HTC Counsellor	Banja La Mtsogolo	0997373336	
Rose Chindebvu	Field Officer	CADECOM	0999691887	rosechindebvu@gmail.com
Andrew Mandolo	Land Surveyor	Survey Office	0999450282	andrewmandolo@gmail.com
Gerald Chirwa	DEO	NICE	0999255178	
Limited Mwango	DM	FPAM	09992295751	
Francis Chiwanga	DC	CEYCA	0999688964	
Cecilia Banda	Administrative Officer	NASFAM	0995444380	cecilia.banda@nasfam.org
Kelvin Mtantho	PO	PASI	0999311272	kelvinmtantho@gamil.com
Erick Nema	DPF	Kasungu District Council	0995586653	
Josophine	Assistant public consultations expert		0993121044	josochintengo@gmail.com
G. Mkweza	FTO	Pump Aid	0999695868	gautimkweza@gmail.com
Blessings	Senior Traffic Officer	Kasungu Police	0993629131	
James Mulinda	Administrative officer	Good Health Organization	0999426663	mulindajames@yahoo.com

Nam	Positio	Organisation	Telephone	Email / Address
Doreen Phiri	ACLO	Ministry of Trade	0999616962	phiridoreen@gmail.com
Joshua Thom	Lands Officer	Lands	0999359844	joshuathom@gmail.com
Richard Mjuweni	DPC	National Registration Bureau	0999147698	
Alex Chinunda	Chairperson	MEJN	099876939	
Olive Panyanja	District Labour Officer	Labour	0999285554	Olive.panyanja@yahoo,com
A.R. Kalazi	DEC	Kasungu District Council	0999094210	
Z.W. Mhango	Head teacher	Mzimba secondary school	0888517160	
G. Gopani	DIO	Irrigation	0888694441	
Steve Masoo	DCDO	Gender	0888468744	
Laston D.G Phiri	DFO	Forestry	0882142898	
Henry Nkhata	DIO	Information	0888856049	
Wilfred Chimbayo	S.E	NRWB	0884517526	
Jonait Ngulube	DIS	M.H.C	0888426013	
K. W Mkhulu	DWDO	Water	0888662953	
Lilian Chimphepo	EDO	Environment	0888890908	
Evelyn Mwelebanda	M & E	COIDA	0888613011	
Modester Mwakaswaya	PO	COIDA	0888710030	
Samuel Nkhata	Accounts	COIDA	0888546174	
Jolly Mulima	MPC	MPC	0888384777	
Haward Msewa	DMO	MET	0882793101	
S.S Kalinde	DIO-OPC	OPC-MB	0884933744	
Clement Mseteka	Stu-Manager	M.C. Radio	0884579212	
Y.J Kazembe	DRS	P. Works	0888536883	
John Chipeta	Building Foreman	Rural Health	0999123360	
Sopani Shaba	BELIFA/ADMIN	BELIFA	0888678189	
Pauline H. Masekese	Project Officer	Mzuzu CCJP	0999618927	
Q.J Masina	GD.O	Police	0888866480	
Loyness Gumbo	Magistrate	Judiciary	0995418452	
Tiwonge	District Supervisor	MEDF	0999309756	

Nam	Positio	Organisation	Telephone	Email / Address
James Pelani	DFO	Fisheries	0888554892	
Jackson Chimowa	Rehab Officer	MACOHA	0888321898	
Chimwemwe Kumwenda	ACLO	OVOP	0995212979	
Omk Banda	Commissioner	CCJP	0881069908	
Martin Mazunda	P.O	PASI	0881116439	
Frank Mfune	DAC	M`belwa D. Crunes	0999366196	
K. Kkhata	ADR	DRO-MDC	0999279413	
Precious Nkoka	Acting Program Manager	World vision	0993251327	
Cecilia Mhone	CPW	DSWO	0888568922	
Kondwani Ndambi	HTC Coordinator	TOVWIRANE	0999032845	
Funny Glory Chumbi	Project Officer	Church Society	0888693784	
Lucy Muyafula Kabaghe	DLO (Lands)	MDC	0881912420	
Sunday Kondowe	LA	Youth	0888008765	
M. Nyironga	F.O	CCJP	0888599285	
Amon V. Sibande	CARER MW	CARER MW	0999378079	
LE Mvula	DEM	EDU (S)	0999938343	
LAP. Munthali	DADO	AGRIC	0888393767	
John Nyondo	ST	COIDA	0884234733	
Albert Chidembo	Project Officer	CCJP	0999123376	
Â. Msimuko	District Secretary	CCJP. Mzuzu	0888393888	
Dofinas W. Ndodo	ASS	MDC	0999719016	
Moses Manda	ADCEO	NICE	0999600434	
Jones Moyo	COIDA	ED	0996193910	
John Chirwa	The Nation	Reporter	0888039825	PO Box 30312, Lilongwe wvkayira@yahoo.co.uk
Cleaversen Nyando	DOW	MDC	0888322819	loismbewe@yahoo.com
Vamani Nyirenda	Journalist	ZBS	0999343714	anniesalama@yahoo.com
Moses Mwakhiwa	Immigration Officer	Immigration	0881791853	

Nam	Positio	Organisation	Telephone	Email / Address
Kelvin Tembo	Journalist	Capital Radio	0884247895	phiridoreen@gmail.com
Michael Mwachilale	IA	MDC	0881670155	joshuathom@gmail.com
Dan Phiri	OYM	Labour	088413076	
RKM. Mutali Mhone	DLO	Labour	01342269	
Paulo Mumba	Villager	Chimwaza Trading Centre	0995134641	
Agnes Ntaya	Villager	Ntuluka	0999663813	
Aness Phiri	Villager	Ntuluka	0994099528	
Jayilosi Chipingasi	Villager	Jilatenga	0995567622	
Yohane Alikanjelo	Villager	Chimwaza Trading Centre	0995217858	
Uliya Chisinga	Villager	Mphepo	0996624205	
Felix Potifala	Villager	Lile	0996783622	
Mcluph Lungu	Villager	Dickson	0888390774	
Youngstone Shawa	Villager	Chimwaza Trading Centre	0996877796	
Evelyn Khoma	Villager	Chengaukhwele	0997807645	
Lucial Zenga	Villager	Chimwaza Trading Centre	0995656794	
MchengaKachingwe	Villager	Chimwaza Trading Centre	0999689564	
Kafuwu Lire	Villager	Chimwaza Trading Centre	0999039398	
Masucani	Villager	Chimwaza Trading Centre	0995951138	
Kankumbi	Villager	Chimwaza Trading Centre	0992105872	
Lazalo	Villager	Chimwaza Trading Centre	0999655235	
Edwin Chatsalira	Villager	Chimwaza Trading Centre		
Flexible	Villager	Mwale	0993653301	
Lizo Kafasi	Villager	Chimwaza Trading Centre	0999267346	
Dicho Saya	Villager	Chimwaza Trading Centre	0999801722	
Gracian Kamiuro	Villager	Chimwaza Trading Centre	0999148337	
Bom Dzuwa	Villager	Chimwaza Trading Centre	0994812185	
Zagwazatha Kajawa	Villager	Chimwaza Trading Centre	0995354088	
Theresa Black	Villager	Chilatenga		

Felesi Mangani	Villager	Chimwaza Trading Centre	0999393272	

Nam	Positio	Organisation	Telephone	Email / Address
Christina Banda	Villager	Chimwaza Trading Centre	0881229200	
B. Jolijo	Villager	Mchengawa	0999458044	
* Eleson Dzuwa	Villager	Mtuluka	0995486948	
* GVH. Dickson	Villager	Chimwaza Trading Centre	0999125200	
Hastings Chirwa	Villager	Jenda Trading Centre	0995657048	
Charles Theu	Villager	Jenda Trading Centre	0991340674	
Seke	Villager	Jenda Trading Centre	0993842035	
Patrick	Villager	Zebera	0885185420	
Joseph Mapiri	Villager	Chidowure	0993226626	
Esau Msuku	Villager	Mwarimo		
Edwin Yirenda	Villager	Kapopo	0884648511	
Wiston	Villager	Nkhata	0885810621	
Frank K.	Villager	Jenda Trading Centre	0999531016	
Mbapapi	Villager	Jenda Trading Centre	0884346621	
Bosco Botia	Villager	Jenda Trading Centre	0996023394	
Madalitso	Villager	Jenda Trading Centre	0993195129	
Edward Chisi	Villager	Jenda Trading Centre	0884009334	
Khumbo Ngwira	Villager	Jenda Trading Centre	0991011891	
Elias Ndhlovi	Villager	Jenda Trading Centre	0882494069	
Booker Kauli	Villager	Jenda Trading Centre	0997377675	
Blessings Mchoma	Villager	Champhira Trading Centre	0881992340	
George Q. Moyo	Villager	Bode H Champhira	0999439076	
Kutabo	Villager	Nguluwe		
Mutey	Villager	Bandaba	0888620134	
Christopher Muula	Villager	Kang`oma		
Foster Ngwenya	Villager	Jenda Trading Centre		
Rodrick Nhlema	Villager	Jenda Trading Centre		
Fletcher Mwenda	Market Chair	Jenda Trading Centre		

Robertson Phiri	Villager	Jenda Trading Centre		

Nam	Positio	Organisation	Telephone	Email / Address
Framasco Phiri	Chairman	Jenda Trading Centre		
Langi Myirongo	Villager	Jenda Trading Centre		
Musalile Mtila	Villager	Jenda Trading Centre		
Gilbert Myigha	Villager	Jenda Trading Centre		
Raphael Saquata	Villager	Jenda Trading Centre		
Hambe Kamanga	Villager	Jenda Trading Centre		
Lyson Moyo	Villager	Jenda Trading Centre		
Lucky Sambo	Villager	Jenda Trading Centre		
Alfred Ganizan Nyirongo	Villager	Jenda Trading Centre		
Kellness Nkhata	Villager	Jenda Trading Centre		
Ucizi Chirwa	Villager	Jenda Trading Centre		
David Phiri	Villager	Jenda Trading Centre		
Anastasia Matanda	Villager	Jenda Trading Centre		
Loniry P. Ngonzo	Villager	Jenda Trading Centre		
Chimwemwe Ngozo	Villager	Jenda Trading Centre		
Geturudi Nzimba	Villager	Jenda Trading Centre		
Nailess Mwale	Villager	Jenda Trading Centre		
Lindya Banda	Villager	Jenda Trading Centre		
Rute Sakata	Villager	Jenda Trading Centre		
Aphat Jafati	Villager	Jenda Trading Centre		
Tikambirane Nkhata	Villager	Jenda Trading Centre		
Zakeyo Phiri	Villager	Jenda Trading Centre		
Tiwonge Ndhlovu	Villager	Jenda Trading Centre		
Rute Nyirenda	Villager	Eyiti		
Mjeluzge Nyirongo	Villager	Jenda Trading Centre		
Chidokiso Theu	Villager	Jenda Trading Centre		
Nation Kamanga	Villager	Jenda Trading Centre		
Joji Nyirenda	Villager	Jenda Trading Centre		
Yolamu K. Mtonga	Revenue collector	Jenda Trading Centre		

Nam	Positio	Organisation	Telephone	Email / Address
Ali Umali	Villager	Lumbadzi Trading Centre	0996312248	
Nelson B. Kazembe	Villager	Lumbadzi Trading Centre	0992606096	
Elias Benati	Villager	Lumbadzi Trading Centre	0884861799	
Yakobe Walasi	Villager	Lumbadzi Trading Centre	0999008543	
Yohane Shema	Villager	Lumbadzi Trading Centre	0995217747	
Maxwell M. Kananji	Villager	Lumbadzi Trading Centre		
Gamali Mwale	Villager	Lumbadzi Trading Centre	0993727334	
Vincent J. Tchuma	Villager	Lumbadzi Trading Centre	0881544773	
Dolika Phiri	Villager	Lumbadzi Trading Centre	0999213309	
Limbikani	Villager	Lumbadzi Trading Centre	0993594584	
Kachere	Villager	Lumbadzi Trading Centre	0993402601	
Frolence	Villager	Lumbadzi Trading Centre	Not available	
Wilson	Villager	Lumbadzi Trading Centre	0999024488	
Mai Ngosi	Villager	Lumbadzi Trading Centre	09991353347	
Malita	Villager	Lumbadzi Trading Centre	Not available	
Mtisunge	Villager	Lumbadzi Trading Centre	0999711775	
Eunice	Villager	Lumbadzi Trading Centre	Not available	
Mai Kawawa	Villager	Lumbadzi Trading Centre	0999047577	
Mai Ndandala	Villager	Lumbadzi Trading Centre	0999213309	
Mai Harrison	Villager	Lumbadzi Trading Centre	0884277463	
Mai Mkumbira	Villager	Lumbadzi Trading Centre	Not available	
Edward Batoni	Villager	Lumbadzi Trading Centre	Not available	
Chifuniro Kaudzu	Villager	Lumbadzi Trading Centre	Not available	
Chisomo Bester	Villager	Lumbadzi Trading Centre	08843309593	
Andisani	Villager	Lumbadzi Trading Centre	0885430177	
Blessings Charles	Villager	Lumbadzi Trading Centre	0999475041	
Man Elenesito	Villager	Lumbadzi Trading Centre	0992481278	
William Jere	Villager	Lumbadzi Trading Centre	0999284045	
Gostino Phiri	Villager	Lumbadzi Trading Centre	0997710531	

Nam	Positio	Organisation	Telephone	Email / Address
Jacob Phiri	Villager	Lumbadzi Trading Centre	0993541212	
Lyton Chinyama	Villager	Lumbadzi Trading Centre	0996004059	
Macloud Gunde	Villager	Lumbadzi Trading Centre	088887704	
Peter Nzengeza	Villager	Lumbadzi Trading Centre	0995257487	
Jafali Ajida	Villager	Lumbadzi Trading Centre	0991913822	
Samson Banda	Villager	Lumbadzi Trading Centre	0995577387	
Keneth	Villager	Lumbadzi Trading Centre	0999870036	
Jurias	Villager	Lumbadzi Trading Centre	0999638951	
Deano	Villager	Lumbadzi Trading Centre	0991402188	
Gadabwali	Villager	Lumbadzi Trading Centre	0991305466	
Peter Chilombo	Villager	Lumbadzi Trading Centre	0995991875	
B. D. Phiri	Councillor	Lumbadzi Trading Centre	0993631844	
Issac P. Kachala	Villager	Lumbadzi Trading Centre	0997396821	
Jameson Chibwe	Villager	Lumbadzi Trading Centre	0884604604	
Chisomo James	Villager	Lumbadzi Trading Centre	0995251088	
Chisomo Bakali	Villager	Lumbadzi Trading Centre	0996106173	
Martin Phiri	Villager	Lumbadzi Trading Centre	Not available	
Blessings Glyn	Villager	Lumbadzi Trading Centre	0995713114	
Mrs Benard	Villager	Lumbadzi Trading Centre	Not available	
Mcowen Banda	Madisi Ward Councillor	Madisi Trading Centre	0999298834	
Dorothy Msumani	Villager	Madisi Trading Centre		
Tiyamike Kalimbira	Villager	Madisi Trading Centre	0995527868	
Juma J.C Chisawa	Villager	Madisi Trading Centre		
R.L Kamwamba	Villager	Madisi Trading Centre		
M. Kamsali	Villager	Madisi Trading Centre	0999780982	
Chikapa	Villager	Madisi Trading Centre	0994117804	
F.I Malata	Villager	Madisi Trading Centre		
Efrieda Yohane	Villager	Madisi Trading Centre	0994240320	

Eliza	Villager	Madisi Trading Centre		

Nam	Positio	Organisation	Telephone	Email / Address
Malita Jemusi	Villager	Madisi Trading Centre		
Michael Jonas	Villager	Madisi Trading Centre		
Tonex Chirwa	Villager	Madisi Trading Centre	0998787570	
Jonah Masasa	Villager	Madisi Trading Centre	0996956083	
B. Lambulila	Villager	Madisi Trading Centre	0999143719	
Nelson	Villager	Madisi Trading Centre	0888549805	
Yankho Shop	Villager	Madisi Trading Centre	0999212150	
Limbikani Chilinga	Villager	Chopuma	0993224182	
Alick Khomani	Villager	Madisi Trading Centre	0998337897	
Misheck	Villager	Madisi Trading Centre	0996566710	
Marko Yotamu	Villager	Madisi Trading Centre	0995453515	
Karonga Shawa	Villager	Madisi Trading Centre		
Chango Melana	Villager	Madisi Trading Centre	0999557525	
P. Mdzonzi	Villager	Madisi Trading Centre	0995407750	
Emurani Ibrahim	Villager	Madisi Trading Centre	0997553668	
Mr. Chikoti	Villager	Madisi Trading Centre	0993544518	
Mdzukulu	Villager	Madisi Trading Centre	0996246038	
Richard Chinkhwaya	Villager	Madisi Trading Centre		
Joseph Moto	Villager	Madisi Trading Centre	0999320796	
Tunghay Nghay	Villager	Madisi Trading Centre	0998801111	
Mabvuto Aggabu	Villager	Madisi Trading Centre	0999078702	
Josephy Phiri	Villager	Madisi Trading Centre		
Ambassador Shop	Villager	Madisi Trading Centre	0997358572	
A.M Katema	Villager	Madisi Trading Centre	0999336448	
Georgina Chunga	Mponela Villager	Mponela Ward Councillor	0991747194	
Moses Fulumila	Mponela Villager	Mponela market south east	0884765441	
Dyson Banda	Mponela Villager	Mponela market south east	0999333825	
Precious Kambuzi	Mponela Villager	Chakhaza north west	0995165488	

Allan Kaziputa	Mponela Villager	Jemusi	0888639441	

Nam	Positio	Organisation	Telephone	Email / Address
Darlington Harwi	Chairman of Business Committee	Mponela Trading Centre	0888366277	
V.M Chikuma	Mponela Villager	Mponela Trading Centre		
Kanyalo Chipeni	Mponela Villager	Mponela Trading Centre	0999736995	
Fumisa Biziazi	Mponela Villager	Mponela Trading Centre	0999679517	
Stiinel M. Banda	Mponela Villager	Mponela Trading Centre	0994005080	
Wayiso	Mponela Villager	Mponela Trading Centre	0888553590	
Stanley Mayembe	Mponela Villager	Mponela Trading Centre	0888040168	
Robert Chilunjika	Mponela Villager	Mponela Trading Centre	0884219500	
Ibrahim Major	Mponela Villager	Mponela Trading Centre	0996556002	
Hardwell Chithumba	Mponela Villager	Mponela Trading Centre	0995359809	
Haward Dzuwa	Mponela Villager	Mponela Trading Centre	0999143398	
Banda Samuyere	Mponela Villager	Mponela Trading Centre	0999473315	
Harrison Ngozo	Mponela Villager	Mponela Trading Centre	0999773196	
Kelvin Njali	Mponela Villager	Mponela Trading Centre	0888602005	
Salani Dzimbiri	Mponela Villager	Mponela Trading Centre	0999170705	
Mndolo J.	Vice Chair of Business Committee	Mponela Trading Centre	0999416185	
Mike Magawa	Secretary	Mponela Trading Centre	0888319420	
Johon Xasco	Mponela Villager	Mponela Trading Centre	0999928225	
Nelson Thandaza	Mponela Villager	Mponela Trading Centre	0999688699	
Rose Chipenjele	Mponela Villager	Mponela Trading Centre	0999307788	
Rose Kankhumbwa	Mponela Villager	Mponela Trading Centre	0999404034	
Dorica Suntche	Mponela Villager	Mponela Trading Centre	0992890590	
Adamu Galita	Mponela Villager	Mponela Trading Centre	0992468494	
Francis Machero	Mponela Villager	Mponela Trading Centre	0999143388	
Mbela Binali	Mponela Villager	Mponela Trading Centre	0999308775	
Allan Kalilamake	Mponela Villager	Mponela Trading Centre	0881310870	
Amos Nkhoma	Mponela Villager	Mponela Trading Centre	0999398306	
Joji Gasiya	Mponela Villager	Mponela Trading Centre	0999300873	

Ediwadi	Mponela Villager	Mponela Trading Centre	0996142238	

Nam	Positio	Organisation	Telephone	Email / Address
Adamu Bwanali	Nkhamenya Villager	Nkhamenya Trading Centre	0999125480	
Jessie Mkandawire	Vice secretary	Nkhamenya Trading Centre		
Mzamu Bilhim	Nkhamenya Villager	Nkhamenya Trading Centre	0999485710	
Ivy Moyo	Nkhamenya Villager	Nkhamenya Trading Centre	0999470932	
Smartson Mussi	Nkhamenya Villager	Nkhamenya Trading Centre	0996808476	
K.A Chiwalaphiri	Nkhamenya Villager	Nkhamenya Trading Centre	0991559947	
M. Nyirenda	Nkhamenya Villager	Nkhamenya Trading Centre	0995630604	
Ali Banda	Nkhamenya Villager	Nkhamenya Trading Centre	0999875420	
YohanESMPata	Nkhamenya Villager	Nkhamenya Trading Centre	0888678185	
Luscious	Nkhamenya Villager	Nkhamenya Trading Centre	0999415580	
Rashidi Banda	Nkhamenya Villager	Nkhamenya Trading Centre	0998879656	
Noel Kakwela	Nkhamenya Villager	Nkhamenya Trading Centre	0888851616	
Mapopa Bornface	Nkhamenya Villager	Nkhamenya Trading Centre		
S.K. Phiri Chiwera		Muunguti Location	0999670725	
S. Shaiba		Mchenga Location		
Lameck Banda		Mchenga Location	0995293696	
Grecian Banda	Nkhamenya Villager	Nkhamenya Trading Centre	0888825037	
Noel Nyindu	Nkhamenya Villager	Nkhamenya Trading Centre	0993370965	
Mark A. Moyo	Nkhamenya Villager	Nkhamenya Trading Centre	0994703384	
Anastasia Lupaka		Mudima road		
Grace Kumwenda		Filling Location	0998389723	
Chrissie Chigowani		Mbvunguti Location	0881198461	
Zamadula Jere		Mudima road Location		
D.E Mwale	Villager	Mikuyu Location		
Y. Phiri Viyombo	Villager	Butcha Location	0993717930	
Kondwani Chipeta	Villager	Mchenga Location		
E. Banda		Shallowells Team	0884539205	
Stalin Shaba		CADECOM - ZM	0991914561	

Nam	Positio	Organisation	Telephone	Email / Address
D. Kachilonda	Head of Programs	Plan International	0992768637	daffukachilonda@planinternational
Adams Lupale	Program Manager	Good Neighbours (NGO)	0991519158	adamlupale@gmail.com
G. Mkweza	FTO	Pump Aid	0999695868	gautimkweza@gmail.com
James Mulinda	Administrative officer	Good Health Organization	0999426663	mulindajames@yahoo.com
PROJECT				
Robert Geddes	Project Manager	Roughton International		rgeddes@cdsafrica.com
Kingsley Wataya	In-country Director	Wataya Consulting Engineers	088889602	otiswataya@yahoo.com
Melissa Moffett	Environmental / Social	Specialist Roughton	+(27)825714842	melissa@africanlitany.co.za
Rex Kanjedza	Public Consultation / Social Specialist	Roughton International / Wataya	0888876595	rexkanjedza@gmail.com