

Environmental and Social Impact Assessment for the proposed rehabilitation of Kacheche to Chiweta Section of the M1 Road, Rumphi District in Malawi



FINAL DRAFT

Report Prepared by

The Roads Authority



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Environmental and Social Impact Assessment for the proposed rehabilitation of Kacheche to Chiweta Section of the M1 Road, Rumphi District in Malawi

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SRK Project Number 490005/1

Executive Summary

Introduction and background

In April 2015 the World Bank Group (WBG) approved funds to improve Malawi's road infrastructure with the focus on the M1 Road, which is the backbone of Malawi's road network and facilitates trade between Tanzania with South Africa.

SRK Consulting (South Africa) (Pty) Ltd (SRK) in collaboration with Vineyard Consulting were appointed by the Malawi Road Authority (RA) to undertake an Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for the upgrade and widening of a 66.5 km portion of the M1 road between Kacheche to Chiweta. The project is estimated at MK 36.19 billion (USD 47,000,000) and is estimated to commence as soon as the ESIA Report and tendering process has been approved.

The proposed project will comply with in-country legal requirements and align with the World Bank Environmental and Social Framework (2016) which lists 10 Environmental and Social Standards for Investment Project Financing.

This report and its findings reflects final design information from March 2019.

Project description

The M1 road between Kacheche and Chiweta currently consists of two 3 m wide surfaced lanes with gravel shoulders varying in width on either side of the road. The design engineer's intention is to increase this width to two 3.4 m wide surface lanes with 2 m wide gravel shoulders, including a 0.3 m width for rounding.

The final design information from March 2019 was considered in this ESIA. It is anticipated that the contractor will be provided with an opportunity to tender by September 2019, after which construction will commence. The intention of the Malawi Roads Authority is to select a contractor by March 2018, after which construction planning will commence. Construction is expected to be completed in two years.

The location of construction infrastructure such as construction camps, laydown areas, and borrow-pits will be finalised once a contractor has been appointed prior to commencement of construction. It is likely that power supply during construction will be provided by ESCOM. Skilled and unskilled labourers will be used during the construction phase, the total estimated work force is over 1200 workers in all phases of the project.

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 involuntary 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. In addition, the magnitude of the project is expected to trigger some of the World Bank Environmental and Social Safeguard Policies more especially the Environmental Assessment Policy.

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.

Summary of Potential Positive and Negative Impacts and their Enhancement and Mitigation Measures

The rehabilitation of the section of the M1 Road between Kacheche and Chiweta in Rumphi district 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;

Potential Positive and their Enhancement

Improved international and regional access due to improvement of the M1 with associated national and regional economic benefits (cumulative)

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 neighboring countries such as Tanzania and Zambia;
- Open up previously untapped tourism areas, thus affording local communities business opportunities, tourism opportunities through enhanced access;
- Enhance local and regional trade;
- 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 in shorter time periods

Employment Opportunities for Local Community Members including Women

Road construction activities are a source of employment both for the local community and the specialized 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.

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.

Potential Negative Impacts and their Mitigation Measures

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;
- 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

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.

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

Risk of increased HIV, STD and other infectious diseases

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

Loss or degradation of subsistence agricultural habitat and related ecological processes during construction;

- Organise awareness meetings with local leaders and people in the project area to stop people from farming along the road reserve
- Start construction works immediately after crops have been harvested

Labour influx;

- Employ more people from surrounding communities

Damage to properties due to clearing of land and earthworks

- Identify and value the property and land affected
- Organise meetings with local leaders and property owners
- Compensation the affected people

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

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

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;

Increased dust and vehicle emissions impacting on adjacent land users during operation

- 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

Cumulative Impacts

Although the project is unlikely to give rise to many cumulative impacts, the road upgrade will contribute to high sediment loads in watercourses in the study area. However, this impact is likely to be low given the limited geographic and temporal scale of the project. The improvement of the M1 road, is likely to have a number of economic and safety impacts. The improvement of the road is likely to have moderate positive impact to the Southern African region as a whole, and Malawi in particular. However, the road improvements are also likely to contribute to increased ribbon development as well as lead to a greater volume of traffic. The combined effect of increased density along the road and higher traffic flows will increase the risk of road accidents, resulting in human injury and mortality. The road related impacts are deemed to be of moderate significance.

Monitoring

The Roads Authority will implement an ongoing monitoring programme during pre-construction, construction and operation of the road to ensure that the management measures stipulated in the ESIA, and conditions set out in the relevant environmental permits, are complied with and implemented. The road construction contractor will, on behalf of the RA, need to regularly monitor air quality, biodiversity, water quality, cultural heritage and occupational health and safety.

Conclusion and recommendations

The project team is of the opinion that the upgrade of the M1 road can proceed provided that the RA only widens the road by 3.4 m on either side, and that recommendations for mitigation and monitoring as set out in the ESIA are followed.

It is recommended that the environmental and social management plan be revised once the contractor has been appointed and the construction methodologies has been confirmed.

It is further recommended that the RA work with other governmental departments and neighbouring countries to manage impacts associated with increased international access due to improvement of the North South Corridor and other cumulative impacts in the project area, notably those that affect Lake Malawi as the final receiving environment in the catchment.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by The Malawi Roads Authority (RA). The opinions in this Report are provided in response to a specific request from RA to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AADT	Annual Average Daily Traffic
ADC	Area Development Committee
Aol	Area of Influence
AQG	Air Quality Guideline
ART	Antiretroviral Therapy
AWS	Automatic Weather Station
BATNEEC	Best Available Technology Not Entailing Excessive Cost
BID	Background Information Document
CAD	Computer Aided Design
CBD	Central Business District
CoBD	Convention on Biological Diversity
CBO	Community Based Organisation
CDC	Centre for Disease Control and Prevention
CHSP	Community Health and Safety Plan
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade of Endangered Species of Wild Fauna & Flora
CNDP	National Congress for the Defence of the People
CO	Carbon Dioxide
CR	Critically Endangered
CRR	Comment and Response Report
CSD-18	Commission on Sustainable Development
DC	District Council/ District Commissioner
DEC	District Executive Committee
DLHRD	Department of Land, Housing and Rural Development
EAD	Environmental Affairs Department
EAP	Environmental Assessment Practitioner
EcAP	Economically Active Population
ECO	Environmental Control Officer
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environment Management Act
ESMU	Environmental and Social Management Unit of the Roads Authority
EN	Endangered
EP's	Equatorial Principles
EPC	Engineering, Procurement and Construction
EPFI	Equator Principles Finance Institutions
EPIII	Equator Principles III
ESIA	Environmental and Social Impact Assessment

ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GMP	Grievance Management Procedure
GoM	Government of Malawi
GPS	Global Positioning System
GVH	Group Village Headmen
HDI	Human Development Index
HFO	Heavy Fuel Oil
HIV	Human Immunodeficiency Virus
IAS	Invasive Alien Species
IBMS	Integrated Biodiversity Management System
ICERD	International Convention on the Elimination of All Forms of Racial Discrimination
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IHS3	Third Integrated Household Survey
IISD	International Institute for Sustainable Development
ILO	International Labour Organization
ISO	International Organisation for Standardization
ITU	United Nations agency for information and communication technologies
IUCN	International Union for Conservation of Nature
IVSC	International Valuation Standards Council
JICA	Japan International Cooperation Agency
Km	Kilometer
LFP	Labour Force Participation
LRP	Livelihood Restoration Plan
m/s	Metres per second
Mamsl	Metres above mean sea level
MAP	Mean Annual Precipitation
MBS	Malawi Bureau of Standards
MD	Mzimba District
MEA	Millennium Ecosystem Assessment
MGDS II	Malawi Growth and Development Strategy II
MKW	Malawi Kwacha
MRP	Mitigation and Rehabilitation Plan
MSDS	Material Safety Data Sheets
MV	Market Value

NBSAP I	National Biodiversity Strategy and Action Plan
NBSAP II	National Biodiversity Strategy and Action Plan II
NCE	National Council for the Environment
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NGO	Non-governmental Organization
NMT	Non-Motorised Transport
NO2	Nitrogen Dioxide
NSC	North-South Corridor
NSO	National Statistical Office
OECD	Non-Organization for Economic Co-operation and Development
PAP	Project Affected People
PCP	Preliminary Closure Plan
PM	Particulate Matter
PS	Performance Standard
PSI	Primary Sphere of Influence
RA	Roads Authority
RAP	Resettlement Action Plan
RD	Rumphi District
RFM	Resettlement Management Framework
RPF	Resettlement Policy Framework
RRB	Road Reserve Boundary
SADC	Southern African Development Community
SANS	South African National Standard
SAPP	Southern African Power Pool
SATTFP	Southern African Trade
SDP	Sustainable Development Plan
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
SO2	Sulfur Dioxide
SRK	SRK Consulting (South Africa) (Pty) Ltd
STI	Sexually Transmitted Infection
TA	Traditional Authority
TCE	Technical Committee on the Environment
TFCA	Transfrontier Conservation Area
TFR	Total Fertility Rate
TOR's	Terms of Reference
UKAID	United Kingdom Aid
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNCBD	United Nations Convention on Biological Diversity

UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on the Environment
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nation's Forum on Forests
UNFRA	United Nations Population Fund
UNGC	United Nations Global Compact
UNICEF	United Nations International Children's Emergency Fund
UNPF	The United Nations Population Fund
VC	Vineyard Consulting
VDC	Village Development Committees
VIP	Ventilation Improved Pit
VU	Vulnerable
WBG	World Bank Group
WB ESF	World Bank Environmental and Social Framework
WHO	World Health Organisation
WMP	Waste Management Plan

1 Introduction and Scope of Report

1.1 Background of the project

In April 2015 the World Bank Group (WBG) approved a US\$69 million credit to help improve, amongst other issues, Malawi's road infrastructure. The program will focus on the M1 Road which is the backbone of Malawi's road network and includes an upgrade and widening of the Kacheche - Chiweta Road. The Malawi Roads Authority (RA) is a quasi-government body which was established in 2006 with a mandate to ensure that public roads are continually maintained and rehabilitated.

SRK Consulting (South Africa) (Pty) Ltd (SRK) in collaboration with Vineyard Consulting were appointed by the Malawi Road Authority (RA) (Contract No. RA/CON/14/19) to undertake an Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for the upgrade and widening¹ a 66.5 km portion of the M1 road between Kacheche to Chiweta in Malawi, hereafter referred to as the "project". However, due to the differing timeframes of the ESIA and RAP, the final RAP will be submitted in a separate stand-alone document. This report and its findings are therefore based on preliminary engineering design information and will be updated when final engineering design information becomes available.

As a result of the different timelines of completion for the ESIA and RAP Framework are compiled as separate stand-alone documents. The ESIA and RAP has been documented in separate stand-alone reports mainly due to the differing timeframes of their completion. This report documents the ESIA process but provides an outline of the RAP process and how it aligns with the ESIA process. The ESIA includes an Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan and fulfils the requirements of Malawi environmental laws and regulations and the policies and standards of the World Bank.

1.2 Project applicant

The applicant for this project is the Malawi Roads Authority. The relevant contact person is:

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1.3 Purpose and objectives report

The purpose of the report is to present the ESIA to:

- Comply with Malawi in-country regulations;
- Align with requirements contained in the policies, standards and relevant sector guidelines of
- WBG, specifically the WB Environmental and Social Framework (2016);
- Present a detailed biophysical and socio-economic baseline;
- Present an environmental and social impact assessment;
- Propose appropriate mitigation and management measures; and
- Propose an appropriate environmental and social monitoring plan.

The ESIA is undertaken to ensure that the environmental and social consequences of the project are fully understood, and impacts are adequately managed. The ESIA covers construction and operation phases of the road rehabilitation.

¹ The road upgrade its broader meaning including the widening of the road (road and shoulders), repair and resurfacing, vertical and horizontal alignment, improvement and repair of drainage infrastructure, construction / upgrade of other infrastructure (e.g. bridges), signage and embankment protection, as well as rehabilitation of construction activities.

1.4 Geographical setting

The section of the M1 Road to be upgraded is situated in the Northern Region of Malawi between the Kacheche turnoff to Chiweta near Lake Malawi. Figure 1 shows the locality of the road in relation to major towns, districts and traditional authority jurisdiction boundaries. A 1:50 000 map of the road is contained in Appendix A.

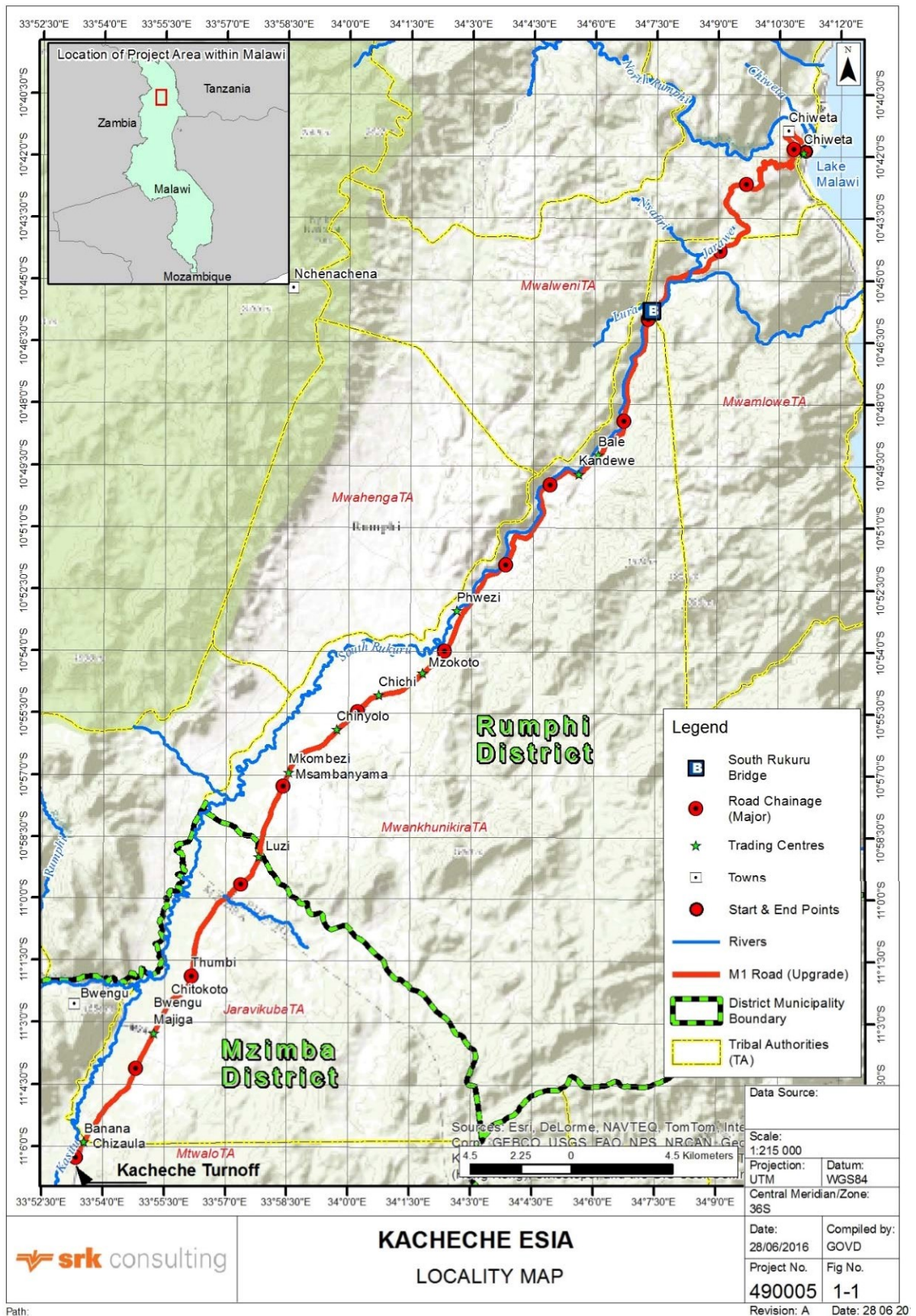


Figure 1: Road locality in relation to towns, districts and traditional authority boundaries

1.5 Project team

Team members have been selected based on their experience in similar types of assignment. Key to their selection is the following attributes:

- The project team leader is a local consultant registered with the Malawi Environmental Affairs Department (EAD), with extensive project experience in Malawi;
- The project team has extensive experience in conducting ESIA and ESMPs for similar projects in the region that meet in-country requirements as well as international policies, standards and guidelines;
- The social expert has extensive experience in social research, baseline surveys Social Impact Assessments (SIAs) and RAP processes; and

The project civil engineer is highly experienced in civil works including road construction. He will provide input into the engineering design team to identify risks and opportunities and provide technical guidance on environmental design criteria for the road design.

1.5.1 Core Team

Table 1 presents the core team responsible for the day-to-day management of the ESIA process.

Table 1: Core Team

Core Team Member	Role	Organisation	Designation	Qualification	Years' Experience
Chris Mazuwa Chiumia	Team Leader	Vineyard Consulting	Principal Consultant	MSc Environmental Science	12
Darryll Kilian	Technical and Social Review and Quality Assurance	SRK	Project Partner	MA Environmental and Geographical Science	24
Beth Candy	Project Management	SRK	Project Manager	MSc in Environmental Science Honours in Geology	13
Lysette Rothmann-Guest	Project and Stakeholder Engagement Co-ordinator	SRK	Stakeholder Liaison	BL (Hons) Landscape Architecture	27
Grant Theu	Stakeholder Liaison	SRK	Principal Environmental Scientist	BA Environmental Science	11

1.5.2 Specialist and support team

Table 2 and Table 3, respectively, present the specialist and support teams of the ESIA process.

Table 2: Specialist team

Specialist Team Member	Role	Organisation	Designation	Qualification	Years' Experience
Anita Bron	Social Specialist	SRK	Principal Social Consultant	MA Research Psychology	18
Kurt Uderstadt	Civil Engineer	SRK	Principal Civil Engineer	BSc Civil Engineering	27
Xanthe Adams	Integrated Water Management	SRK	Senior Engineer	MSc Science and Engineering (Environmental Engineering specialising in water treatment)	13
Warrick Stewart	Biodiversity	SRK	Principal Environmental Scientist	MSc (Botany: Conservation Planning)	16
William Pierce-Jones	Occupational Health and Safety	Engineering Advice and Services	Health and Safety Consultant	Cape Drafting Centre (Draughting and Structural Steelwork), University of Free State (RiskMAQ 1,2,3)	14

Table 3: Support team

Support Team Member	Role	Organisation	Designation	Qualification	Years' Experience
Vassie Maharaj	Stakeholder Engagement Advisor	SRK	Principal Stakeholder Engagement Consultant	BSc (Biochemistry, Physiology)	19
Keagan Allan	GISCAD	SRK	Senior GIS Specialist	MSc Geographical Science (Cum Laude)	10
Adel Malebane	Resettlement	SRK	Social Scientist	MSc, Development Planning	14
Dhiren Naidoo	Air Quality	SRK	Senior Environmental Scientist	BSc (Hons) Environmental Science	8

2 Project Description

2.1 Motivation for the project

The M1 road is an important corridor in eastern and southern Africa, forming part of a larger North-South Corridor (NSC) running for 3900km from the port city of Dar-es-Salaam in Tanzania to Durban in South Africa.

To support Malawi's national economy, the RA identified the need to improve a 66.5km section of the M1 between Kacheche to Chiweta for the following reasons:

- It is the main north-south arterial road in Malawi;
- It is part of the larger North-South Corridor (NSC) between Tanzania and Durban;
- It links the port in Dar-es-Salaam to Zambia's Eastern Province for transport of agricultural products;
- As an interior country Malawi needs to be well-connected to ports and key cities through good quality roads to help reduce transport costs which are one of the major obstacles to increasing trade and economic growth. Although much of the regional road network is in fair condition, some sections in Malawi and her neighbors are in poor condition; and
- Increased traffic levels, especially from pedestrians and bicycle users have necessitated upgrading of the road since its previous upgrade in 1980-81.

The design objectives of the road will include the following elements:

- Appropriate maintenance and rehabilitation of the pavement to ensure the functional and structural performance thereof for a design period of 15 or 20 years;
- Improvement of the geometric standards of the road in terms of its cross-section and vertical/horizontal alignment;
- Mitigation of pertinent road safety hazards through the widening of the surfaced traffic lanes and shoulders, instituting traffic calming measures and improvement of the alignment to eliminate black spots; and
- Improving the facility's ability to support increased levels of pedestrian, bicycle and other non-motorized traffic in village areas.

2.2 Description of the existing and proposed road

2.2.1 Dimensions of the road

The M1 road between Kacheche and Chiweta currently consists of two 3 m wide surfaced lanes with gravel shoulders varying in width on either side of the road. The design engineer's intention is to increase this width to 2 x 3.4 m wide surfaced lanes with 2 m wide surfaced shoulders, including a 0.3 m width for rounding between km 0 and km 35. Between km 35 and km 66.5 the x-section will be the same save for the shoulders which will be only 1 m wide. The reduced shoulder width is intended to obviate the need to widen very deep cuts and very high fills. (Final Design Report, Civil Planning Group, March 2019. Table 4 provides generalized road width details.

Table 4: Existing and proposed road specifications

Existing Road Specifications	Proposed Road Specifications
<p>Two x 3 m surfaced lanes (6 m) with ~ 1.5 m wide Gravel shoulders with 0.3 m rounding</p> <p>Overall top width ~9.6 m</p> <p>Slopes 1:1.5</p> <p>Overall in situ width 12 m</p>	<p>Two x 3.4 m surfaced lanes (6.8 m) with ~ surfaced shoulders 2 m wide between km 0 and km 35 and 1 m wide between km 35 and km 66.5 with 0.3 m rounding throughout</p> <p>Overall top width 11.4 m (km 0 - km 35) and 9.4 m (km 35 – km 66.5)</p> <p>Slopes 1:2</p> <p>Overall in situ width typically min 15.6 m, but varies</p>

2.2.2 Design of the road

Road specifications will differ slightly for distinct sections of the road. During the first 35 km section from the Kacheche turnoff heading northwards, the road passes through flat to rolling topography. Thereafter the topography is rolling and mountainous. The last 10 km passes through an escarpment which ends at Chiweta on the shores of Lake Malawi.

As a result of the change in topography the upgrade of the road varies between the first 35 km and the remainder of the road. Figure 2 and Figure 3 display a typical cross sections of the two distinct sections of the road.

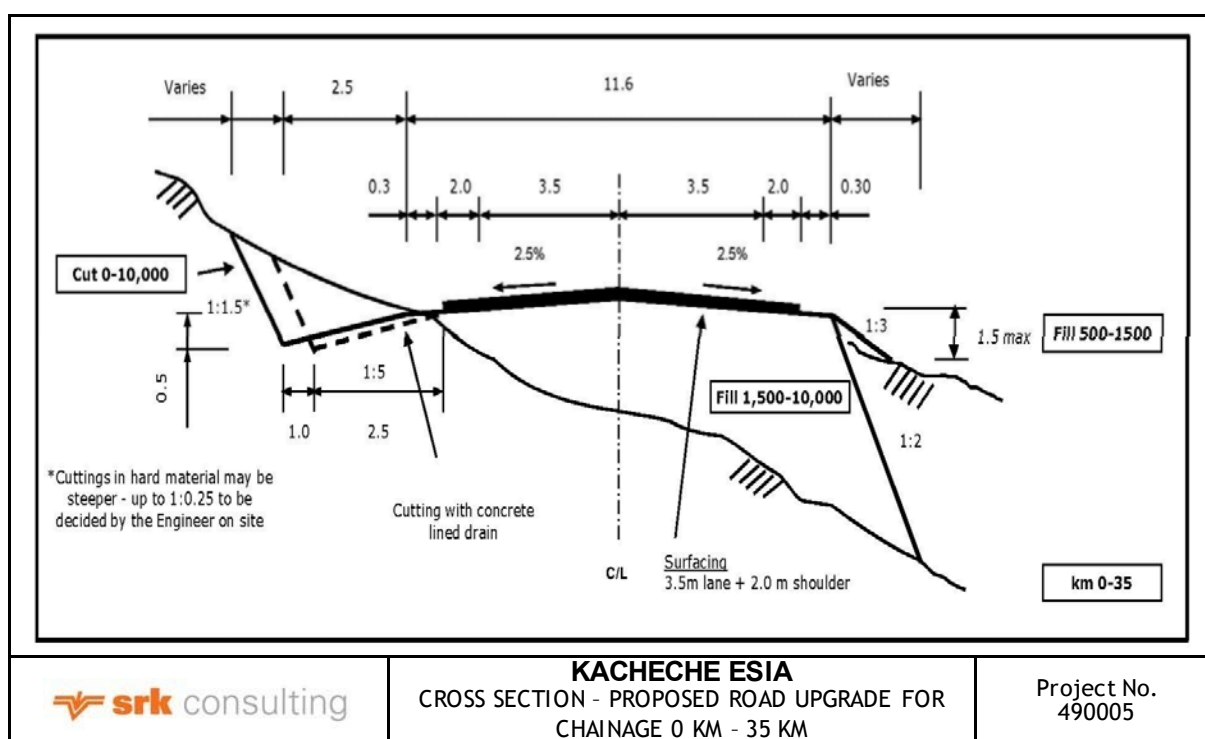


Figure 2: Typical cross section of the proposed road upgrade for chainage 0 km – 35 km

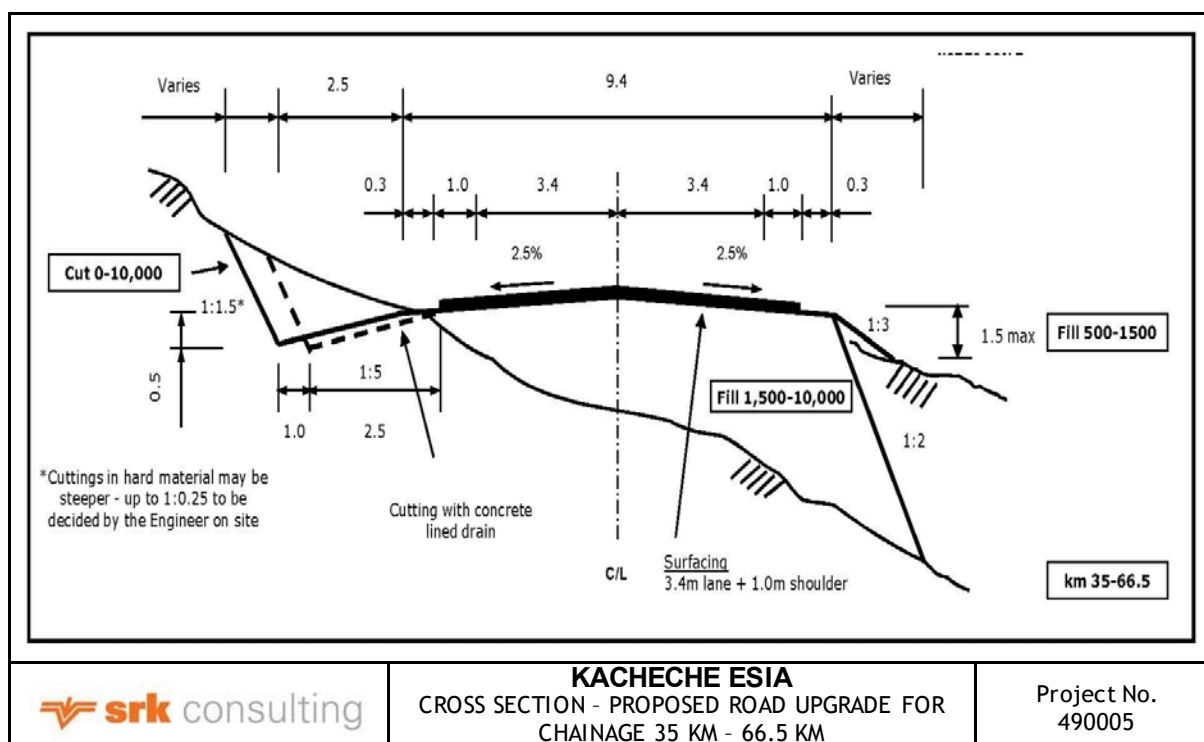


Figure 3: Typical cross section of the proposed road upgrade for chainage 35 km – 66.5 km

2.2.3 Design considerations

The following design considerations are proposed for the widening of the Kacheche-Chiweta section of the M1 road (Civil Planning Group, 2016):

- Increasing road width and the additional shoulder to further reduce pedestrian accidents;
- Reducing road slopes from 1:1.5 – 1:2 to reduce run off velocities minimizing erosion;
- To keep the existing alignment as far as possible, except at chainage 50 km at the Kawelezi Bridge where some straightening is required;
- Standard pavement design with a pavement depth of 800 mm;
- Rehabilitation of the base and subbase layers will be required in some sections;
- Standard guidelines for stormwater drainage have been applied in the final design report and identifies 157 stormwater culverts along the route which may either have to be repaired or replaced; and
- Safety measures along the route comprise of rumble strips at tight corners and on entering village areas. Current signage on the road is limited.

2.3 Project timeframes

Table 5 provides the current activities and corresponding timeframes for the proposed project. Timeframes will only be finalized once the contractor has been appointed. Decommissioning and closure is not addressed in the report as the road is anticipated to be used in perpetuity, with upgrades being conducted from time to time.

Table 5: Project timeframes

Project activities	Expected timeframes
Final road design	March 2019
Selection of contractor	September 2019 – March 2020
Construction	To be confirmed
Operation	To be confirmed
Decommissioning	To be confirmed

2.4 Construction activities

Activities expected during the construction phase are as follows:

- Clearing of vegetation along the extension of the existing road sides to widen the road;
- Cut and fill operations to change the vertical alignment, remove top layer and to facilitate the upgrading of road related infrastructure, including bridges and culverts;
- Excavation of gravel sub layers and other fill materials;
- Construction of contractor camps involving construction of temporary shelters, installation of water and electricity, paving or levelling to accommodate equipment and stores, amongst others;
- Borrow pits, spoil sites and if required, blasting and quarrying;
- Application or drainage of excess water;
- Transportation of soil and construction materials;
- Construction and upgrade of road related infrastructure including bridges, culverts, parking spaces, signs, and other drainage systems;
- Application and compaction of base layer and sub base natural laterite gravel and sub grade layer of any classified material to facilitate road paving and sealing;
- Road paving and sealing;
- Erection of road signage;
- Construction of road shoulders and road drainage and ducting systems;
- Construction of temporary diversion routes or construction of road in half widths (use of “stop and go” flag men);
- Provision of access routes to quarries, water abstraction points and other relevant resources
- Upgrade access routes and coal mines;
- Construction of slope/embankment protection retaining walls;
- Landscaping and rehabilitation of degraded sites including borrow pits and detours;
- Re-vegetation; and
- Site rehabilitation measures including general trimming, shaping, grassing, re-vegetation and hydro-seeding.

2.5 Project infrastructure and services

The road design has been finalized and details associated with construction will only be available once the contractor has been appointed. The information provided below has been informed by the final design report.

Table 6 sets out the infrastructure and services components of the project.

Table 6: Infrastructure and services for the road upgrade

Infrastructure	Description
Construction camps	Temporary construction camp for employees. Expected number in the vicinity of 600
Laydown areas	To be confirmed by contractor's prior to construction
Borrow -pits	Chiskemba km 5.8 : S 11 01.926 E 033 54.653 Chipokababoli km 5.8 : S 11 01.967 E 033 53.056 Chivungulu km 31.1 : S 10 53.442 E 034 01.587 To be finalised once the contractor has been appointed
Quarry	km 18 : S 10 58.714 E 033 58.049. To be finalised once the contractor has been appointed
Temporary roads	Temporary access roads to quarries, borrow -areas, water abstraction points
Water provision	Water supply for construction workers and for the temporary construction camp during construction
Solid waste landfill site	To be confirmed once the contractor has been appointed
Power supply	Expected to be ESCOM – to be confirmed
Storage of construction equipment	At main and satellite construction camps once the contractor has been appointed
Fuel depot	At main camp once the contractor has been appointed
Soil and topsoil stockpiles	Not required once the contractor has been appointed
Sewage treatment infrastructure	To be confirmed once the contractor has been appointed
Waste treatment infrastructure	To be confirmed once the contractor has been appointed
Stormwater infrastructure	To be confirmed once the contractor has been appointed
Employment	Skilled and unskilled labourers will be used during the construction phase. Numbers of labourers and local employment to be confirmed once the contractor has been appointed

3 Project alternatives

No alternatives were considered for the construction of a new road route as the focus of this project is the widening and upgrading of the existing M1 road between Kacheche and Chiweta. Options for selection of a suitable road widening width were considered. The preferred option is to expand the road on either side by 1.5 m.

The general design approach is to keep the existing alignment as far as possible and this was adopted in the preliminary report and maintained in the final design report. The design engineers highlight a problem around chainage 50 km at the Kawelezi Bridge, where some straightening is required.

The preliminary design report prepared by Civil Planning Group (Preliminary Design Report, 2016 and Final Design Report, March 2019) considered a number of pavement mechanistic and construction methodologies as set out below.

3.1 Mechanistic analysis

Three design alternatives have been proposed for the economic analysis on the basis of mechanistic pavement approach. These are shown in Table 7, Table 8 and Table 9 below.

Table 7: Alternative 1

Layer Thickness (mm)	Material Code (TRH 4)	Layer Type	Source	Compaction Requirements	Strength Requirements
40	AC	Hot-mix Asphalt	Quarry	97% MTRD - %VIM	ITS \geq 1000 kPa Dynamic Creep Modulus $>$ 20
150	G1	Base	In-situ & quarry	88 % of ARD	10% FACT \geq 110 kN
200	C3	Subbase	In-situ mixture existing graded crushed stone + underlying in-situ G9-G10 quality	97 % of MADD	UCS : 1.5-3.5 MPa & ITS \geq 250 kPa @ 100 % of MADD; Max agg size: 37.5 mm Max PI after stab : 6 WDD Loss $<$ 20%
150	G9	USSG	In-situ or imported	93 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	LSSG	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	FILL	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD

Table 8: Alternative 2

Layer Thickness (mm)	Material Code (TRH 4)	Layer Type	Source	Compaction Requirements	Strength Requirements
-	S2	Double Seal Surfacing	Quarry	-	ACV Max : 21
150	G1	Base	In-situ & quarry	88 % of ARD	10% FACT \geq 110 kN
200	C3	Subbase	In-situ mixture of 100 mm graded crushed stone + 100 mm in-situ G9-G10 quality	98 % of MADD	UCS : 1.5-3.5 MPa & ITS \geq 250 kPa @ 100 % of MADD; Max agg size: 37.5 mm Max PI after stab : 6 WDD Loss < 20%
150	G9	USSG	In-situ or imported	93 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	LSSG	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	FILL	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD

Table 9: Alternative 3

Layer Thickness (mm)	Material Code (TRH 4)	Layer Type	Source	Compaction Requirements	Strength Requirements
40	AC	Hot-mix Asphalt	Quarry	97% MTRD - %VIM	ITS \geq 1000 kPa Dynamic Creep Modulus > 20
150	G1	Base	In-situ & quarry	88 % of ARD	10% FACT \geq 110 kN
200	C3	Subbase	In-situ 200 mm G9-G10 after modification with lime and stabilisation with cement	98 % of MADD	UCS : 1.5-3.5 MPa & ITS \geq 250 kPa @ 100 % of MADD; Max agg size: 37.5 mm Max PI after stab : 6 WDD Loss < 20%
150	G9	USSG	In-situ or imported	93 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	LSSG	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD
150	G9	FILL	In-situ or imported	90 % of MADD	CBR \geq 7% @ 93 % of MADD

3.2 Construction methodology

It is envisaged that the upgrading of the existing roadway will be executed in the following sequence:

Alternatives 1 and 2:

- Clear and grub road bed and fill slopes for widening of embankment (only in section km 0 – km 35);
- Clear and grub existing gravel shoulder (average of 1 m width);
- Construct widening of fill to a level of 225 mm below final road level;

- Remove existing surfacing to spoil;
- Spread existing crushed stone base evenly across the width of the road prism to a level of 225 mm below final road prism;
- Stabilise 200 mm modified subbase with cement to achieve C3 cementation;
- Import 150 mm graded crushed stone base;
- Construct 150 mm G1 base;
- Prime G1 base with MC 20 prime.

Alternative 1:

- Apply tack coat of SS60 stable-grade anionic emulsion diluted to have a bitumen content of 30% at a nominal rate of 0.5/m²
- Surface with 40 mm thick medium, continuously graded hot-mix asphalt with 9.5 mm bitumen pre-coated rolled in chippings applied at 4.0 kg

Alternative 2:

- Surface with 10.0/9.5 double seal surface treatment.

Alternative 3:

- Clear and grub road bed and fill slopes for widening of embankment;
- Clear and grub existing gravel shoulder (average of 1 m width);
- Construct widening of fill to the level of the underside of existing crushed stone base;
- Remove existing surfacing to spoil;
- Remove graded crushed stone base to stockpile;
- Modify 200 mm subbase with road lime to reduce PI to maximum of 10;
- Stabilise 200 mm modified subbase with cement to achieve C3 cementation;
- Import 150 mm graded crushed stone base;
- Prime G1 with MC 30prime;
- Surface with 19.0/9.5 double seal surface treatment (Alternative 2).

4 Policy and Legal Framework

4.1 Introduction

This section provides an overview of the governance framework (relevant policies, acts and guidelines) applicable to the ESIA. The structure and content of the ESIA is guided by in-country legal requirements and the World Bank policies, standards and guidelines including:

- Relevant Malawi Acts, policies and environmental standards;
- The WBG Environment, Health and Safety (EHS) Guidelines, in particular the updated World Bank Environmental and Social Framework (WB ESF) of 4 August 2016;
- International agreements and conventions adopted by the Government of Malawi; and RA's vision, mission statement and environmental policies, notably the principles in the Environmental and Social and Management Framework and the Resettlement Management Framework.

The scope of the ESIA outlined in this report was developed in accordance with the abovementioned requirements. Where relevant project aspects were not considered by Malawi local legislation, use was made of WB ESF standards and guidelines. The regulatory framework is described in further detail below.

4.2 Policy Framework

4.2.1 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 aim of attaining sustainable development.

4.2.2 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.

4.2.3 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.

4.2.4 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.

4.2.5 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.

4.2.6 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 measures stipulated in the ESMP for proper conservation and management of wildlife are implemented.

4.2.7 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 this provision, this ESIA has been conducted to take care of all ecosystems.

4.2.8 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.

4.2.9 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.

4.2.10 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.

4.3 Laws and Regulations

4.3.1 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.

4.3.2 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.

4.3.3 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 safety and well-being of the workers and general public.

4.3.4 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.

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.

4.3.5 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 asset 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.

4.3.6 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.

4.3.7 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.

4.3.8 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. Rumphi District Council and Mbwelwa Council where the project will be implemented were 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 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.

4.3.9 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.

4.3.10 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 authorized 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, Part 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.

4.3.11 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.

4.3.12 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.

4.3.13 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 licenses 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 an ESIA must be submitted with each application. For large scale exploration and mining, the Minister grants the licenses 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 burrow pits that will be operated.

4.3.14 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 blasting; 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 explosive's magazine in accordance with provisions of the Act; and
- In that event, the project will have to employ an experienced and registered blaster.

4.4 Summary of Project permit requirements

The project will require several permits. Table 10 provides a list of permits required for the project and responsible institutions.

Table 10: List of statutory licenses required for in implementation and operations of proposed project

List of statutory approvals or licenses to be obtained	Legal and regulatory framework	Responsible institution for processing approval or license
Environmental Impact Assessment Certificate	Environment Management Act (1996)	Environment Affairs Department
Workplace Registration Certificate	OSHA (1997)	Ministry of Labor
Planning Permission	The Physical Planning Act No 17 (2016)	Rumphi and Mbelwa District Councils
Waste Management Licence Chemicals Licence	Environment Management Act (1996)	Environment Affairs Department
Approval to dispose of waste	Local Government Act (1998)	Rumphi and Mbelwa District Councils
Mining License	Mines and Minerals Act	Mines Department
Water right for abstraction	Water Resources Act (CAP 72.03)	National Water Resources Authority

4.5 Multi-lateral environmental agreements

Malawi is a party to many international agreements such as on biodiversity, endangered species, and protection of cultural heritage, including:

- RAMSAR convention for the conservation and sustainable use of wetlands;
- Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris (1972);
- Convention on Biological Diversity (Fifth National Report prepared by Malawi in 2014); and
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973).

The project will comply with in-country legislation and the WB ESF

4.5.1 World Bank environmental, health and safety guidelines and safeguard policies

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social standards. The updated framework released in 2016, sets out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects. This is achieved through meeting ten environmental and social standards throughout the project life-cycle, namely:

- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Environmental and Social Standard 2: Labour and Working Conditions;
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management;
- Environmental and Social Standard 4: Community Health and Safety;
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- Environmental and Social Standard 8: Cultural Heritage;
- Environmental and Social Standard 9: Financial Intermediaries; and
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

The World Bank requires that all environmental and social risks and impacts of the project be addressed as part of the environmental and social assessment conducted in accordance with ESS1. ESS2–10 set out the obligations of the Borrower in identifying and addressing environmental and social risks and impacts that may require particular attention.

The purpose of the standards will be to support Borrowers in achieving good international practice relating to environmental and social sustainability. In addition, the standards assist Borrowers in fulfilling their national and international environmental and social obligations and promotes non-discrimination, transparency, participation, accountability and governance. This enhances the sustainable development outcomes of projects through ongoing stakeholder engagement.

For more detail on the World Bank Environmental and Social Framework, refer to the full document on the following link: https://consultations.worldbank.org/Data/hub/files/consultation-template/review-and-update-world-bank-safeguard-policies/en/materials/the_esf_clean_final_for_public_disclosure_post_board_august_4.pdf

Borrowers and projects are also required to apply the relevant requirements of the World Bank Group Environmental, Health and Safety (EHS) Guidelines (2007) and outlined in Table 11.

Table 11: World Bank EHS guidelines, safeguard policies and instruments

Guideline/Safeguard Policy/Instrument	Key element
EHS Guidelines (2007)	
General Guidelines	The Environmental, Health and Safety (EHS) Guidelines document is a reference document with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components. One component that is of importance to this project is the construction section, which is section 4 of this document. This section outlines the measures for specific guidance on prevention and control of community health, environment and safety impacts that may occur during new project developments (IFC, EHS Guidelines, 30 April 2007).
Ambient Air quality	This guideline provides information about common techniques for emission management to avoid, minimize and control adverse impacts to human health, safety and the environment from emissions to air. It also provides an approach to the management of significant sources of emissions, including specific guidance for assessment and management of impacts. It states that the generation and release of emissions of any type should be managed through measures such as energy use efficiency, selection of fuels or other materials, the processing of which may result in less polluting emissions. It provides ambient air quality standards for various pollutants.
Wastewater and ambient water quality	The protection of human health and environment from impacts due to sewage and stormwater. In addition to: <ul style="list-style-type: none"> Prevent runoff from contaminated areas; Install oil water & separators where relevant; Discharge & treat sewage as per local requirements; Where possible, reduce nuisance odours from sewage treatment; Develop a wastewater and water quality monitoring program including quality assurance and control.
Toll Roads	To protect the environment from high erosion and flooding due to higher flows potentially introduced from roads. In addition to: <ul style="list-style-type: none"> Implement stormwater management to reduce peak flows and sediment load and increase infiltration; Monitor and maintain stormwater management systems during operation
Hazardous Materials	To protect health, environment and property by management of any hazardous materials. In addition to: <ul style="list-style-type: none"> Where possible, avoid or minimise the use of hazardous material; Keep a record of all hazardous material on site Train personnel on release prevention; Prepare a spill management plan; Provide some form of prevention or reduction in the risk of overfilling storage containers; Provide impervious, chemically resistant secondary containment when storing
Operating Safeguard Policy	
Environmental Assessment (1998)	Help ensure the environmental and social soundness and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process
Natural Habitats (1998)	Protection, maintenance and rehabilitation of natural habitats. The WB ESF expects project proponents to apply a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.

Guideline/Safeguard Policy/Instrument	Key element
Forestry (1998)	Realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.
Involuntary Resettlement (1990)	Avoid or minimize involuntary resettlement, and where it is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of the project implementation, whichever is higher
Cultural Property (1986)	Assist the preservation of cultural properties, which encompasses both remains left by previous human inhabitants and unique natural environmental features
Safeguard Instruments	
Environmental Assessment Sourcebook (1999)	Provides guidance on procedural requirements and practical aspects of environment assessment in energy and industry projects for the World Bank
World Bank Participation Sourcebook (1996)	Supports participation, by recognizing that there is a diversity of stakeholders for every activity and that those people affected by development interventions must be included in the decision-making process by participatory processes
Disclosure Handbook (2002)	Making operational information available to the public in accordance with World Bank Policy and facilitate the disclosure of all documents that are made publicly available

4.6 International agreements and conventions

The Malawi Government is party to a number of international conventions, treaties and other agreements in the environmental arena. The Millennium Development Goals and Agenda 21 are noted as of particular importance.

4.6.1 Millennium Development Goals

As a member of the United Nations (UN), Malawi aspires towards the Millennium Development Goals, emanating from the international summit held in September 2000, committing the international community as a global partnership to reduce extreme poverty and setting out a series of time-bound targets with a deadline of 2015. Eight goals have been commonly accepted as a framework for measuring development progress. The first six goals are directed at reducing poverty, the seventh to sustainable development, while the eighth, global partnership, is about the means to achieve these.

4.7 Roads Authority vision, mission and environmental policy statement

The RA policy statements state that by the year 2020, the Malawi public road network is to be developed and maintained to a standard where all motorized and non- motorized traffic reach their destination in Malawi in adequate, safe, reliable, efficient, economic and in an environmentally friendly manner during all times of the year. The principles underlining the policy are as follows:

- Comply with the relevant health, safety legislation in accordance with Section 13(d) of the Malawi Constitution and adhere to the environmental best practices for the roads sector;
- Prevent adverse environmental effects of road construction and ensure that the infrastructure itself is environmentally friendly:
 - the inclusion of ESIA and ESMP in the planning of the construction of roads and energy conservation;

- Promote environmental protection and resource conservation;
 - Ensure that roads do not impede drainage and cause water stagnation resulting in water pools that may become breeding places for disease vectors and pathogens;
 - Ensure that drainage outlets do not become the primary sources of erosion; and
 - Promote the use of more energy-efficient and less polluting modes of transport according to Environmental and Social Guidelines.
- Enforce environmental standards and specifications in line with Malawi Bureau of Standards (MBS) – International Standards Organisation (ISO) 14,000 series;
 - Carry out on-site supervision on sites with consultants and contractors to ensure environmental due diligence; and that agreed environmental, health and safety standards designed to reduce associated risks during construction and operation, are being followed;
 - Report on compliance with environmental commitments, the status of the mitigation measures and the results of the monitoring programmes to consultants, contractors, stakeholder and members of the public; and get feedback on the requisite environmental performance information;
 - Develop specified performance indicators to enhance the review of progress in implementing mitigation measures; and where necessary recommending remedial measures; and
 - Conduct training in ESIA and ESMP and provide safe, practical and efficient work procedures to minimise the negative impacts and enhance positive impacts by adopting the precautionary principle; the polluter pays principle and best available technology that entails the least environmental cost (BATNEEC):
 - Prepare and implement environmental risk management and road safety plans;
 - Prepare environmental guidelines and best practices for road construction, maintenance and environmental management for use in the sector; and
 - Compliment activities and endeavors of partners in the Transport Sector like Rail, Aviation and Marine Transport Systems.

The statement provides policy direction and guidance for all roads activities including construction.

4.8 Administrative framework of the ESIA process

The competent authority responsible for approving the ESIA process is the Environmental Affairs Department (EAD). The responsible authority for the RAP process is the Ministry of Lands and Urban Development. As noted, the RAP process is documented in a separate report. The Environmental Management Act (1996) (EMA) sets out the powers, functions and duties of the Director of Environmental Affairs in administering the ESIA process. Figure 4 below illustrates this process.

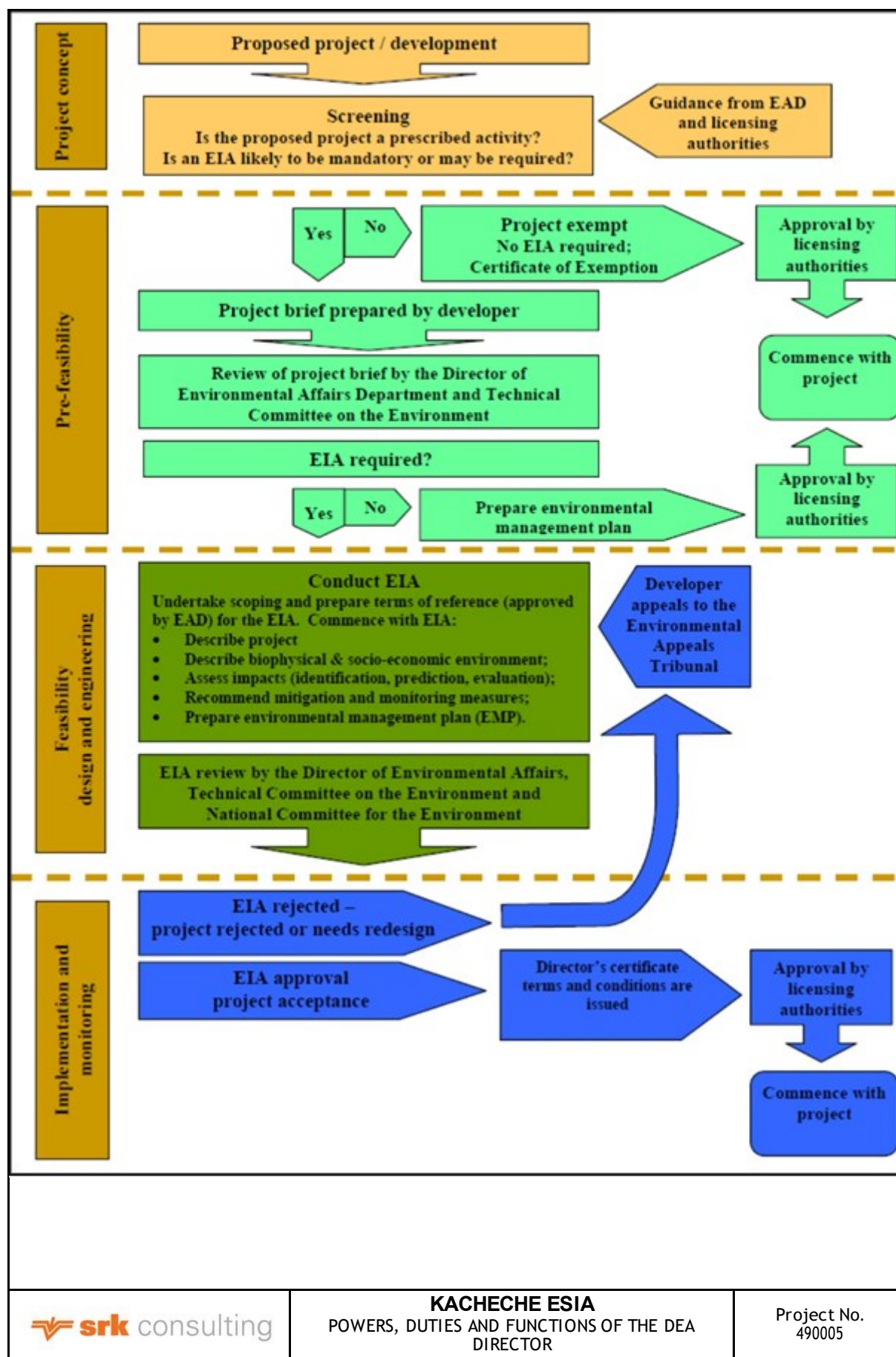


Figure 4: Powers, duties and functions of the Director of the DEA

Section 10 of the EMA 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 ESIA's.

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 EAD issues a certificate stating that an ESIA is not required or on the basis of an ESIA report that he has approved the project. Under the EMA, the DEA is empowered to require changes to a project to reduce its environmental impact and to reject a project if, in their view, it will cause significant and irreparable damage to the environment.

5 ESIA Approach

The ESIA was undertaken in a phased approach comprising project inception, scoping, impact assessment and management planning and disclosure and authority review. The RAP is an integral component of the ESIA process. The detailed RAP process is contained in a separate report, but an overview is outlined below.

5.1 Phasing of ESIA

The ESIA process includes the following phases and timing as set out in Table 12.

Table 12: ESIA phases, tasks and timeframes

Phase	Key Tasks	Timeframe
Project inception	<ul style="list-style-type: none"> Undertake a reconnaissance site visit to the study area Meet with client to confirm roles, responsibilities and inputs Undertake preliminary stakeholder engagement preparation, information needs list and work plan Submit a project inception report Prepare a detailed project description Submit a draft project brief 	July 2016
Scoping	<ul style="list-style-type: none"> Announce the project Prepare stakeholder database Hold scoping consultations with relevant stakeholders Provide a record of consultations Commence specialist investigations 	August/ September 2016
Impact assessment and management planning	<ul style="list-style-type: none"> Prepare ESIA and ESMP Prepare Environmental and Social Monitoring Plan 	October 2016
Disclosure and authority review	<ul style="list-style-type: none"> Review of draft documents by RA Submission of draft ESIA for government review Public disclosure and release of ESIA (RA responsibility) and Non-Technical Summary (NTS) for public comment 	Last quarter of 2016
Final submission of ESIA	<ul style="list-style-type: none"> Submit final ESIA to EAD and relevant government authorities 	First quarter of 2019

5.2 Phasing of RAP

The RAP tasks were integrated into the ESIA process where possible, but due to the differing time frames of the two processes, the RAP is contained in a separate stand-alone report. The RAP process includes the following phases and timing as set out in Table 13.

Table 13: RAP phases, tasks and timeframes

Phase	Tasks	Timeframe
Project inception	<ul style="list-style-type: none"> Undertake a reconnaissance site visit to the study area Meet with client to confirm roles, responsibilities and inputs 	July 2016
Scoping	<ul style="list-style-type: none"> Planning and mobilisation of the RAP team Formulate engagement strategy and RAP engagement structures, i.e. Resettlement Advisory Committee Preparation and undertaking of census and social surveys 	August/ September 2016
Impact assessment and management planning	Commence with the Draft RAP and associated documentation. The RAP is contained in a stand-alone document	October 2016
	Prepare a Final RAP	Mid 2019
Disclosure and authority review	<ul style="list-style-type: none"> Review of draft RAP by RA Submission of draft RAP for government review Public disclosure and release of final RAP 	To be confirmed
Final Submission of RAP	Submit final RAP to competent authority, i.e. the Ministry of Lands and Urban Development	

5.3 Terms of reference for specialist studies

During the inception phase a number of specialist studies were identified to determine the baseline biophysical and socio-economic conditions of the project area, and to identify and predict the effect of potential impacts arising from the project on sensitive receptors. The studies include: air quality, water resources, biodiversity and social including resettlement. In addition, input studies relating to civil engineering and occupational health and safety were undertaken and integrated into the ESIA. These studies were confirmed in meetings with the RA project management and Director of the EAD on 8 July 2016. Terms of reference for the specialist studies were finalized at the start of the scoping phase, and specialist experts were appointed to commence their investigations. Table 14 lists the specialists involved in the project.

Table 14: Project specialists

Specialist Study	Specialist
Air quality	Dhiren Naidoo, SRK Consulting (South Africa) (Pty) Ltd
Water resources	Xanthe Adams, SRK Consulting (South Africa) (Pty) Ltd
Biodiversity	Warrick Stewart, SRK Consulting (South Africa) (Pty) Ltd
Social and Resettlement	Anita Bron, SRK Consulting (South Africa) (Pty) Ltd
Civil Engineering input	Kurt Uderstadt, SRK Consulting (South Africa) (Pty) Ltd
Occupational Health and Safety input	William Pierce Jones, Engineering Advice & Services (Pty) Ltd

To understand baseline conditions, specialists reviewed applicable in-country legislation and WB safeguard requirements and the WB Environmental and Social Framework (2016), made use of existing information, conducted field work and discussions with in-country specialists. Informed by the biophysical and socio-economic environment, specialists identified and assessed impacts of the project and presented suitable management measures to mitigate these impacts. They also provided inputs to the environmental and social monitoring plan. Appendix B contains the terms of reference for each specialist study.

5.4 Assumptions and limitations

The following overarching assumptions are relevant to the project:

- ▮ All the technical data, project description and information provided by the proponent to the Environmental Assessment Practitioner (EAP) and specialists was based on the preliminary design information and updated when the final design report was released in March 2019. Details associated with the construction philosophy will be only be finalised once a contractor has been appointed. The EAP and specialists have identified all possible impacts based on the information provided and these have been assessed and rated accordingly;
- ▮ The stakeholder engagement process for the ESIA and RAP have been integrated as far as possible to make the most efficient use of time and budget. Due to the different time frames for completion of the ESIA and RAP, the RAP is contained in a separate standalone document;
- ▮ The stakeholder engagement process been sufficiently effective in identifying the critical issues that needed to be addressed through specialist investigations and/or by the EAP. Specialist input has thus been appropriately scoped to investigate the critical issues;
- ▮ The stakeholder engagement process has sought to involve key stakeholders and representatives of affected communities. It is assumed that where participation has been sought from the organizational representative/s, that these parties have the authority to comment on behalf of their organisation;
- ▮ All comments received from the authorities are included and considered;
- ▮ RA and its contractors will implement the management measures contained in the ESMP;
- ▮ A monitoring and evaluation system, including auditing, will be established, in line with this ESMP, to track the implementation of this ESMP to ensure that management measures are effective to avoid, minimize and mitigate impacts; and that corrective action is being undertaken to address shortcomings and/or non-performances;
- ▮ RA will adopt a process of continual improvement when managing and/or mitigating negative environmental impacts arising from the project. The ESMP will be used as the basis for environmental management and will be improved and refined regularly; and
- ▮ Monitoring required for the project will determine the validity and accuracy of the predictions made. Any exceedances of parameters or complaints from stakeholders will be investigated and remedied by the RA when required to do so.

Assumptions and limitations specific to the specialist studies are recorded in Appendix B.

6 Stakeholder Engagement

The stakeholder engagement process is guided by the requirements of Malawi legislation, RA Policy and good international industry practice. This section provides a summary of the stakeholder engagement activities undertaken during the ESIA. Stakeholder engagement and grievance management during construction and operation is included in the ESMP in Section 9.

6.1 Phasing of stakeholder engagement process

An overview of the ESIA process, associated stakeholder engagement and broad timeframes is provided in Figure 5.

Note the RA as per their instruction will undertake the entries indicated in red. Initial engagement took place with the DEA during project inception. Three rounds of engagement were planned; one with key stakeholders during pre-scoping and scoping, during July and August 2016 and a second round, focusing on the RAP from 16 to 23 September 2016. The third round was scheduled for the last quarter of 2016 when stakeholders were afforded an opportunity to comment on a Non-Technical Summary (NTS) of the draft ESIA, as well as on the draft ESIA document. Due to the different timeframes for completing the ESIA and RAP, an additional round of consultations was undertaken as part of the RAP process in January 2019.

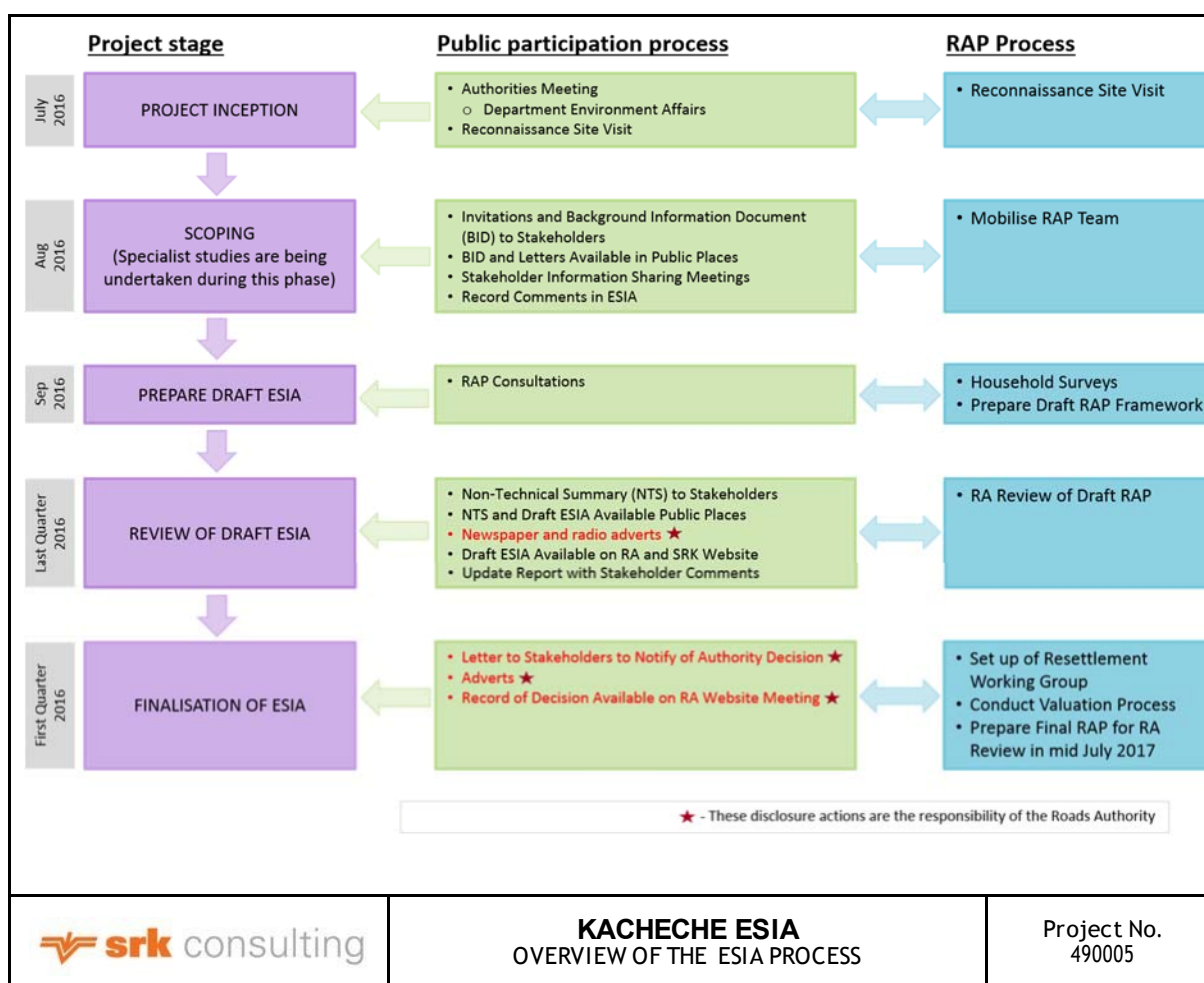


Figure 5: Overview of the ESIA process, associated stakeholder engagement and broad timeframes

6.2 Stakeholder identification, categorization and management

The contact details of stakeholders are captured in an electronic database, with facilities to personalize letters and record notes linked to an individual's name. SRK and Vineyard Consulting's existing stakeholder databases on other projects in the area formed the basis for the development of the stakeholder database for this project. Additional stakeholders will be identified throughout the process through networking and referrals.

Refer to Appendix C for the stakeholder database.

6.3 Stakeholder analysis

Stakeholder analysis is necessary to determine the appropriate level and methods of engagement for identified stakeholders. The level of engagement ranges from information sharing to active and in-depth engagement.

Stakeholders are analyzed according to the extent of the impact, and/ or their interest, as well as the degree of influence they might hold over the progress and success of the project. In general, engagement should intensify and deepen as impact and/or interest and influence increases.

Other important criteria considered in stakeholder analysis are:

- Sphere of influence: physical location relative to the project site and potential impacts. Generally, the closer the stakeholder lives to a project site, the higher their interest and the potential impacts of the project;
- Stakeholder values: the values stakeholders attach to the area that might be affected by the project, such as livelihoods, land use, ownership, heritage, and sense of place; and
- Jurisdiction: the mandate and/or influence of institutions over regulatory and public opinion.

Table 15 summarizes the recommended levels of engagement (information sharing, active and in-depth engagement) appropriate to the level of interest and/or impact of each stakeholder group/s, and possible information requirements and engagement methods.

Table 15: Level of interest and/or impact and methods of engagement

Stakeholder Group/s	Level of interest/impact	Level of engagement	Possible methods of engagement
Traditional Authorities Affected communities Trading Centres along the M1 Road	HIGH: Project and directly affected villages fall under their jurisdiction. Will have a high interest in the socio-economic impacts and benefits of the project as some of the villages are right next to the road	In depth engagement	<ul style="list-style-type: none"> Advance notification of meetings by telephone, email, personal visits by project team members, and hand delivery of documents to authorities and traditional chiefs Hold one-on-one, focus group and community meetings as appropriate to proactively share information and provide feedback Acknowledge and provide regular written and verbal feedback on concerns Proactively provide project information in different formats, written (non-technical summaries), verbal (personal visits and meetings) and visual (posters) and in relevant languages (English and Chitumbuka) Make project information available on RA website for those who have access Distribute newsletters/ hold regular meetings to provide information and updates on project progress
National government: Environmental Affairs Department (EAD)	HIGH: The EAD is the decision-making authority for this project	In depth engagement	<ul style="list-style-type: none"> Advance arrangement of meetings by email, personal visits by project team members and hand delivery of documents Hold one-on-one meetings at regular intervals as appropriate to proactively provide feedback and information in different formats
Other national departments, including the Antiquities and Forestry Department Provincial and local government	MEDIUM: Departments such as the Antiquities and Forestry Department have decision-making authority in terms of issuing permits and approvals. The interest will focus on provincial and local benefits to the project area	Active engagement	Same as above, but can be less frequent and linked to key project milestones or specific approvals
District government: Mzimba and Rumphi District Councils	MEDIUM: District councils have decision-making power and is a key stakeholder as the road passes through their jurisdiction	Active engagement	

Stakeholder Group/s	Level of interest/impact	Level of engagement	Possible methods of engagement
The Malawi Roads Authority	HIGH: The client for which the project is undertaken	In depth	One-on-one scheduled meetings, workshops, emails, telecons, progress reports as required by the contract
The World Bank	HIGH: Funder for the project	In depth by the client	As per the requirements set by the WB for the client, the RA
NGOs	MEDIUM/LOW: NGOs will have interests in the project to ensure human rights are not violated. The project is not expected to have many social impacts with high significance	Information sharing	BID / information sharing meetings/ community presentations
Community Based Organisations (CBOs)	MEDIUM/LOW: Many CBOs assist communities with improvement of livelihood practices. Engagement with these organisations will assist in understanding the issues of communities	Information sharing	
Business	LOW: Businesses will have interest in benefiting from the project but have no decision-making power	Information sharing	BID / information sharing meetings/ community presentations

6.4 Stakeholder engagement during the ESIA process

6.4.1 Project inception

The stakeholder engagement tasks and activities undertaken during project inception are presented in Table 16 below.

Table 16: Stakeholder engagement tasks undertaken during project inception

Task	Activities during project inception	Timeline
Develop stakeholder database	<ul style="list-style-type: none"> Identify and categorise stakeholders from a wide range of sectors of society and develop stakeholder database Database is updated throughout the process 	July 2016
Pre-scoping engagement with key stakeholders	<ul style="list-style-type: none"> Conduct consultation with Malawi Department of Environment Affairs to discuss the terms of reference for the ESIA and specialist studies Undertake a reconnaissance site visit to develop a better understanding of the stakeholders along the M1 road 	July 2016

6.4.2 Scoping

The stakeholder tasks and activities undertaken during scoping are presented in Table 17.

Table 17: Stakeholder engagement activities undertaken during scoping

Task	Activities during scoping	Timeline
Prepare engagement documentation	<ul style="list-style-type: none"> Compile a Background Information Document (BID), (English and Chitumbuka) describing the project, ESIA process and how stakeholders can be involved (Appendix D) Prepare a meeting invitation letter and comment sheet (English and Chitumbuka) (Appendix D) Prepare a schedule of meetings with key stakeholders for scoping 	August 2016
Distribute engagement documentation	<ul style="list-style-type: none"> Distribute BID, letter and comment sheet (English and Chitumbuka) via email and personal delivery to all stakeholders on the stakeholder database 	August 2016
Hold scoping meetings	<ul style="list-style-type: none"> Conduct dry run meeting with project team prior to scoping meetings. The purpose of the dry run meeting is for the team to finalise meeting arrangements and presentations to ensure that messages are clear and consistent, and to strategize on responses to stakeholder comments and questions Hold scoping consultation meetings (in English and Chitumbuka) with stakeholders, i.e. national, regional, district and local government, NGOs, individual organisations and parastatals. The purpose of the meetings were to provide stakeholders with an opportunity to introduce the project and raise any issues of concern or comment 	15 – 26 August 2016
Prepare Comment and Response Report (CRR) and Stakeholder Engagement Chapter	<ul style="list-style-type: none"> Record all stakeholder comments in a CRR, including comments from the project team Prepare Stakeholder Engagement Chapter, which documents the stakeholder engagement process followed during scoping, for incorporation into the Draft ESIA Report 	September 2016

The schedule of scoping engagement meetings, as well as the stakeholder group, approximate number of attendees and number of BIDs distributed is shown in Table 18.

Table 18: Schedule of stakeholder meetings during July/August 2016

Date of meeting	Stakeholder Group	Organisation	Approx. number of attendees	No. of BIDs distributed
8 July 2016	National Government	Environmental Department	6	0
15 August 2016	National Government	Department of Antiquities	4	8
16 August 2016	National Government	Department of Mining	3	6
16 August 2016	Regional Government	Regional Water Office	3	6
16 August 2016	Regional Government	Regional Forestry Office	3	6
16 August 2016	Parastatal	Malawi Energy Regulatory Authority (MERA)	3	6
16 August 2016	NGO	National Aids Committee (NAC)	3	6
17 August 2016	District Government	Mzimba District Executive Sub-committee (DESC)	24	48
17 August 2016	District Government	Mzimba District Environmental Sub-Committee	14	28
18 August 2016	District Government	Rumphi District Council (RDC)	29	58
18 August 2016	District Government	District Executive Council (DEC), Rumphi	14	28
19 August 2016	District Government	Rumphi District Environmental Sub-Committee (DESC)	29	58
19 August 2016	Local Government	Area Development Committee (ADC), Mwalweni	43	86
20 August 2016	Local Government	Area Development Committee (ADC), Chinyolo	23	46
15 August 2016	National Government	Ministry of Transport and Public Works	3	6
15 August 2016	National Government	Ministry of Local Government	4	8
15 August 2016	Business	SimbaNET	3	6
15 August 2016	National Government	Ministry of Housing, Lands and Urban Development	3	6
22 August 2016	Regional Government	Road Traffic and Safety Services	1	2
23 August 2016	Regional Government	Zonal Forestry Office	1	2
24 August 2016	Regional Government	Mzuzu City Council	1	2
25 August 2016	Regional Government	Education Division	1	2
25 August 2016	Regional Government	Water Division	1	2
25 August 2016	Regional Government	Regional Engineer	1	2
25 August 2016	Regional Government	Mzuzu Meteorology Division	1	2
25 August 2016	Parastatals	Malawi Telecommunications Limited (MTL)	1	2
25 August 2016	NGO	Synod of Livingstonia Development (SOLDEV)	1	2
25 August 2016	NGO	Feed the Children International	1	2
26 August 2016	Regional Government	Defence Force: Mzuzu	2	4

Comments raised by stakeholders at these meetings are recorded in the CRR (Appendix E). Attendance registers for scoping meetings are contained in Appendix F.

Summary of stakeholder comments received during scoping

Table 19 provides a summary of the main issues, expectations and perceptions expressed by stakeholders.

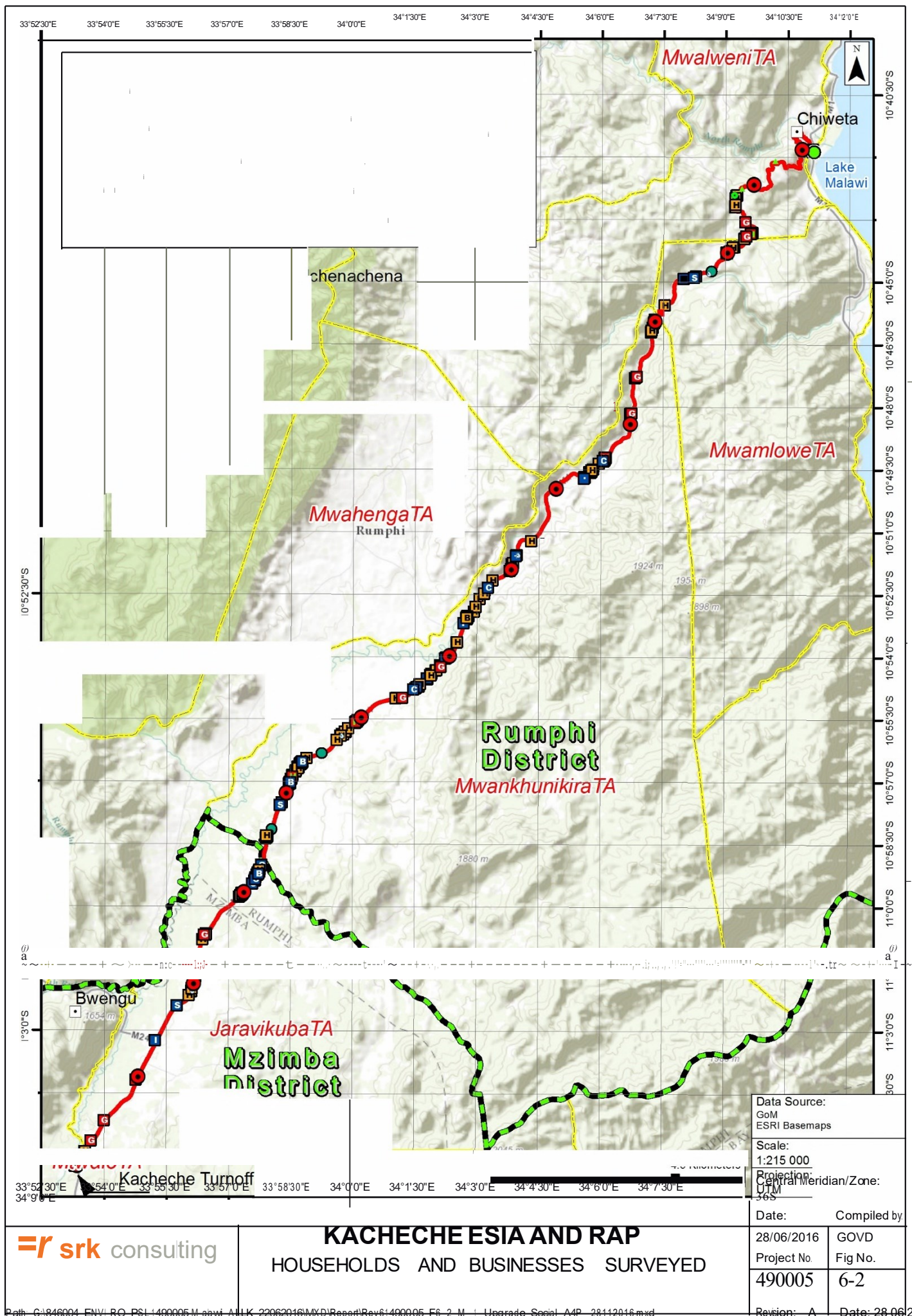
Table 19: Key comments from stakeholders during scoping

Stakeholder group	Expectations/ perceptions/ views/ concerns expressed by stakeholders
National Government	<ul style="list-style-type: none"> Request to involve the Forestry Department in obtaining an inventory of trees along the road Request to provide an opportunity for stakeholders to comment on the terms of reference of the study including specialist studies
Regional Government	<ul style="list-style-type: none"> Concerns expressed regarding drainage, siltation, water quantity and quality and impact of diversion of waterways due to construction Queries whether temporary dams will be constructed during the road project Requests for provision of fly overs near schools, and appropriate road safety measures near schools, especially for pedestrians Requests for adequate drainage measures in flood prone areas, especially the Luzi Water Scheme Expectations expressed that the road upgrade will provide easy access to the Regional Water Office to reach the rural communities Concerns expressed that soil moved during construction will pollute water resources Request to include communities in stakeholder engagement throughout the process Request to provide adequate stormwater drainage along the road Concerns that any removal of trees will affect the scenic beauty of the area
District Government	<ul style="list-style-type: none"> Appreciation for the project Requests for cost and timeframes for development of the project Queries regarding management and mitigation of historical projects Request for location of planned borrow-pits Importance of management and rehabilitation of excavated areas and borrow-pits Concerns regarding management of the road reserve and encroachment Importance of monitoring during implementation of the project to ensure specifications are followed Managing speeding and ensuring road safety during construction Importance of management of the road reserve especially regarding encroachment Requests to manage rock falls and landslides on the road Request to inform the District Forestry Office if any trees need to be felled during construction Concerns regarding the impact on communication cables and PVC pipes next to the road Concerns regarding the impact of dust pollution on communities next to the road Concerns regarding containment of excess runoff from higher elevations on road Concerns expressed regarding the impact on small scale farming and irrigation along the road Importance of implementing gender equality and local procurement in the RA employment policy during the project

Stakeholder group	Expectations/ perceptions/ views/ concerns expressed by stakeholders
Local Government	<ul style="list-style-type: none"> Request for details on costs involved in the project Requests for mitigation of previous borrow-pit disturbance in gardens as well as appropriate mitigation for any new borrow-pits Importance of finalisation of project and rehabilitation before contractor leaves site Request for implementation of dust abatement measures on a daily basis Suggestions were made to reduce road accidents on the by providing signposts and other clear bus stop areas Importance of looking after the welfare of fieldworkers during the RAP Questions regarding impact on existing electricity supply Need for replacement of existing boreholes should they be affected Queries regarding the impact of the project on traffic flow, speed control and impact of speeding and increased traffic on trading centres Questions regarding protection of natural areas, rehabilitation and compensation if trees are removed in the road corridor
Village Group Heads	<ul style="list-style-type: none"> Concern expressed regarding the cutting of trees Request to be compensated for gardens affected in the road reserve Concern regarding the potential impact on the Boliwoli Forest Reserve Concern that the wives of community members are attracted to rich contract workers resulting in marital problems and domestic violence Concern that children would want to work on the construction site instead of attending school Questions whether construction activities will cause blockages on the road
NGOs	<ul style="list-style-type: none"> Importance of sharing and involving stakeholders in design aspects of the road Offers to provide HIV/Aids information into the SIA Request to address gender based violence in the study Expressed thanks for sharing information about the project which will assist them with preparation to work in the area Concern expressed that there will be conflict during compensation negotiation Request for effective sanitation reinstatement should communities' sanitation infrastructure be affected
SimbaNET	<ul style="list-style-type: none"> Suggestion to involve the Department of Forestry to assist with an inventory of trees along the road Suggestion to involve the Village Development Committees (VDCs) in the RAP process
Malawi Energy Regulatory Authority (MERA)	<ul style="list-style-type: none"> Expressed concerns that the road expansion will lead to increase in truck traffic which can cause road wear and tear, accidents and road safety issues Concerns expressed regarding increase in illegal siphoning of fuel from trucks causing legitimate businesses to suffer Request to consider providing resting places for trucks along the road
Electricity Supply Commission (ESCOM)	<ul style="list-style-type: none"> Appreciation expressed for the project bringing welcome development to the country Project will make it easier for ESCOM to move heavy equipment along the road to the port through current narrow and sharp bends Concern that there will be power interruptions to communities if power lines are moved during construction
Malawi Telecommunications Limited (MTL)	<ul style="list-style-type: none"> Concern that fibre optic cables will be affected if soil is excavated during construction. MTL must be consulted should this happen Appreciation was expressed for the road upgrade as this will improve access to MTL infrastructure and minimize risk in transporting equipment from Tanzania to Malawi

6.4.3 RAP consultations

As indicated in Figure 5, the stakeholder consultations for the ESIA during the scoping and inception phases, also initiated the RAP process. Subsequent to the inception and scoping phases, the RAP consultation process commenced during September 2016. Due to the different timeframes for completing the ESIA and RAP, an additional round of consultations was undertaken as part of the RAP process in January 2019. The standalone RAP provides a record of these consultations.



6.4.4 Disclosure of draft ESIA

Stakeholder tasks and activities undertaken during the ESIA are presented in Table 20. Disclosure activities for the availability of the draft ESIA, will be undertaken by the RA (refer to Figure 5)

Table 20: Tasks and activities undertaken during the ESIA disclosure

Task	Activities during ESIA	Timeline
Compile Non-Technical Summary (NTS)	<ul style="list-style-type: none"> Prepare a simplified, easily understandable NTS of the key findings of ESIA Translate the NTS in Chitumbuka 	Last quarter 2016
Prepare notification documentation	<ul style="list-style-type: none"> Prepare a notification letter to accompany the NTS to stakeholders Prepare a comment sheet to accompany letter and NTS for stakeholders to submit comment 	
Disclose the NTS to stakeholders for a period of 30 days	<ul style="list-style-type: none"> Personal delivery of the NTS to key stakeholders accompanied by the notification letter and comment sheet Make copies of the NTS available at the following locations in the project area: <ul style="list-style-type: none"> Luzi Teacher Development Centre (TDC) Mzokoto TDC Bwengu (TDC) and post office Chiweta Area Development Committee office Kandile Village and at the Machenga Mine Mwankhinukira, Mwahenga, Jaravikuba Mtwalo Traditional Authority offices Mzimba and Rumphi District Council offices 	Last quarter 2016
Make draft ESIA Report available	<ul style="list-style-type: none"> Make copies of the draft ESIA (in English) available at the following locations: <ul style="list-style-type: none"> Mwankhinukira, Mwahenga, Jaravikuba Mtwalo Traditional Authority offices Mzimba and Rumphi District Council offices Make a copy of the draft ESIA available on the SRK and RA website 	
Update stakeholder engagement documentations	<ul style="list-style-type: none"> Update the CRR and Stakeholder Engagement Chapter after the end of the commenting period 	Last quarter 2016/ beginning 2019

6.4.5 Disclosure of authority decision

It will be the responsibility of the RA to notify stakeholders of the outcome of the authority decision. Notification will be through information letters and radio and newspapers advertisements in the media. The authority decision is expected during the first half of 2019.

7 Biophysical Baseline

7.1 Overview

This section describes the receiving environment and includes topography, geology, soils, climate and air quality, surface water and biodiversity. This information has been informed by specialist site visits, data collection, literature review and knowledge of the site.

7.2 Topography

Malawi lies within the Great Rift Valley systems. Lake Malawi, a body of water some 580 km long and about 460 m above sea level, is the country's most prominent physical feature. About 75% of the land surface is a plateau between 750 m and 1 350 m above sea level. Highland elevations rise to over 2 440 m in the Nyika Plateau in the north and at Mount Sapitwa (3000 m). The lowest point is on the southern border, where the Shire River approaches its confluence with the Zambezi River at 37 m above sea level.

The topography of the project area varies for the length of the M1 road between Kacheche and Chiweta (Civil Planning Group, 2016). During the first 35 km the road passes through flat to rolling topography. From this point the topography is rolling and mountainous. The last 10 km passes through an escarpment which ends at Chiweta on the shores of Lake Malawi. A 1:50 000 topographical map is included in Appendix A for reference purposes.

The project starts at an elevation of 1 032 m above sea level (ASL) and descends to 850 m ASL at the South Rukuru River (49.3 km) and then climbs sharply from an altitude of 850 m to 1 111 m ASL at the Mchenga Coal Mine are (58 km).

From here the roads drops sharply to the project's end point at Chiweta (66.5 km) where the altitude is 487 m ASL. The vertical grades are gentle from 0 to 49 km being typically less than 4 percent (<4%). From this point to Mchenga Coal Mine and then Chiweta, the gradients increase to in excess of 9-10%.

Topography is an important factor affecting air quality as it influences the dilution and dispersion potential of pollutants such as dust and gas released into the environment.

A plot of the distribution of the absolute values (Civil Planning Group 2016) of the gradient is provided in Figure 7-1 below. The topography can therefore be categorized as follows:

- 0 – 51 km: Predominantly rolling with some mountainous sections
- 51 – 66.5 km: Mountainous.

Figure 6 presents a visual representation of the regional topography of the project area.

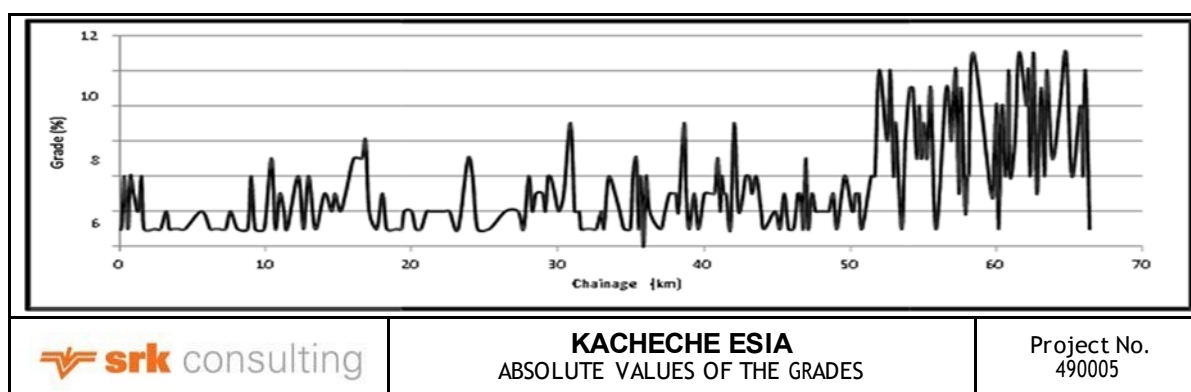
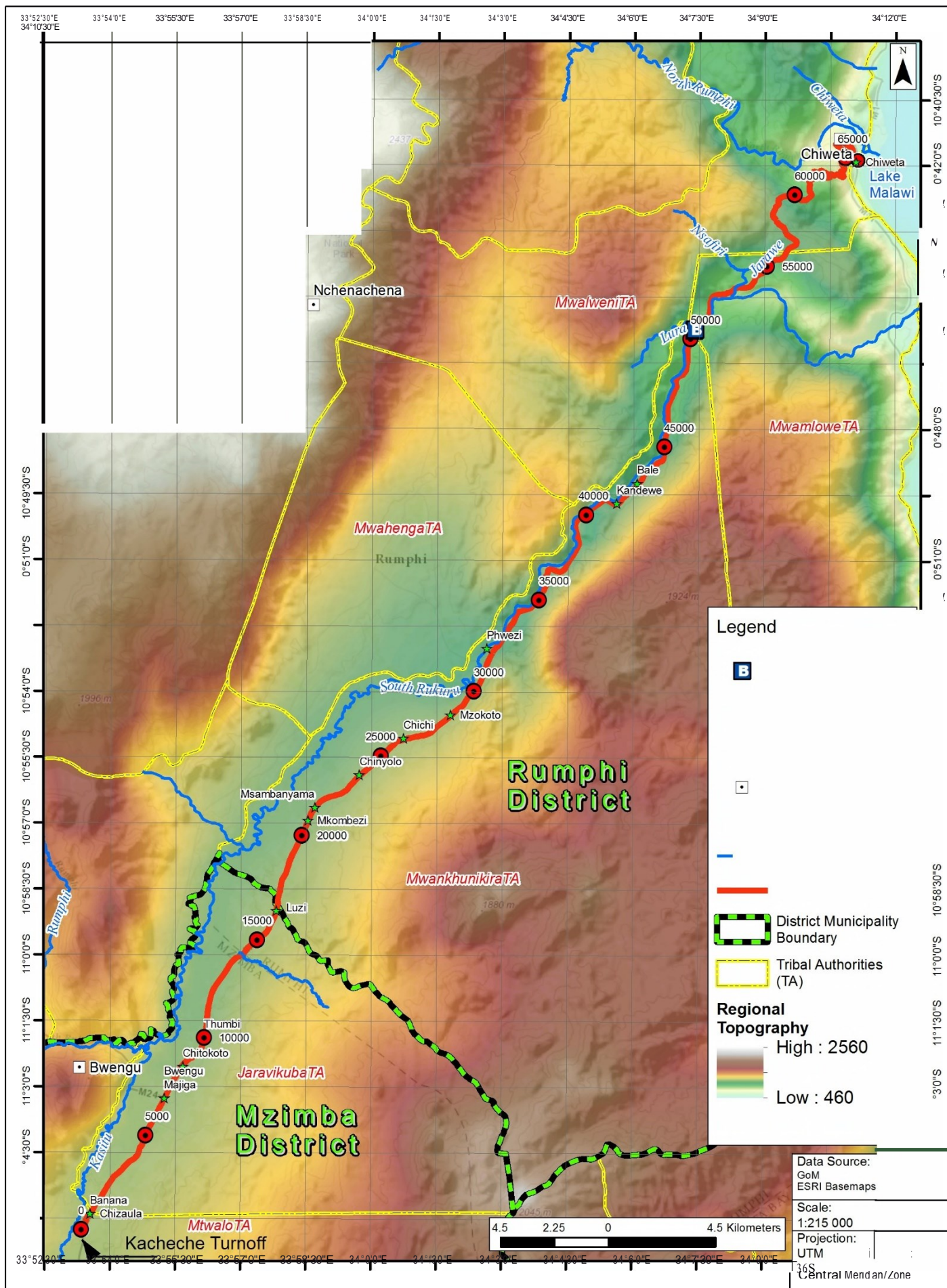


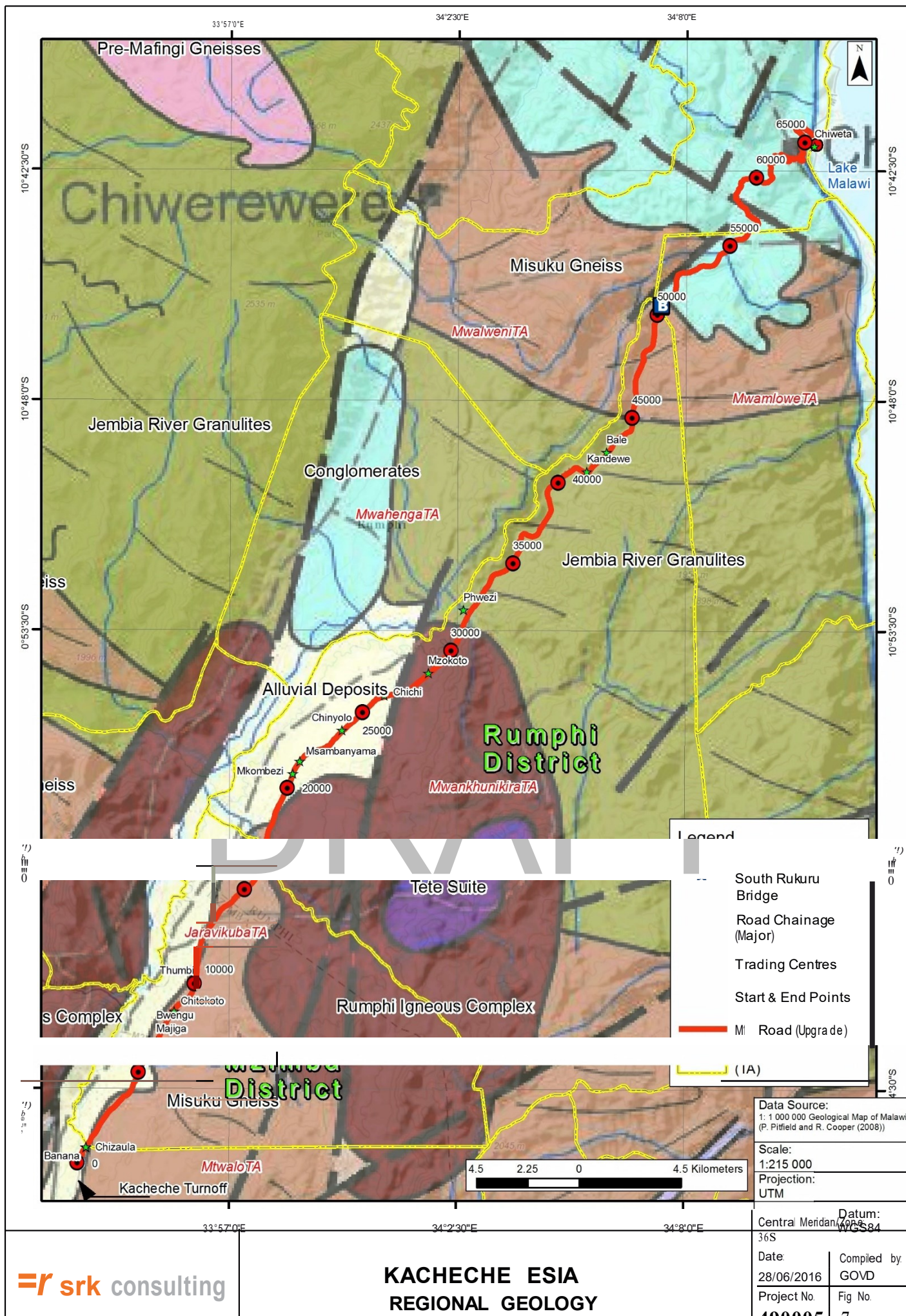
Figure 6: Distribution of the absolute values of the grades.



7.3 Geology

The geological history of Malawi is summarised as a Precambrian basement and mobile belt overlain by Permo-Triassic sediments cut by Mesozoic intrusions and disrupted by Cenozoic faulting that led to the formation of the Malawi Rift a part of the western branch of the East African Rift System.

In broad terms the geology can be divided into the (Precambrian) Basement Complex; the Karoo Supergroup; the Chilwa Alkaline province; Mesozoic sediments and Cenozoic cover rocks. The geology of Malawi is illustrated in Figure 7.



7.3.1 Geology of the project area

At various places in the north and south of the country, the Basement Complex is overlain unconformably by sedimentary and subordinate volcanic rocks of Permo-Triassic age referred to as the Karoo System (Civil Planning, Group 2016).

The Basement Complex constitutes a wide variety of metamorphic rocks of sedimentary and igneous origin formed between Early Precambrian to Early Palaeozoic. They have been subdivided into northern and southern associations. The boundary between these associations has been taken at the Chimaliro Fault, which forms the southern boundary of the high-grade rocks of the Champhira Dome. Separate from the Basement Complex are two groups of psammites and pelites of probable Proterozoic age. These are the Mchinji Group in Central Malawi and the Mafingi Group to the North.

The geology traversed by the project road is shown in Figure 6-2. The route is underlain by rocks of both the Basement Complex and the Karoo System. The first 10 km or so of the route in an easterly direction towards Lake Malawi, traverses alluvial sediments of recent Pleistocene era (Quaternary deposits). The remainder of the route (10 – 66.5km) passes through a mixture of Archean rocks comprising schists, quartzites, marble, ultra-basics, gneisses and granulites.

The first half of the route is underlain by gneisses and granulites of the Basement Complex. These are both fine-grained, acid crystalline, granular metamorphic rocks in which the main component minerals are typically feldspars (orthoclase), quartz and sometimes mica.

The common feature of all these rocks is the absence of montmorillonite stage they decompose. Orthoclase, often in the modification of microcline, is the predominant mineral in all these rocks and it changes directly into kaolinite once it has passed the stage of hydromica. These rocks are therefore eminently suited for use in road construction provided the quantity of mica in them is not excessive. The designer needs to be particularly mindful of this potential problem.

The second half of the route traverses the sediments of the Karoo System. Most of these sedimentary rocks are less suitable for road construction than the underlying igneous structures. The conglomerates and sandstones should however be suitable for use in fills and lower pavement layers. The shales should be avoided as these have a propensity to exfoliate if they are not indurated.

The geology of the project area suggests that there should be no great difficulty in sourcing acceptable quality materials for the construction. These materials include those for pavement layers as well as asphalt and concrete manufacture.

In Malawi, gneisses, granite-gneisses and migmatites are the main rock types which are used to produce crushed aggregates for road construction. These rocks do not present durability problems, but care should be taken to assess their suitability for construction vis-a-vis their typically high micaceous content.

There is a quarry site which was used to construct the section of the road from Chiweta to Karonga. The rock has been assessed by Civil Planning Group as being of good quality.

Subgrades comprising either sands or clays are prone to dimensional instability, with sands having a propensity to collapse and clays exhibiting a tendency to swell. The latter problem is particularly prevalent in montmorillonite clays.

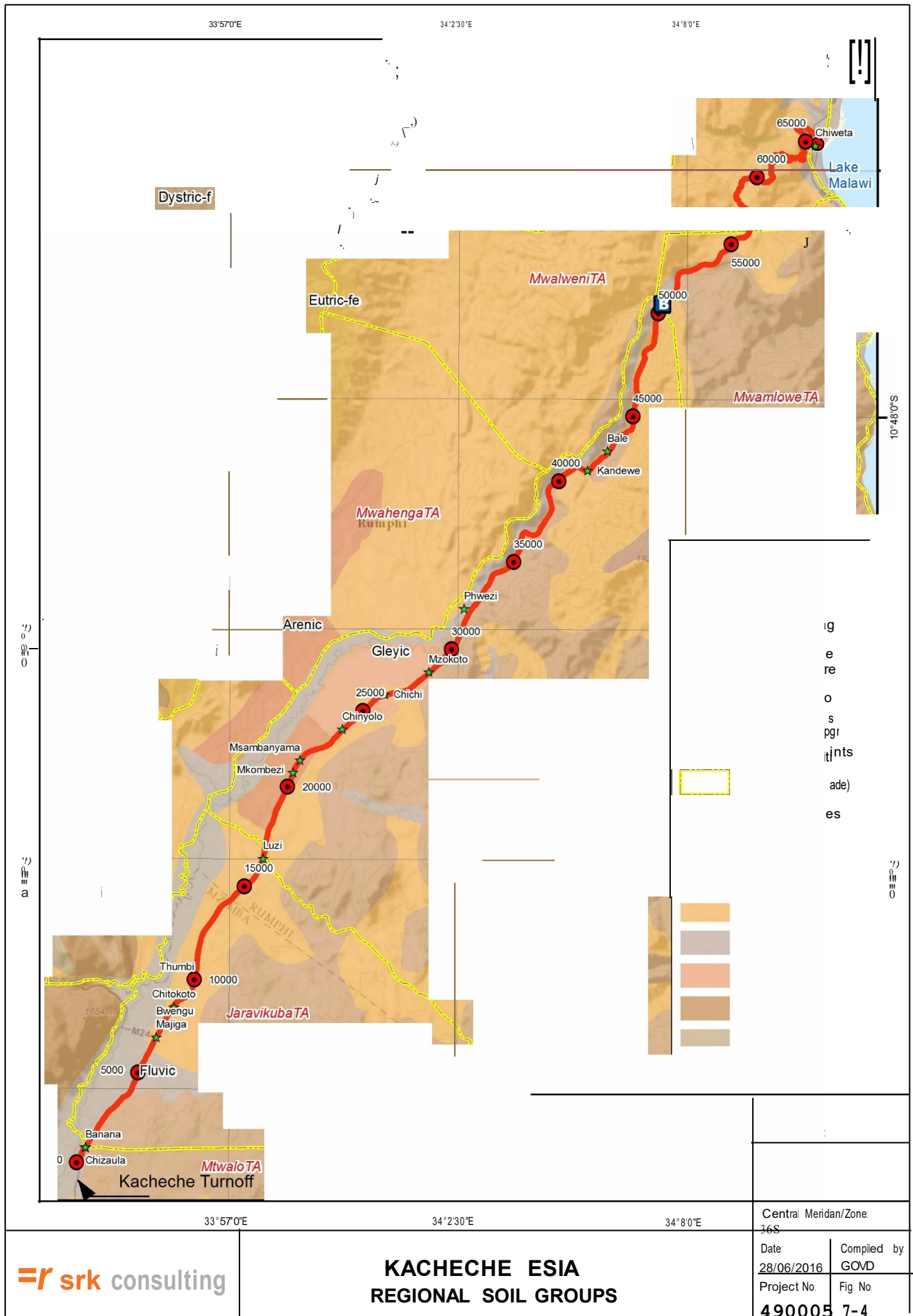
7.4 Soils

Malawi has a land area of approximately 9.4 million hectares. Due to low mineral resources endowment, the relatively fertile land and fisheries form the basis of the country's economic infrastructure. Agriculture still dominates the economy (State of the Environment Report, Malawi, 1998).

Most soils in Malawi are inherently low in nitrogen, which is a very important nutrient to plants. Most soils have light to medium textures and are liable to leach nutrients to below the rooting zone under intense rainfall. Continuous cropping which does not give enough time for replenishment of soil fertility exacerbates the problem, leading to soil exhaustion, and increasing need for inputs of conservation.

Loss of topsoil is a serious environmental problem in Malawi. Silt loads in surface water run-off has led to significant problems in downstream water quality, such as increased suspended solids and siltation.

Refer to Figure 7-4 for a representation of the regional soil groups in the project area.



7.5 Climate

Malawi is described as having a sub-tropical climate, characterised by relatively dry and strongly seasonal conditions. The warm-wet season spans from November to May, during which the majority of the annual precipitation is received. The annual average rainfall varies across the country and can range from 725 mm to 2 500 mm. Temperatures during these months range from 25°C to 37°C, with humidity levels reaching up to 87%. The cooler-dry winter season occurs from June to October, with temperatures between 4°C and 10°C. Climate is an important factor to be considered for the project as high rainfall can contribute to erosion during the construction period. In addition, this may limit construction during November to May when the highest rainfall is experienced. The impact of climate with respect to the project is referred to in greater detail in the Impact Assessment Section (Section 9).

According to the Koppen Climate Classification System the regional area is classified as the Category “C” climate type which is a moist mid-latitude climate with mild winters. The project area falls into the subcategory “Cfa” climate which represents a humid subtropical climate.

Meteorological data for the project area was acquired from www.weatherbase.com (Weatherbase), however, the data is more representative of historical data. Meteorological data was acquired from Weatherbase for the closest towns to the project area, i.e. Rumphi (9.1 km east of the southern sections of the road), Mzuzu (38.8 km south of the road), Livingstonia (12.4 km northwest of the road) and Chikupizga Village (39.1 km east of the southern sections of the road). The locations of the weather stations in relation to the project area are presented in Figure 7-5.

The climate in the project area is expected to vary, with distinct warm months (October to March) and cool months (April to September). Rainfall received varies throughout the year, with higher rainfall received between November and April. Refer to Figure 7-6 for the monthly average rainfall data at four locations in the study area. Prevailing winds in the Chiweta area is generally from east to west, from Lake Malawi in an inland direction. The average monthly wind speeds are fairly low throughout the year, averaging < 3 m/s. This means that high wind speeds will not exacerbate spreading dust during construction.



7.5.1 Meteorological conditions

Meteorological conditions play a major role in air quality as presented in Section 7-6, particularly the dispersion and accumulation of air pollutants. Waste substances released into the atmosphere can be diluted by diffusion, removed by fallout, washout and atmospheric reactions and created by solar radiation through photochemical reactions (Wanta, 1968). Horizontal dispersion is determined by wind speed and wind direction, both which have a powerful influence over the rate of pollutant dispersion and dictate the geographical location and distance that a pollutant will be transported. Vertical dispersion depends on the stability of the atmosphere, which generally depends on the high and low pressure systems, the thermal state of the atmosphere and the height of the mixing depth. A stable atmosphere is associated with a low degree of dilution and high air pollution potential. An unstable atmosphere is linked to intense turbulent mixing of the air resulting in dispersion and low air pollution potential. Overall, pollution levels are governed by wind characteristics and changes in the stability profile of the atmosphere.

Rainfall

Rainfall is an important parameter with respect to air quality (Section 7-6). During the wet seasons (between November and April), air pollution, and more specifically in this case, dust particles, are removed from the atmosphere. Dust emissions are suppressed due to increases in soil moisture content and increased vegetation cover during the rainy season. During the dry season (June – September), dust emission levels are generally higher.

The average monthly historical rainfall measured at the four locations in close proximity to the project area is presented in Table 21. The surrounding areas receive rainfall throughout the year with lower rainfall during the winter months from June to September.

Table 21: Average monthly rainfall data for four locations in close proximity to the project area

Month	Rumphi	Mzuzu	Livingstonia	Chikupizga Village
Units	Mm	Mm	mm	mm
January	196.2	207.0	229.7	193.3
February	170.6	178.0	183.6	174.5
March	194.7	230.0	298.9	165.8
April	134.5	213.0	244.1	79.8
May	45.4	60.0	97.8	22.1
June	15.7	31.0	23.7	5.3
July	11.8	29.0	13.5	3.2
August	5.0	12.0	5.0	1.5
September	3.0	6.0	2.5	1.9
October	18.9	36.0	19.6	12.8
November	66.2	95.0	85.7	58.4
December	183.6	198.0	206.4	179.4
Total	1 045.6	1 295.0	1 410.5	898.0

Dust emissions in the area are expected to be slightly lower from November to May when compared to June to October due to the higher rainfall observed during these months.

The average monthly rainfall for all four locations is presented in Figure 7.

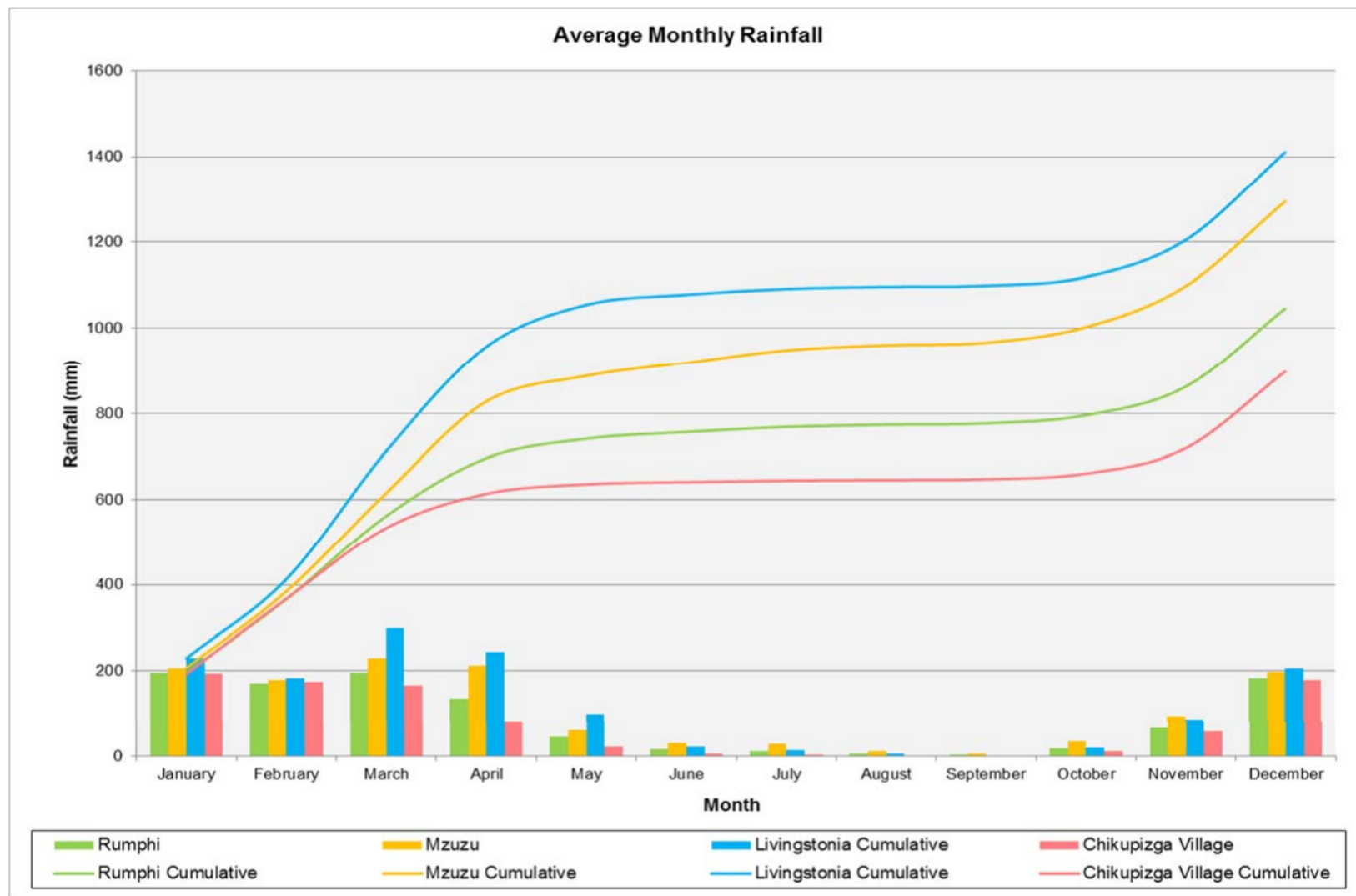


Figure 7: Average monthly rainfall trends for the four weather stations in close proximity to the project area

Temperature

Ambient air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing depth and inversion layers.

Similar to rainfall, temperature data has been sourced from Weather base and is presented in Table 22. The monthly historical average temperature for areas surrounding the project area ranges from 13.0°C to 22.9°C, a variance of 9.9°C. The highest temperatures tend to be experienced between October and March, with cooler temperatures being experienced between April and September. The seasonal variation in temperature is large which suggest cool winters and warm summers as described by the Koppen Climate Classification.

Table 22: Average monthly temperature for four locations in close proximity to the project

Month	Rumphi	Mzuzu	Livingstonia	Chikupizga Village
Units	°C	°C	°C	°C
January	21.6	20.0	21.5	21.1
February	20.9	20.0	20.9	20.3
March	21.3	20.0	21.2	20.9
April	20.4	19.0	20.4	20.1
May	17.6	16.0	18.1	17.4
June	16.1	13.0	16.6	16.0
July	15.5	13.0	16.1	15.5
August	17.0	13.0	17.4	17.3
September	19.8	16.0	20.1	20.0
October	22.3	19.0	22.4	22.4
November	22.8	20.0	22.9	22.7
December	22.2	20.0	22.1	21.7

The average monthly temperatures for all four sites are presented in Figure 8.

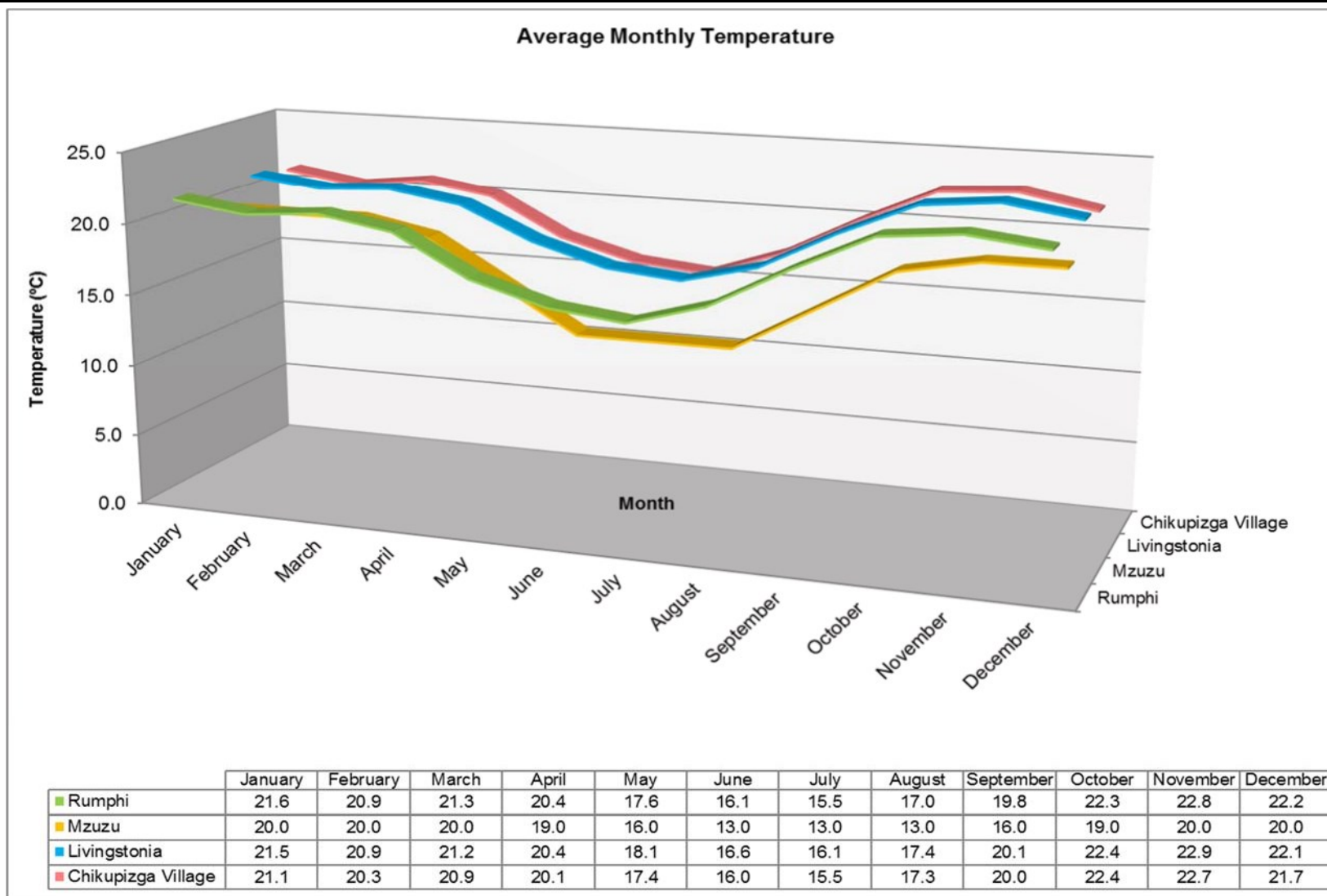


Figure 8: Average monthly temperature trends for the four weather stations in close proximity to the project area

Wind

The wind field for an area is an important parameter with respect to air quality and winds can generate dust emissions as well as control the dispersion of an emissions plume. The degree to which winds can influence dispersion depends on the wind speed. Higher wind speeds result in longer travel distance and dilution of the pollutants and lower, more stable wind conditions result in shorter travel distance and build-up of pollutant levels (especially gases) over a smaller area.

Data acquired from Weather base could not be used to generate wind roses due to the format of the data. Only monthly averages were available whereas hourly data is required to generate wind roses. Therefore, only average monthly wind speed data is presented in Figure 9. Furthermore, data was only available for Livingstonia and Chikupizga Village, which is presented in Table 23.

The average monthly wind speeds are fairly low at both locations.

Table 23: Average monthly wind speed data for two locations in close proximity to the project

Month	Livingstonia	Chikupizga Village
Units	m/s	m/s
January	1.89	1.61
February	1.81	1.50
March	2.00	1.89
April	2.39	2.39
May	2.61	2.50
June	2.61	2.50
July	2.89	2.81
August	3.00	3.00
September	3.39	3.39
October	3.50	3.50
November	3.00	2.81
December	2.19	1.89

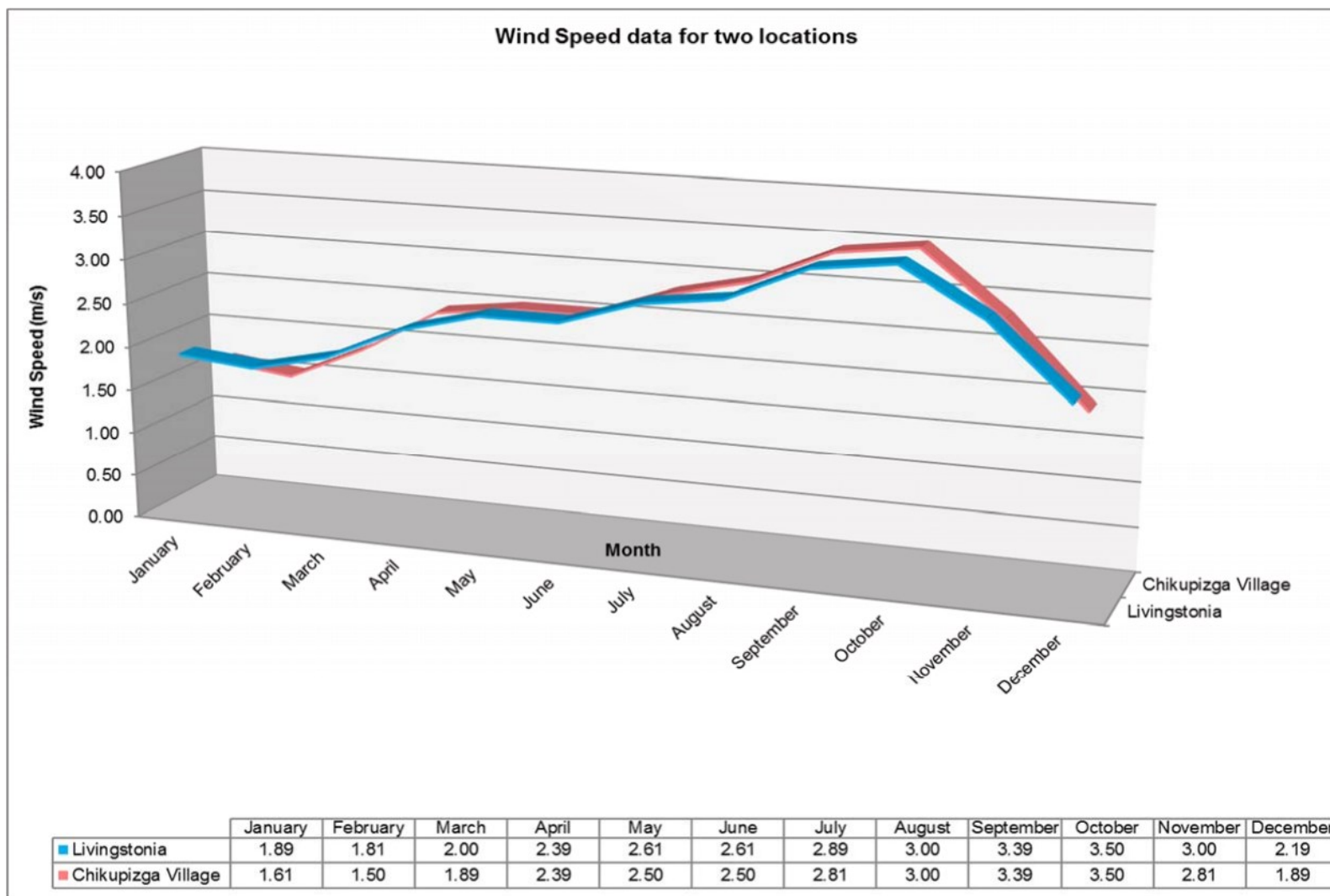


Figure 9: Average monthly wind speed trends for the two weather stations in close proximity to the project area

7.6 Air quality

The baseline information presented in this section is informed by a review of existing documentation and desktop and field investigations.

7.6.1 Sensitive receptors

Sensitive receptors can be defined as receptors that are the most vulnerable and most susceptible to adverse health and environmental impacts. This is so due to their direct and indirect exposure to pollutants such as dust (dust fallout and particulate matter (PM₁₀ and PM_{2.5})) and gases (sulfur dioxide (SO₂), nitrogen dioxide (NO₂) and carbon dioxide (CO₂) amongst others, that are likely to be associated with motor vehicle emissions. The affected receptors may include local residents, children in schools and the elderly. The following sensitive receptors, i.e. trading centres are identified in the area from south to north of the proposed road upgrade. Refer to the social baseline in Section 8 for more detail on these trading centres in the project areas:

Trading centres between 0 – 20 km:

- Banana;
- Chizaula;
- Bwengu Majiga;
- Chtitokoto; and
- Thumbi;

Trading Centres between 20 km – 30 km

- Mkombezi;
- Mzambanyama;
- Chinyolo;
- Luzi;
- Chichi;and
- Mzokoto.

Trading Centres between 30 - 66.5 km:

- Phwezi;
- Kandewe;
- Bale; and
- Chiweta

Within the abovementioned trading centres, it is expected that there are schools, clinics and other social services that will be populated during the day and which may be impacted by change to ambient air quality. In addition to the above sensitive receptors, environmental receptors such as Lake Malawi, wetlands, river systems and greenfield sites have also been identified within the project area.

7.6.2 Baseline air quality

Identifying the sources that contribute to airborne particulate emissions in the project area, which includes all villages/trading centres/residential areas within 5 km of the project area, is important for

establishing baseline sources of air pollution and the cumulative impacts due to baseline conditions, as well as the impact that surrounding industry, if any, may have on sensitive receptors.

The project area and surrounding land use is rural with small scale industrial activities, as well as mining activities taking place towards the northern sections of the route. The area surrounding the project area is characterized by rural residential areas, industrial activities, natural vegetation and subsistence cultivation. The following sources of air emissions were identified in the project area:

- Industrial activities;
- Vehicle entrainment of dust on paved and unpaved roads;
- Vehicle tailpipe emissions;
- Household fuel combustion.
- Fugitive dust sources i.e. windblown dust; and
- Agricultural activities.

7.6.3 Industrial activities

Industrial activities may release particulate and gaseous emissions into the atmosphere, however, this is dependent on the type of industry.

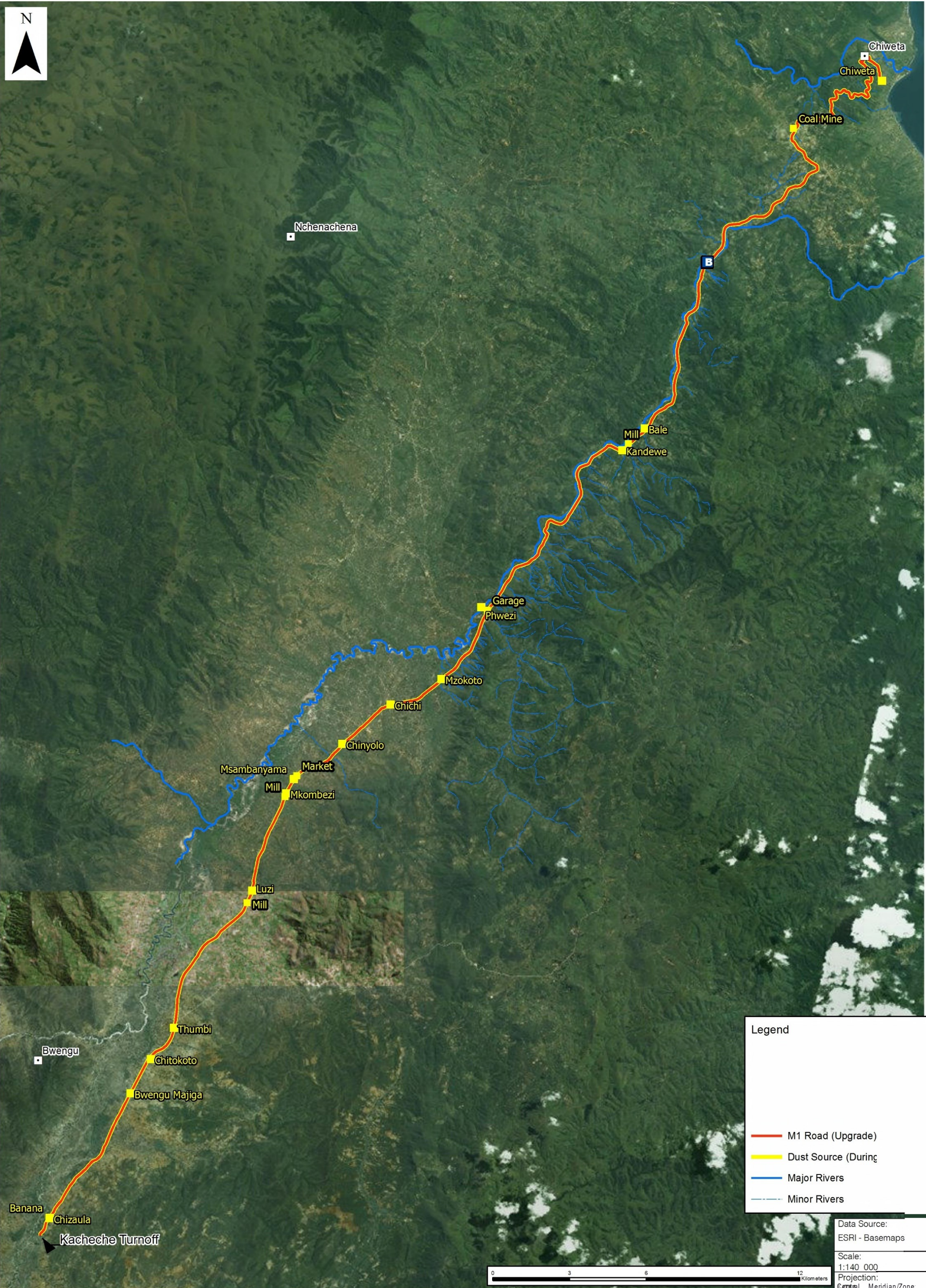
The following industries have been identified based on information collected by the project team during the site visit:

- Kafwe Maize Mill; and
- Mchenga Coal Mine.

It is expected that dust may be generated in the areas where industrial activities are identified. Where available, photographs of identified industries are presented in Figure 7-9. Refer to Figure 7-10 which indicates the point sources of dust pollution in the project area.



Figure 7-9: Photograph of the Kafwe Maize Mill noted in the project area.



Legend

M1 Road (Upgrade)

Dust Source (During

Major Rivers

Minor Rivers

Data Source: ESRI - Basemaps	
Scale: 1:140 000	
Projection: Central Meridian/Zone: Zone 36S	
Date:	Compiled by:
3/09/2016 Project No.	ALLK Fig No.
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Revision: A Date: 01/09/2016	

7.6.4 Vehicle entrainment of dust on paved/unpaved roads

The proposed project is located in an area that can be described as a mixed land use area (rural residential and agricultural with small scale industrial units). The residents currently use a network of paved and unpaved roads in and around the area. The paved roads are mainly associated with national and regional roads. The unpaved roads generally join directly to the main paved roads, and are located within the populated residential areas and industrial units.

7.6.5 Vehicle tailpipe emissions

Vehicle emissions can be classified into two groups, namely, primary and secondary pollutants. Primary pollutants from vehicle tailpipe emissions include: carbon monoxide (CO), carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM) and lead (Pb) depending on the type of fuel that is used. Secondary pollutants exist only because of the chemical reactions that take place in the atmosphere and include nitrogen dioxide (NO₂), photochemical oxidants (e.g. ozone), sulfates and nitrates. Vehicle tailpipe emissions are expected to be higher in older model vehicles as the combustion process is not as efficient as newer vehicles

Vehicles such as motorbikes, cars, trucks or vans pass along the proposed route upgrade as well as the main local roads in and around the project area (Preliminary Design Report, Civil Planning 2016 and Final Design Report, (March 2019). Traffic count data for vehicles is provided in Table 24. A total of 6,633 vehicles were counted over a five-day period along the route of the existing road. Vehicles are sub divided into four classes, light, medium, heavy and 2-wheel vehicles. Light motor vehicles and 2-wheel vehicles observed over the traffic study account for 66.9% of vehicles on the route, whereas medium to heavy vehicles account for 33.1%.

It is assumed the majority of heavy vehicles use diesel fuel and the combustion of diesel fuel leads to SO₂ being emitted into the atmosphere. In comparison the majority of lighter (inclusive of 2-wheel vehicles) to medium sized motor vehicles use gasoline or petrol which will result in lower SO₂ emissions but higher CO emissions. Vehicles travelling at slower speeds may also emit a higher concentration of pollutants per kilometer than vehicles travelling at faster speeds.

Currently, vehicle tailpipe emissions are expected to be moderate/medium within the project area due to the frequency of vehicles passing through the area.

Table 24: Summary of vehicle counts along the M1 Road over a 12-hour period

Type	Vehicle count	Percentage of total vehicles (%)
Light	2,134	32.2
Medium	1,477	22.3
Heavy	719	10.8
2-Wheel vehicles	2,303	34.7
Total	6,633	100

7.6.6 Household fuel combustion

Wood is generally the primary domestic fuel source within rural areas and its combustion is likely to be the greatest source of airborne particulates in such an environment. Airborne PM (Respirable - PM₁₀ and Nuisance - dust deposition) and gaseous pollutants (NO_x, SO₂, CO and CO₂) are the main emissions from domestic wood/charcoal combustion. Portions of the project area have undulating topography, hence air pollution from these sources has the potential to migrate along drainage channels and this can result in wider zones of influence.

7.6.7 Fugitive dust sources

All pollutants that arise from fugitive dust sources are termed primary pollutants as they are generated at source and maintain original form when dispersed. Fugitive dust sources in the area occur from wind erosion of open areas, i.e. soil stockpiles and roadside verges. Particulate emissions from roadways depend on the erodibility of the soil and the number of vehicles using the road. Windblown dust resulting from the erosion of bare ground depends on the velocity of the wind, the size of the exposed area and moisture and silt content of such areas. Areas that receive high amounts of rainfall will experience lower levels of fugitive dust being released into the air than areas that experience low amounts of rainfall. This is primarily because the higher moisture content makes the soil heavier and more compact resulting in the soil being more resistant to wind erosion.

In the project area fugitive dust emissions are expected to increase during the dry season (June to October). The major sources that will contribute to an increase in dust fallout during the dry season are windblown dust off bare ground, industrial processes, roads and vehicle entrainment of dust. During the rainy season (November to April), the concentration of dust in the air will decrease due to dust being washed out of the atmosphere as a result of the rain.

7.6.8 Agricultural activities

Subsistence farming is one of the main sources of food in the project area with activities such as ploughing done by hand. Dust emissions from this activity are expected to be low to negligible as the preparation of the land for planting is done manually and in small patches. Agricultural activities are considered to be a minor or negligible source of dust in the project area.

7.7 Surface water

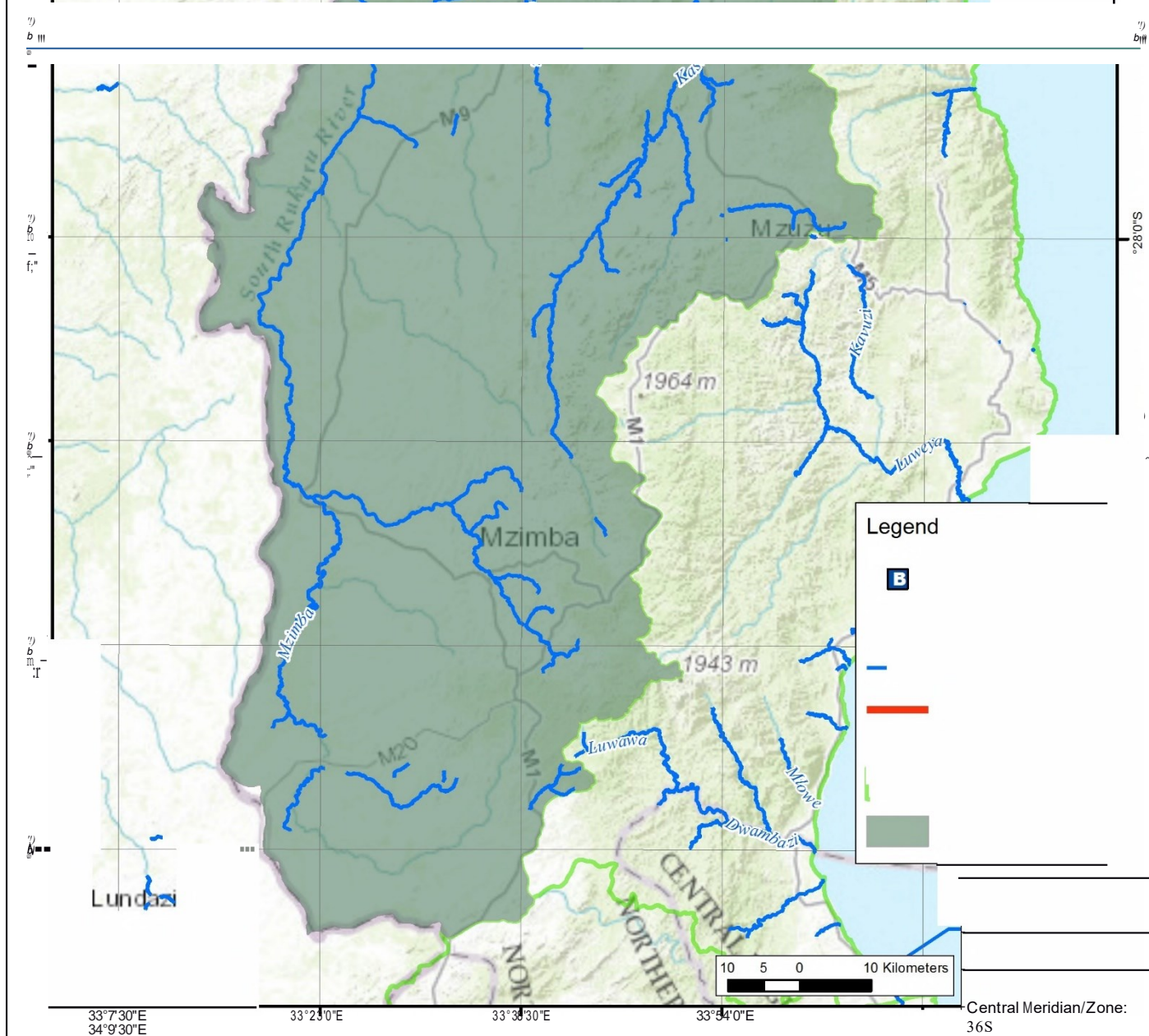
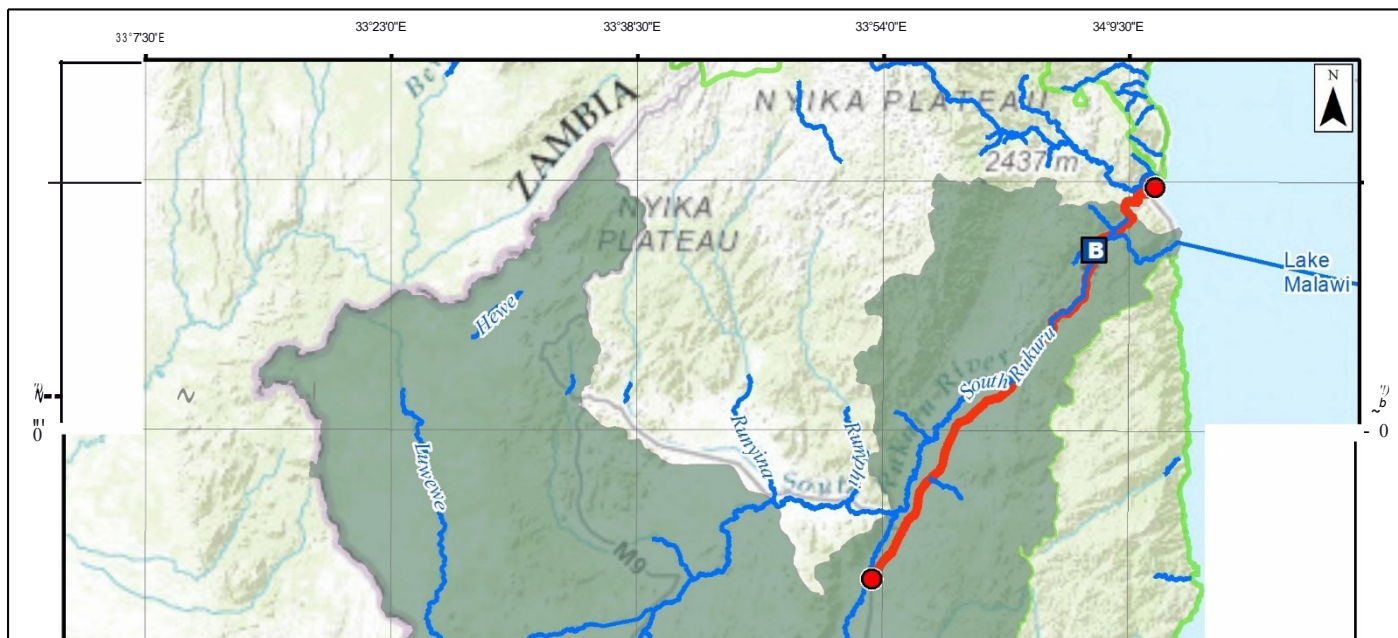
The baseline information presented in this section is informed by a review of existing documentation and desktop and field investigations.

7.7.1 Catchment, rivers, streams and hydrology

Catchment characteristics and hydrology

The M1 road between Kacheche and Chiweta follows the South Rukuru River. The South Rukuru River approaches the project area from the West, and joins with the Kasitu River approximately 10 km from the start point at the Kacheche turnoff.

The South Rukuru River drains a catchment of approximately 12,110 km² (Shela, 2000 and Kumambala, 2010) and is the second largest catchment contributing to the feed of Lake Malawi (Shela, 2000). The Kasitu River forms part of the catchment area considered under the South Rukuru River drainage area. Figure 7-11 presents project area in relation to the South Rukuru Catchment.



The South Rukuru River is a perennial river. The dry season flows are probably attributed to the delayed release of water by way of seepage from the surrounding environment. The surface runoff from the major catchments in Malawi is shown in Table 25. The runoff is described as a percentage of rainfall (mm).

Table 25: Surface runoff from major catchments (Ministry of Water Development, 1986 cited by Chavula, 1998)

River Basin	Runoff as a percentage
North Rumphu	44
Ruo	39
Karonga Lake Shore	35
Nkhata Bay Lake Shore	32
North Rukuru	26
South East Lake Shore	23
Lake Chiuta	22
Songwe	20
Lake Chilwa	20
South West Lake Shore	20
Nkhotakota Lake Shore	20
Lufira	20
Linthipe	16
Shire	15
South Rukuru	13
Dwangwa	12
Bua	10
Likoma Island	N/A
Chizumulu Island	N/A

The project area crosses mainly ephemeral streams, with approximately five crossings where water was actively flowing during the field investigations. As the field investigation was conducted in the dry season, this suggests that the five streams in question may be perennial. In the initial section, the tributaries are largely slow flowing due to the topography of the area. Large rainfall events, however, may result in high velocity flow due to the volume of water exiting a defined drainage area. The Rukuru-Kasitu River valley, located approximately 30 km from the Kacheche start point of the project area, features high velocity stream flow as the norm. The valley sides are steep, resulting in significant erosion where natural vegetation has been cleared for agriculture, or where footpaths have been created close to the stream invert.

The river catchments in the project area are, in general, sensitive in nature due to biodiversity. This includes the entire area from the pass down to Lake Malawi that lies between 58 km to 66.5 km. It should, however, be noted that biodiversity is not specifically linked to water courses (Figure 10). Other important biodiversity areas are discussed under Lakes and Wetlands (Section 7.7.3 and 7.7.4).

Channel slope and slope characteristics

The characteristics of the first 35km of road are that of a large, flat floodplain characteristic of both sides of the river. Field observations for this indicate a meandering river, featuring sand bars midstream. The river was viewed during the dry season, leading to it being tortuous in nature. Large

portions of the floodplains had been converted into agricultural land, dominated by subsistence agriculture.

After the confluence of the South Rukuru River and the Kasitu River (10 km's from the start point at Kacheche), the flow was noticeably larger in volume and velocity when viewed from sections of the M1 (between 20 and 30kms). Sand bars, however, remain evident. After approximately 30 km from the start point, the surrounding topography merges to form a strongly defined valley. Within this section of the South Rukuru River, the channel characteristics change from one predominantly characterised of sand deposits to an absence of such deposits (i.e. the river course consists of rock and boulders). River flow velocity increases and agriculture largely ceases. These characteristics remain the same until the South Rukuru River discharges into Lake Malawi. The longitudinal profile of the river is shown in Figure 10.

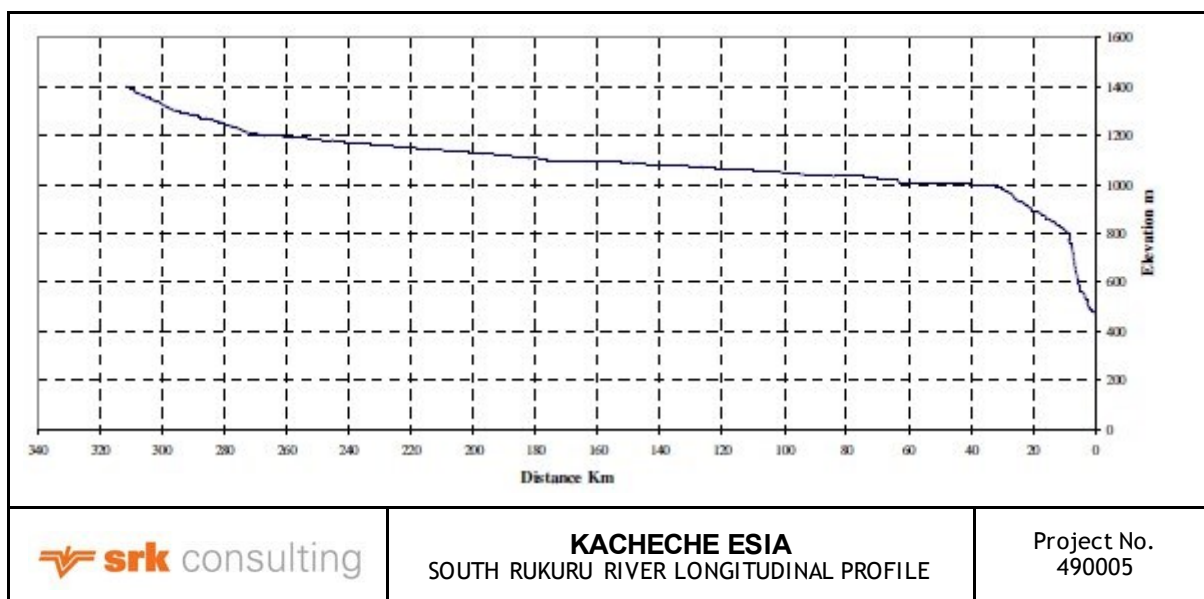
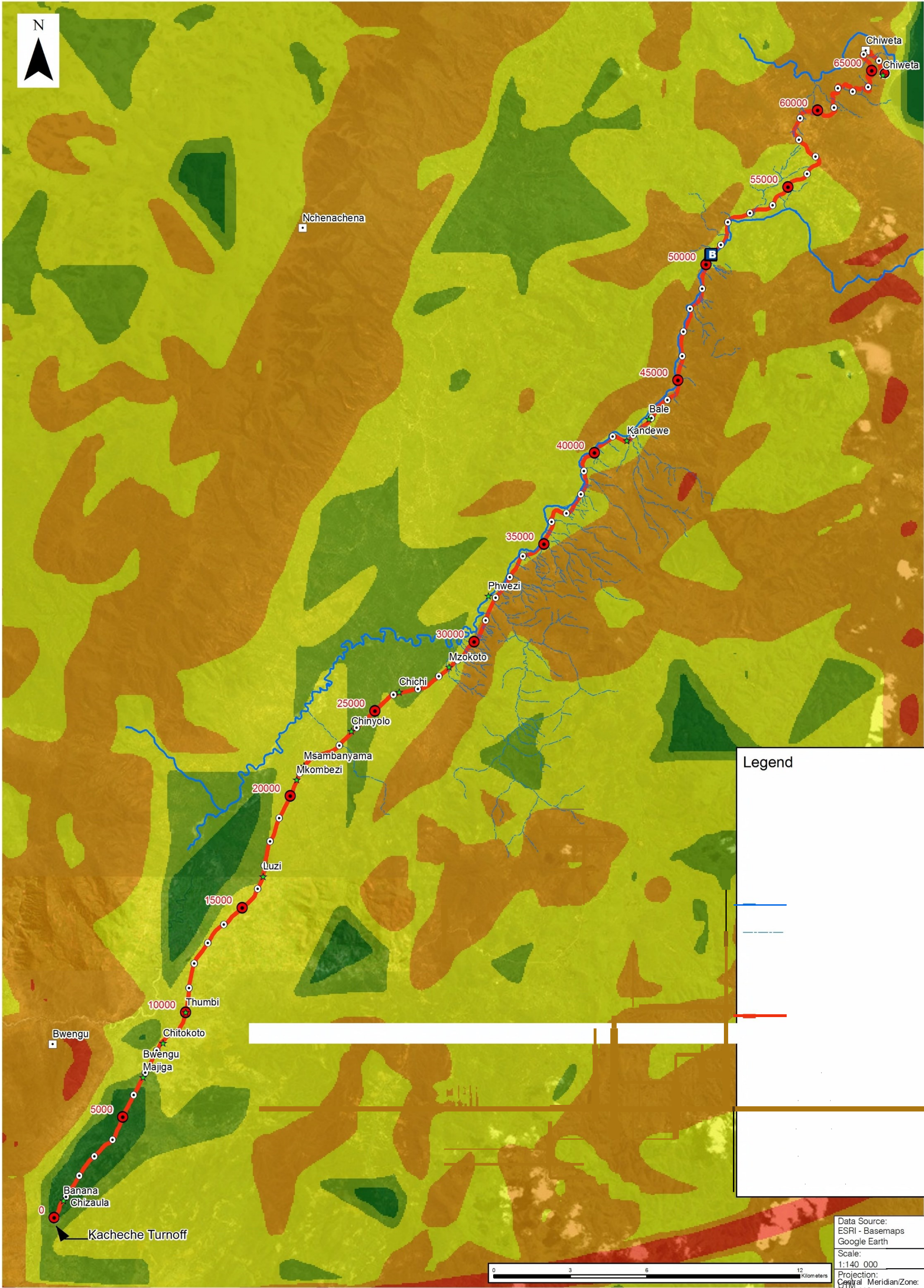


Figure 10: South Rukuru River longitudinal profile (Kumabala, 2010)

The typical slopes of the area are shown in Figure 11. The slopes in the first 6 km's of the road are less than 0.6 degrees (<1 in 100 slope). On such slopes, stormflows will move relatively slowly and erosion is far less likely. However, for most of the route, approximately 60 km's toward Lake Malawi, slopes are generally steeper, and this will generate faster flows. An example of this is the 5.8 to 18 degree range seen in the second half of the M1 road section. When slopes exceed 18 degrees, revegetation is difficult to achieve, but fortunately, very little of the route is characterised with such slopes.



Legend

Data Source: ESRI - Basemaps Google Earth	
Scale: 1:140 000	
Projection: Central Meridian/Zone: Zone 36S	
Date:	Compiled by:
31/08/2016	ALLK
Project No. 490005	Fig No. 11
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In general, the slopes that were noted as typical slopes in the area will produce storm flows that will be relatively high, and associated erosion risks are also likely to be high. During the field investigation, as noted above, erosion was observed in the latter portion of the route. Erosion was also observed at many river crossings. At most culverts, it was noted that silt deposition had occurred upstream of the culvert and erosion downstream of the culvert. The preliminary engineering study (Civil and Planning Group, 2016). Water quality concerns were identified and baseline conditions determined. The water quality parameter of greatest concern is silt and sedimentation as this is a particular threat to biodiversity in Lake Malawi (Jorgensen, 2005). Jorgensen (2005) also noted nutrient inputs as a concern, however roads are not typically a source of nutrient inputs. Sediment transport and siltation, particularly from erosion, was also noted in the IFC EHS guidelines for Toll Roads (IFC 2007). Consequently, the field observations focused on sedimentation and erosion. At most culverts, it was noted that silt deposition had occurred upstream of the culvert and erosion downstream of the culvert. The preliminary engineering study (Civil and Planning Group, 2016) also noted siltation at a large number of river crossings.



Figure 12: An example of siltation at Chainage 37170 (Civil and Planning Group, 2016)

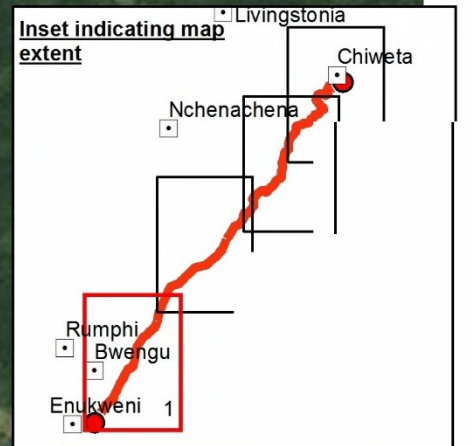
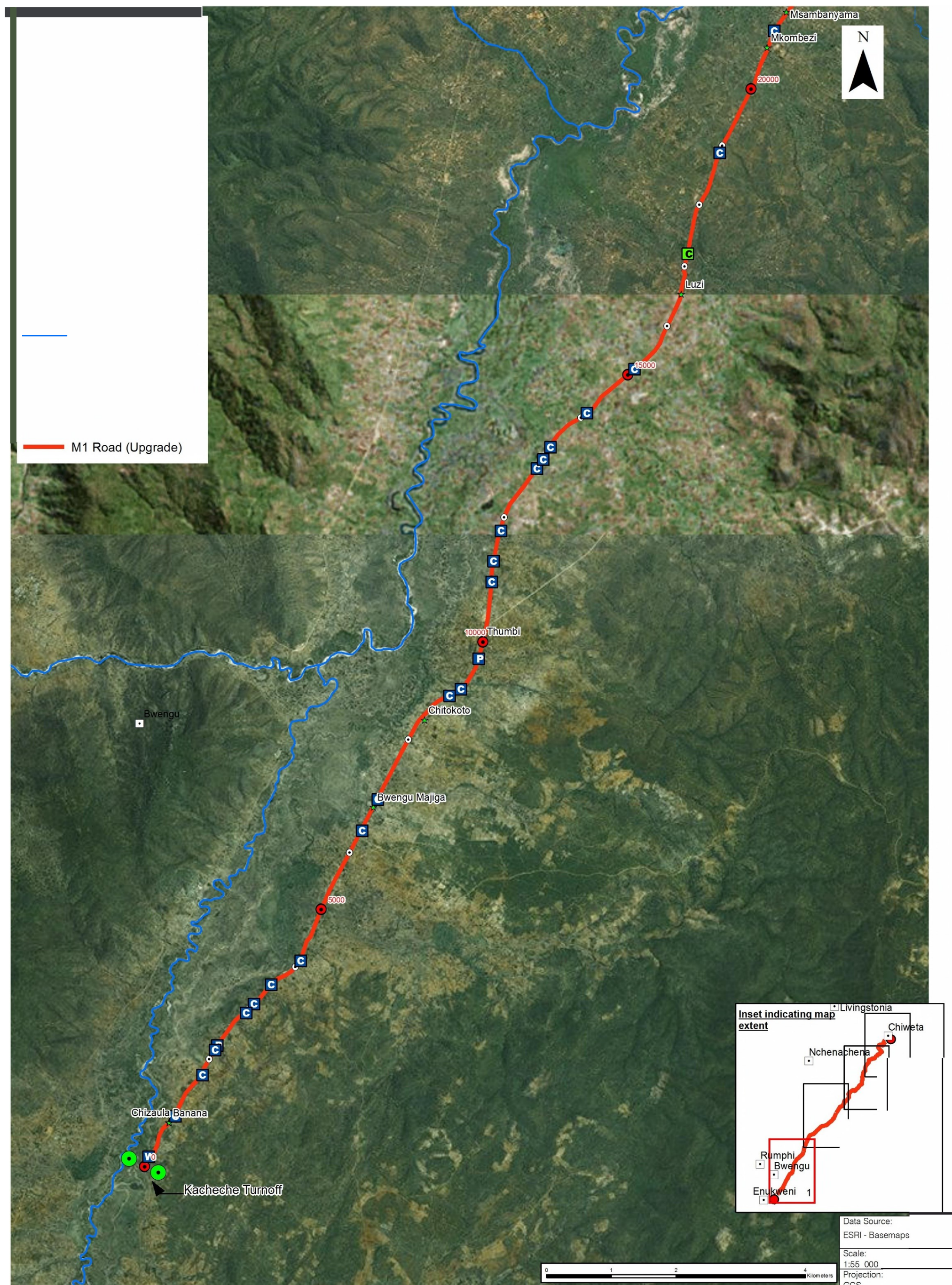
Other water quality parameters can be affected by roads and road users. These parameters range from hydrocarbons to heavy metals to the cement used during construction. Baseline assessment of all possible contaminants from roads was not possible as the variety of chemicals was so great. Furthermore, the large number of rivers crossing renders adequate coverage impractical and prohibitively expensive. Nonetheless, a few general water quality parameters were collated from available literature and indicated that water in Lake Malawi is fresh with an average salinity of 230 umhos/cm (Hughes 1997) and has a relatively high pH of between 8.2 and 8.8. The South Rukuru River, the main river in the study area, is also fresh and has an average TSS (total suspended solids) value of 289 mg/l (Kingdon et al 1997). Other major rivers contributing to Lake Malawi varied from 43 mg/l to 705 mg/l and thus the South Rukuru River carries a slightly below average, but still significant level of suspended solids. The data suggests that some impact from sediment transport already exists which is in agreement with observations on site.

Drainage lines

The drainage lines which cross the M1 road in the project area and discharge to the South Rukuru River, have been spatially logged, as shown in Figure 13 to Figure 16. Note that the rivers shown in these figures provide a general overview of river density rather than showing accurate locations. The rivers were delineated through satellite imagery from Google Earth. As described above, the initial section is characterised by a large flood plain, indicating that the river is running slowly because of a flat gradient. Culvert spacing is reasonably far apart, with the drainage lines on average 10 m wide.

After the confluence of the South Rukuru River and the Kasitu River, the Rukuru-Kasitu valley results in a steeper topography on either side of the river. In this area, the number of culverts increases significantly as additional culverts are required to drain an equivalent sized area. The increase in the frequency of culverts is evident in the north-east of Figure 14. This trend continues until the end of the project area at Chiweta (refer to Figure 16).

The M1 road crosses over the South Rukuru River at approximately 50 km from the start position. The bridge features two piers founded within the portion of the river experiencing regular flow. The banks have been sloped and protected from erosion by a stone and cement layer. Hydraulically, the structure is capable of passing the 1:100-year flood, with a 1.45 m freeboard (Civil and Planning Group, 2016). The bridge features discussed are shown as inserts in Figure 15.

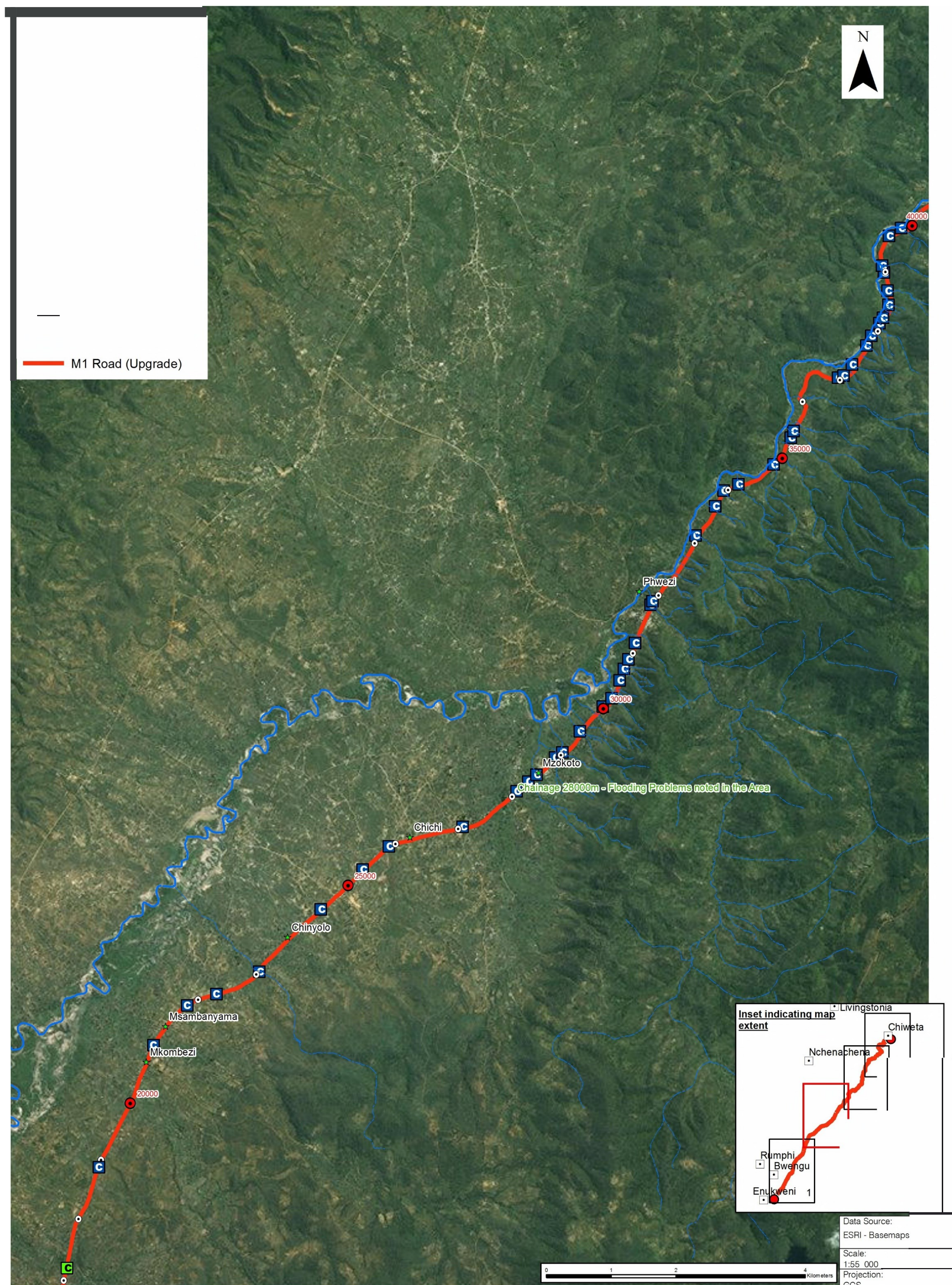


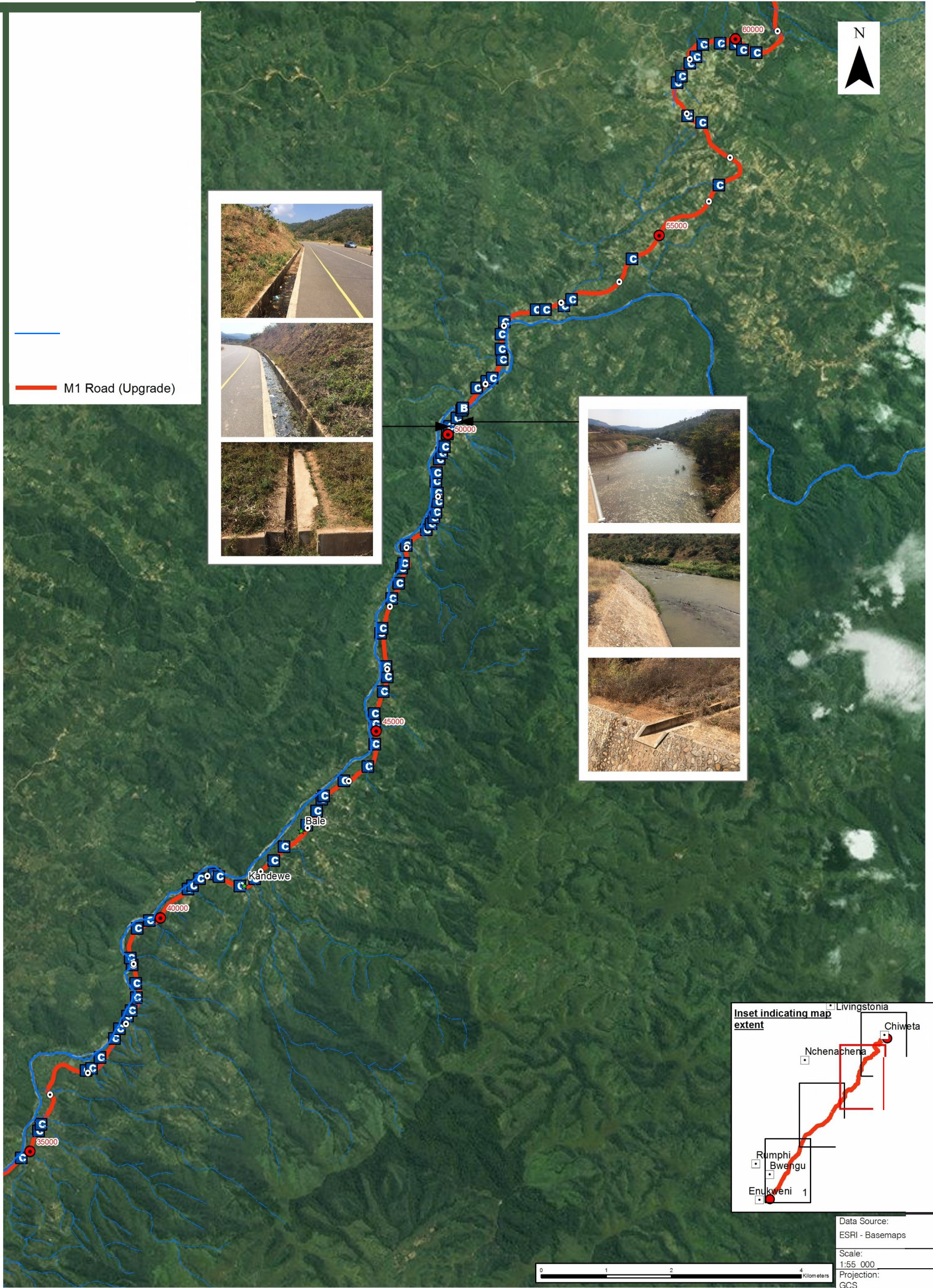
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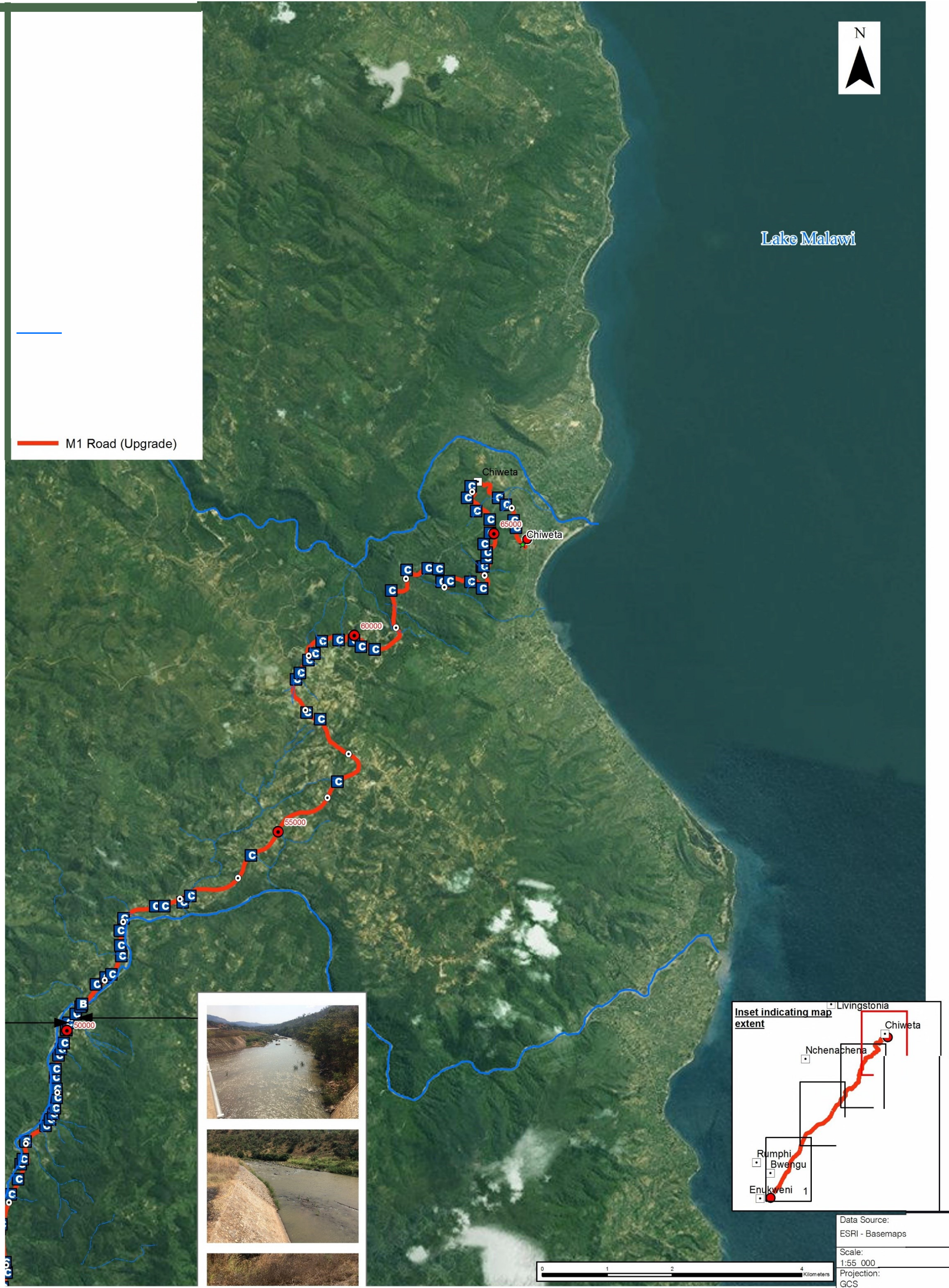
Scale:
1:55,000

Projection:
GCS

Central Meridian/Zone:







7.7.2 Water use

Surface water is used in several ways, but most commonly for irrigation and water supply (Kumambala, 2010). The volumes of surface water used from the South Rukuru River as mentioned by Kumambala, (2010) are as follows:

- Irrigation – 17,000 m³ per day;
- Domestic, industrial and other uses water supply - 16,000 m³ per day; and
- A small portion is licensed to rural piped water supply schemes.

The site visit and discussions with local communities indicated that river water is also used for washing. Water transfer infrastructure for the existing M1 road in the form of large ARMCO pipes (2500 – 3000 mm diameter) were observed being used by the community as tunnels to transfer stock across the road.



Figure 17: An ARMCO pipe at chainage 20500

7.7.3 Lakes

The only lake within the project area is Lake Malawi. Lake Malawi is a freshwater lake with a surface area of 28,800 km² and a maximum estimated depth of about 800 m (Crul, 1997). Three countries Malawi, Mozambique and Tanzania border the lake. Lake Malawi has a catchment of approximately 126,500 km² draining Malawi, Mozambique and Tanzania (Crul, 1997). The entire project area falls within the catchment of Lake Malawi, with all the watercourses that cross the project area ultimately discharging into the lake. The Kasitu River crosses the M1 near after 10 km from the Kacheche turnoff and flows into the South Rukuru River which is one of the three main rivers feeding Lake Malawi.

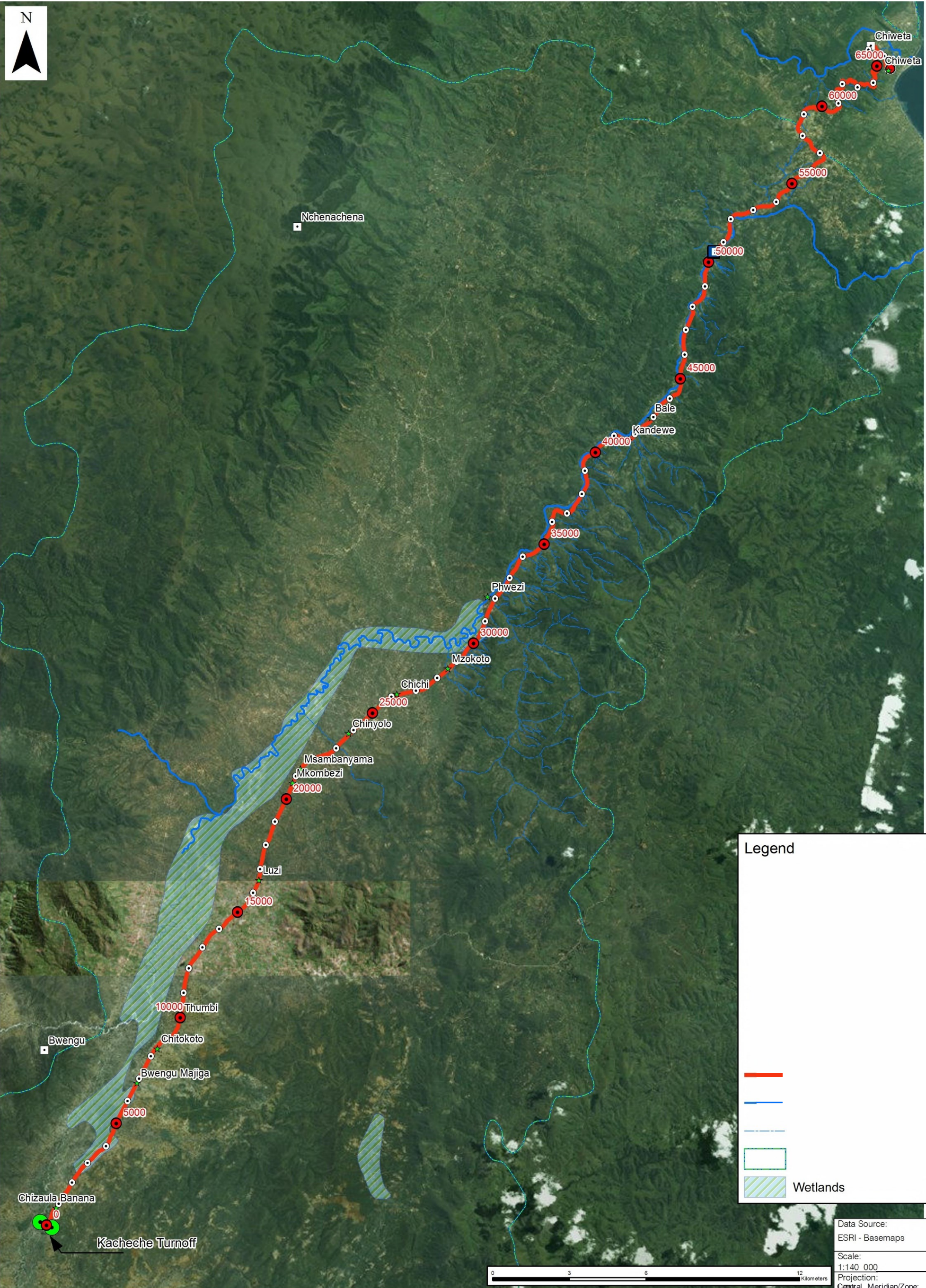
The lake also has a greater diversity of fish species than any other lake in the world, which is the principal reason part of it at the Lake Malawi National Park has been declared a UNESCO World Heritage Site (Sheila, 2000). A recent study indicated that the fish population has declined dramatically in recent years with research suggesting

that overfishing and water quality changes due to poor agricultural practices, deforestation and biomass burning (Jorgensen, 2005). Lake Malawi is a freshwater lake with low nutrient concentrations. The quality of the water varies with depth due to stratification, and with location given the size of the lake. The major threats to lake water quality include increased nutrient inputs, and possible sediment loading (Jorgensen, 2005).

The most significant use in the Lake Malawi area is for fishing which is extremely important to the economy and food supply of Malawi. Fisheries in Malawi are largely dependent on the lake, which supports nearly 1.6 million people, and contributes about 4 percent of the Gross Domestic Product (FAO, 2005). Water from Lake Malawi is also used for irrigation and domestic supplies. However, extraction from the lake is relatively small, and is not included in water balance calculations for the lake (Crul, 1997).

7.7.4 Wetlands

There were no wetlands immediately adjacent to the linear project area. The wetland extent shown in Figure 18 is taken from a regional database, and as a result does not match perfectly with the situation observed on the site visit. It does give a good general idea of the topography surrounding the river and the favourable conditions for wetlands to exist. Furthermore, the flat topography of the initial 30 km stretch northwards from Kacheche is however characterised by a large flood plain. Some wetlands were evident within this flood plain (between 0.5 and 3 km west of the project area). Based on consultation with local communities, the extent of these wetlands in the wet season could be delineated. Figure 18 shows the area where wetlands are known to occur during the wet season. In other portions of the project area, subsistence agriculture was commonplace within areas where wetlands may have occurred but have since been destroyed.



Legend

Wetlands

Data Source:	
ESRI - Basemaps	
Scale:	
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Projection:	
Central Meridian/Zone:	
Zone 36S	
Date:	Compiled by:
31/08/2016	ALLK
Project No.	Fig No.
490005	18
Revision: A Date: 01/09/2016	

7.8 Biodiversity baseline environment

The need for a biodiversity study was identified to assess potential risks and impacts of the proposed project. The biodiversity study consisted of a desktop review of relevant information pertaining to biodiversity in Malawi and in relation to the project. A rapid field investigation was then undertaken with an in-country field worker to identify potential species of importance along the project route. Afterwards, all information gathered was used to inform a biodiversity impact assessment and the identification of management measures to mitigate impacts.

The biodiversity baseline information presented in this section is informed by a review of existing documentation and desktop and field investigations.

7.8.1 Biodiversity of Malawi

Malawi consists of four ecoregions including Central and Eastern Miombo Woodlands, Rift Valley Lakes, Southern Rift Montane Woodlands, and Zambezian Flooded Savannas, which constitute the country's unique and diverse flora, fauna and ecosystems (Olson D, 2001). Malawi has 87 forest reserves, five national parks, four wildlife reserves and three nature sanctuaries. Most of these protected areas are Important Bird Areas (IBAs).

Terrestrial ecosystems in Malawi include forests, mountains and grasslands, while aquatic ecosystems are typified by wetlands, lakes and rivers. As reported in the fifth Convention on Biological Diversity (CoBD) Country Report, the most biologically diverse areas in the country are the highlands, such as Nyika Plateau, which support large patches of evergreen forests and high altitude grassland, and Mulanje Mountain, which represent the largest area of montane forests in Malawi. Aquatic ecosystems cover about 20% of the total surface area of Malawi and are habitats to a diversity of species such as fish, amphibians, reptiles and water lilies. IUCN Red Data List (2016), indicates that Malawi has 176 threatened species (Critically Endangered, Endangered and Vulnerable categories only).

Flora of Malawi

The fifth CoBD report indicates that Malawi has over 6,000 flowering plant species of which 122 are endemic and 24 are considered threatened species. Genetic resources of different plant species are conserved at the National Plant Genetic Resource Centre, Agricultural Research station, Botanical Gardens, Academic institutions and Forestry Research Institute of Malawi. A list of threatened plant species for Malawi, as reflected in the 2016 IUCN Red Data List, is provided in Table 26 and plant species protected by the National Park and Wildlife Act (1994) are provided in Table 27.

Table 26: List of Red Data List flora species (2016)

Genus	Species	Common names	Usage	Red List status
<i>Widdringtonia</i>	<i>whytei</i>	Mulanje Cedar, Mulanje Cedarwood, Mulanje Cypress	Timber	CR
<i>Eriocaulon</i>	<i>selousii</i>	None known	Not known	EN
<i>Buxus</i>	<i>nyassica</i>	None known	Not known	EN
<i>Marsdenia</i>	<i>exellii</i>	None known	No known use	EN
<i>Aldrovanda</i>	<i>vesiculosa</i>	Waterwheel, Common Aldrovanda	Not known	EN
<i>Deinbollia</i>	<i>nyassica</i>	None known	Not known	EN
<i>Dyschoriste</i>	<i>nyassica</i>	None known	Not known	EN
<i>Podocarpus</i>	<i>henkelii</i>	Henkel's Yellowwood, Falcate Yellowwood	Timber	EN
<i>Encephalartos</i>	<i>gratus</i>	Mulanje Cycad	Not known	VU
<i>Hylebates</i>	<i>chlorochloe</i>	None known	Not known	VU
<i>Angraecopsis</i>	<i>parva</i>	None known	Not known	VU
<i>Schefflera</i>	<i>stolzii</i>	None known	Not known	VU
<i>Philippia</i>	<i>nyassana</i>	None known	Not known	VU
<i>Euphorbia</i>	<i>lividiflora</i>	None known	Not known	VU
<i>Trichocladus</i>	<i>goetzei</i>	None known	Not known	VU
<i>Tinnea</i>	<i>vesiculosa</i>	None known	Not known	VU
<i>Ocotea</i>	<i>kenyensis</i>	Mock Stinkwood	Not known	VU
<i>Cola</i>	<i>mossambicensis</i>	None known	Not known	VU
<i>Morinda</i>	<i>asteroscepa</i>	None known	Not known	VU
<i>Khaya</i>	<i>anthotheca</i>	African Mahogany, White Mahogany	Timber, bark for medicine	VU
<i>Zanthoxylum</i>	<i>deremense</i>	None known	Timber, bark for medicine	VU
<i>Justicia</i>	<i>rodgersii</i>	None known	Not known	VU
<i>Ternstroemia</i>	<i>polypetala</i>	None known	Not known	VU
<i>Rawsonia</i>	<i>burt-davyi</i>	None known	Timber	VU

Table 27: Flora species protected by National Parks and Wildlife Act (1994)

Scientific Name	Common Name	Vernacular Names
<i>Adina microcephala</i> (<i>Breonadia microcephala</i>)	Redwood	Mw enya; Chonya; Mgw enya; Mung'ona; Mw ina; Mungw ina
<i>Azelia quanzensis</i>	Mahogany Bean	Msambamfumu
<i>Borassus aethiopum</i>	Deleb Palm, Palmyra Palm	Mvumo
<i>Bridelia micrantha</i>	Coast Gold leaf	Mpasa
<i>Burkea africana</i>	Ash	Mkalati; Kalinguti
<i>Colophospermum mopane</i>	Butterfly Tree/Turpentine	Tsanya; Sanya; Mopani
<i>Cordyla africana</i>	Sunbird Tree, Wild Mango	Mtondo
<i>Hyphaene crinata</i>	Doum Palm	Mgw alangw a
<i>Khaya anthotheca</i>	Mahogany	Mbaw a
<i>Pterocarpus angolensis</i>	African Teak	Mlombw a
<i>Terminalia sericea</i>	Yellow Wood	Naphini; Mpini

Fauna of Malawi

Animal species in Malawi comprise both terrestrial and freshwater aquatic vertebrates and invertebrates. The fifth CoBD report indicates that there are about 192 mammal species in Malawi, of which ten are listed as threatened under IUCN, 2016. About 83 species of amphibians have been recorded in Malawi of which six species are endemic and six are threatened. The country has 145 species of reptiles of which 12 are endemic and four are threatened. There are 664 known bird species, of which, four are endemic and 18 are threatened. The total number of fish species found in Malawi is estimated to be in excess of 850 species of which 98 are considered threatened. Over 800 fish species have been described in Lake Malawi, 95% being haplochromine cichlids, and 99% of which are endemic to the Lake.

Table 28: List of Red Data List fauna species (2016)

Class	Genus	Species	Common names	Red List status
Insects	<i>Oreocnemis</i>	<i>phoenix</i>	Mulanje Damsel	CR
	<i>Allocnemis</i>	<i>maccleeryi</i>		CR
	<i>Allocnemis</i>	<i>montana</i>		EN
	<i>Umma</i>	<i>declivium</i>	Green-banded Sparklewing	VU
	<i>Teinobasis</i>	<i>alluaudi</i>	Indian Ocean Fineliner, Seychelles Fineliner	VU
	<i>Nepogomphoides</i>	<i>stuhlmanni</i>		VU
	<i>Chlorolestes</i>	<i>elegans</i>	Elegant Malachite	VU
Amphibians	<i>Arthroleptis</i>	<i>francei</i>	Ruo River Screeching Frog, France's Squeaker	EN
	<i>Ptychadena</i>	<i>broadleyi</i>	Broadley's Ridged Frog	EN
	<i>Amietia</i>	<i>johnstoni</i>	Johnston's River Frog	EN
	<i>Nothophryne</i>	<i>broadleyi</i>		EN
	<i>Hyperolius</i>	<i>inyangae</i>	Nyanga Long Reed Frog	VU
	<i>Hyperolius</i>	<i>spinigularis</i>	Spiny-throated Reed Frog	VU

Class	Genus	Species	Common names	Red List status
Birds	<i>Gyps</i>	<i>africanus</i>	White-backed Vulture	CR
	<i>Necrosyrtes</i>	<i>monachus</i>	Hooded Vulture	CR
	<i>Trigonoceps</i>	<i>occipitalis</i>	White-headed Vulture	CR
	<i>Aquila</i>	<i>nipalensis</i>	Steppe Eagle	EN
	<i>Torgos</i>	<i>tracheliotos</i>	Lappet-faced Vulture	EN
	<i>Balearica</i>	<i>regulorum</i>	Grey Crow ned-crane	EN
	<i>Apalis</i>	<i>flavicularis</i>	Yellow -throated Apalis	EN
	<i>Acrocephalus</i>	<i>griseldis</i>	Basra Reed-w arbler	EN
	<i>Alethe</i>	<i>choloensis</i>	Thyolo Alethe, Cholo Alethe	EN
	<i>Zoothra</i>	<i>guttata</i>	Spotted Ground-thrush	EN
	<i>Ardeola</i>	<i>idae</i>	Madagascar Pond-heron	EN
	<i>Polemaetus</i>	<i>bellicosus</i>	Martial Eagle	VU
	<i>Sagittarius</i>	<i>serpentarius</i>	Secretary Bird	VU
	<i>Bucorvus</i>	<i>leadbeateri</i>	Southern Ground-hornbill	VU
	<i>Falco</i>	<i>fasciinucha</i>	Taita Falcon, Teita Falcon	VU
	<i>Buggeranus</i>	<i>carunculatus</i>	Wattled Crane	VU
	<i>Apalis</i>	<i>chariessa</i>	White-w inged Apalis	VU
	<i>Hirundo</i>	<i>atrocaerulea</i>	Blue Sw allow	VU
	<i>Egretta</i>	<i>vinaceigula</i>	Slaty Egret	VU
Mammals	<i>Diceros</i>	<i>bicornis</i>	Black Rhinoceros	CR
	<i>Lycaon</i>	<i>pictus</i>	African Wild Dog	EN
	<i>Myosorex</i>	<i>gnoskei</i>	Nyika Burrow ing Shrew	EN
	<i>Acinonyx</i>	<i>jubatus</i>	Cheetah, Hunting Leopard	VU
	<i>Panthera</i>	<i>leo</i>	African Lion	VU
	<i>Panthera</i>	<i>pardus</i>	Leopard	VU
	<i>Hippopotamus</i>	<i>amphibius</i>	Hippopotamus	VU
	<i>Smutsia</i>	<i>temminckii</i>	Ground Pangolin, Cape Pangolin	VU
	<i>Loxodonta</i>	<i>africana</i>	African Elephant	VU
	<i>Otomys</i>	<i>lacustris</i>	Tanzanian Vlei Rat	VU
Reptiles	<i>Rhampholeon</i>	<i>chapmanorum</i>	Chapman's Pygmy Chameleon	CR
	<i>Nadzikambia</i>	<i>mlanjensis</i>	Mulanje Chameleon	EN
	<i>Rhampholeon</i>	<i>platyceps</i>	Mount Mulanje Pygmy Chameleon, Malaw i Stumptail Chameleon	EN
	<i>Cycloderma</i>	<i>frenatum</i>	Zambezi Flapshell Turtle	EN
Gastropods	<i>Lanistes</i>	<i>nyassanus</i>		EN
	<i>Lanistes</i>	<i>solidus</i>		EN
	<i>Bellamya</i>	<i>robertsoni</i>		EN
	<i>Bulinus</i>	<i>succinoides</i>		EN
	<i>Melanoides</i>	<i>truncatelliformis</i>		VU

Table 29: Fauna species protected by National Parks and Wildlife Act (1994)

Mammals	Reptiles	Fish	Birds
<ul style="list-style-type: none"> Bushbuck Warthog Common Duiker Buffalo Brown Hyena Cheetah Blue Monkey Eland Elephant Rhinoceros Hartebeest Hippopotamus Impala Klipspringer Kudu Leopard Livingstone's Suni Nyala Oribi Sable Sharpe's Grysbok Waterbuck, Zebra Cape Hunting Dog Civet Serval Jackal Lion Puku Red Duiker Pangolin Aardvark Bush Baby 	<ul style="list-style-type: none"> Crocodile Python Cobra Viper Mamba Boomslang Monitor Lizard Tortoise Turtles 	<ul style="list-style-type: none"> Tiger Fish Mbuna Mpasa (Opsaridium microlepis) Nchila (Labeo messops) Kadyakolo (Barbuseurys Stomus) 	<ul style="list-style-type: none"> Turaco Lilian's Love Bird White Stork Trogon Black Ducks Guinea Fowls all species of Parrots all species of Rollers all species of Cranes Ground Wood Pecker Denham's, Kori and Stanley's Bustards all species of Owl Secretary-Bird Red Winged Francolin all species of Eagle Ground Horn bill

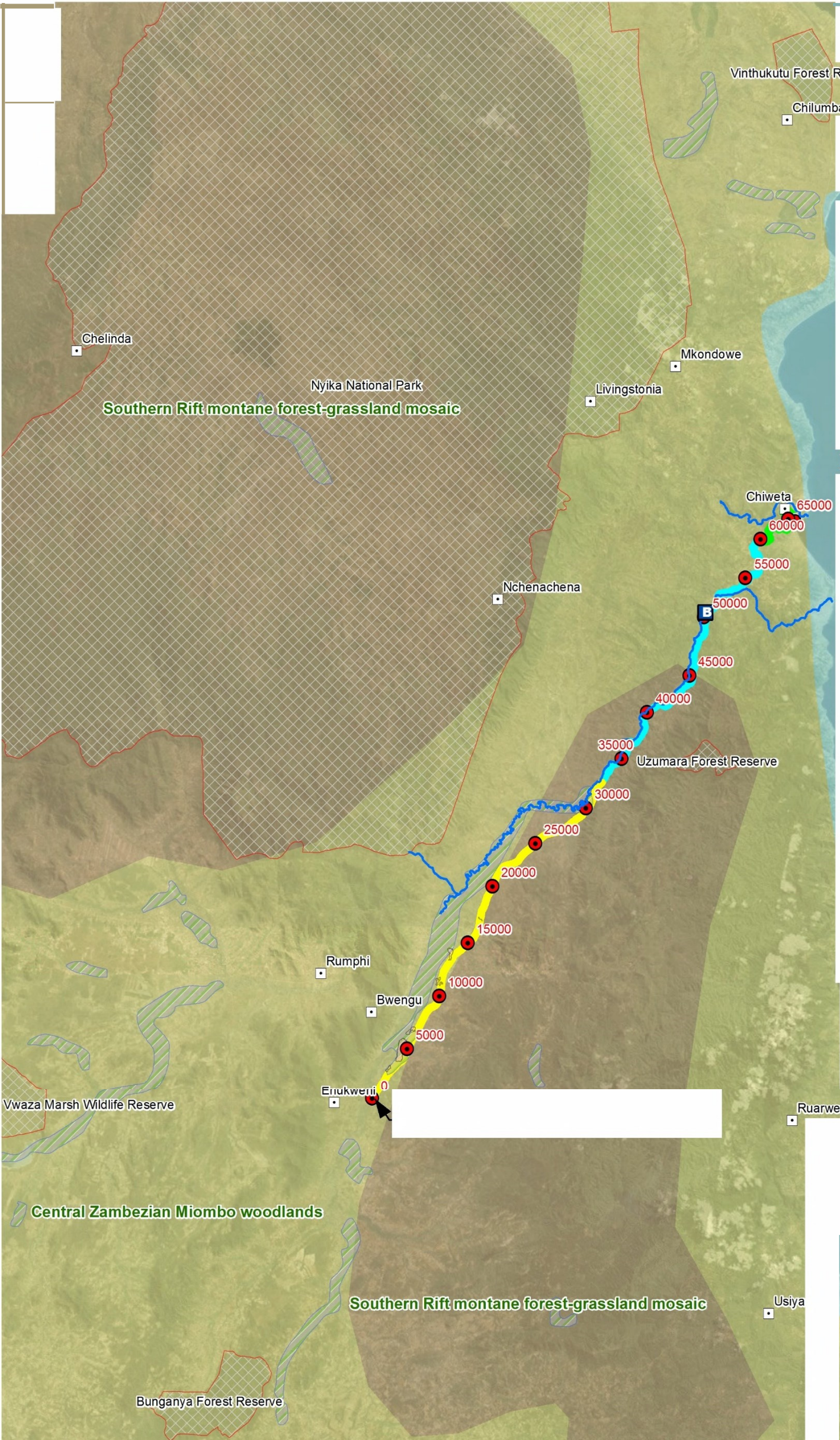
7.8.2 Regional biodiversity features

The project site runs along the eastern boundary of the Malawi-Zambia Transfrontier Conservation Area (TFCA). The TFCA connects the Nyika National Park (largest national park in Malawi) and Vwaza Marsh Wildlife Reserve (both Malawi) in the north, to the North Luangwa National Park (Zambia) in the south. The project area runs directly adjacent to the Nyika National Park eastern border, approximately 4 km to its closest point and 15 km at its furthest. The closest point of the project to the national park is approximate at the 10 000 m road marking point. Figure 19 presents a map showing these regional conservation features.

The topography of the project area influences the habitat types with two primary vegetation types within the vicinity. The lower valley and valley depression areas consist of Central Zambezian Miombo Woodlands. While the highland areas consist of a Southern Rift Montane Forest and Grassland Mosaic. Miombo woodland typically comprises of mature, relatively undisturbed woodland vegetation with a partly closed canopy constituting the reference vegetation for the region. Generally dominated with trees from the general *Brachystegia*, *Julbernardia* and *Isoberlinia*. Dambos, such as those present

in the Henga Valley along the South Rukuru River, are distinctive features of the Miombo region and consist of seasonally waterlogged shallow valley depressions and largely treeless grasslands.

Southern Rift Montane Forest and Grassland Mosaic consists of a series of mountains and plateaus centered on the shores of Lake Malawi. Altitude and climate are the main factors separating this ecoregion from the surrounding Miombo ecoregions. The ecoregion is composed of several structurally and compositionally distinct vegetation communities, the most dominant of which is grassland. Afromontane forest is confined to fire-sheltered pockets, moist escarpments, valleys and watercourses. The Nyika Plateau has a high species richness in orchid flora, totalling 214 species.



Legend

Rukuru Bridge

Rivers

Chainage (Major)

ns

rt & End Points

Wetlands / Dambos

Endruthed Wetlands / Dambos

Wetlands

D Protected Areas

Predominant Landtype

Section 1 - Modified Habitat

Section 2 - South Rukuru River Valley

Section 3 - Escarpment forest

strial Eco-Regions

Tropical and subtropical grasslands, savannas, and shrublands

Montane Grasslands and Shrublands

Lakes

Data Source:

ESRI - Basemaps

VVDB - Protected Areas

Scale:

1:35000

Projection: UTM Datum: WGS84

Central Meridian/Zone: 36S

Date: 01/09/2016 Compiled by:

7.8.3 Regional threats to biodiversity

The National Biodiversity Strategy and Action Plan (SABP II) provides the most recent information on threats to biodiversity in Malawi and is summarised below. The report states that protected areas have the richest biodiversity, while public and community areas are characterized by general degradation of resources largely due to habitat loss and overexploitation. This has contributed to the declining status of biodiversity in Malawi. Terrestrial and aquatic ecosystems of the country are being modified and degraded and species composition is being altered due to unsustainable utilization and management of natural resources. However, biodiversity contributes significantly to economic growth and poverty alleviation. The report reflects the following key threats to biodiversity for Malawi:

- Habitat loss;
- Over-exploitation of biological resources;
- Pollution;
- Invasive Alien Species (IAS); and
- Climate change.

High population growth has created a demand for settlement and agricultural land as well as natural resources such as fisheries and forest resources. This has resulted in a loss of habitats and species diversity, mainly driven by deforestation. Indiscriminate cutting of trees, commercial harvesting and conversion of forest land to settlement and agriculture. Although a few indigenous tree species yield good timber, most are poor in commercial timber. Species such as *Widdringtonia cuppresoides* (Mulanje cedar), *Pterocarpus angolensis* (mlombwa) and *Khaya anthotheca* (mbawa) produce quality and durable hard wood and as a result, their populations are threatened due to unsustainable harvesting. Fields for subsistence agriculture are generally always planted and often occur in the dambos and along riverbanks. Bushfires are also a major contributing factor to habitat destruction leading to changes in species composition of both flora and fauna.

Population growth in Malawi has also increased demand for resources, which has led to overharvesting of natural resources like forests and fisheries. Forest resources are being exploited because of an increasing demand for biomass energy, which is the main source of energy in Malawi. The 2008 population and housing census revealed that 43% of all households in urban areas use charcoal for cooking, 41.8% use firewood and only 13.6% use electricity. The clearing of vast amounts of forests for charcoal production has led to alteration of species compositions in the forests, as most of the trees favoured for charcoal production have been removed.

IAS like *Pinus patula* (pine), *Rubus elipticus* (Himalayan raspberry) and *Pteridium aquillinum* (Bracken fern) are found on Mulanje Mountain and Nyika National Park. Bracken fern has widely spread in Nyika National Park, where it has invaded grasslands important for wildlife grazing and tourism. The agriculture sector has also been affected by several invasive alien species, including cassava mealy bug, cassava green mite, larger grain borer and spotted stalk borer that have caused great losses in agricultural production.

Malawi is vulnerable to adverse effects of climate change. Floods and droughts are the most common occurrences that affect biodiversity in the country. Habitat and tree cover loss in fragile ecosystems could lead to an increase in occurrences and impact of floods. Climate change also affects species assemblages that are sensitive to temperature changes, such as the montane forests.

7.8.4 Project area observations from the field investigation

The project area traverses a diversity of habitats and current land uses, broadly divided into three sections outlined in Table 30 and reflected in Figure 19. Classification of vegetation types and land uses in the project area are as follows:

- Agriculture/cultivation – Active fields used for subsistence agricultural purposes. All cultivated fields on both sides of the road belong to subsistence farmers who cultivate a number of crops, fruits and vegetables including maize, tobacco, bananas, mustard, tomatoes, Chinese cabbage, millet, pawpaw and sugarcane. Mango trees were found in each field as well as around homesteads.
- Settlements/villages – Areas inhabited by people, including large and small homesteads, trading areas, schools and community areas. Brickmaking and associated works were also noted as a common activity.
- Wetland/riparian habitat and dambos – occurring in the valley bottom settings with permanently or seasonally wet soils. The wetland/riparian habitat present within the study area appear largely modified by subsistence agriculture.
- Woodlot/subsistence forestry stands - Due to excessive harvesting of indigenous trees, the government of Malawi has encouraged villages to plant woodlots. Almost all villages and/or individual homesteads had evidence of these, mainly *Eucalyptus* spp. but also some *Gmelina* spp. Recently, more emphasis has been placed on growing indigenous trees, especially *Khaya anthocea*, a protected species.
- Invasive and alien species (non-commercial) - Several exotic plant species including *Eucalyptus*, *Toona ciliata*, *Gmelina arboretum*, and *Melia azedarach* were also found along the road. Large trees that are within the road reserve appear to be non-commercial and not utilised by the surrounding villages. Plant species around homesteads included *Eucalyptus*, *Toona ciliata*, *Gmelina arboretum*, *Melia azedarach*, *Mangifera indica*, *Papaya carica* and *Solanum tabacum*.
- Mining – Includes the Mchenga coal mine and artisanal quarrying.
- Miombo woodland – Areas comprising mature, relatively undisturbed woodland vegetation with a partly closed canopy constituting the reference vegetation for the region. Generally dominated with trees from the *Fabaceae* family, particularly the genera *Brachystegia*, *Julbernardia* and *Isobertia*.

Table 30: Breakdown of the three board land use/land cover types present in the project area

Section Name	Section distance in relation to road upgrade	Habitat description ³	Description
1 – Henga Valley Figure 7-22 Plate 7-1	0 - +/- 31km	Modified	<ul style="list-style-type: none"> Section 1 is located within the Henga Valley. The area is a wide valley area with gently undulating topography, however, to the west of the valley, are the steep east facing slopes of the Nyika Plateau, which forms the boundary to the Nyika National Park. To the east of the valley is the Lake Malawi escarpment range. A large wetland/dambo system is present within the Henga Valley area that is associated with a tributary to the South Rukuru River. The wetland system is dominated by <i>Faidherbia albida</i>, <i>Phragmites</i> and other <i>Acacia</i> species and is largely modified. Interspersed with the agricultural plots and villages is patchy woodland comprising of Miombo woodland associated species such as <i>Brachystegia</i>. Only one protected species, <i>Khaya anthocea</i>, was recorded along this section of the road. The valley area is typified by dispersed settlements along the existing road, such as villages, trading areas and schools. The area is extensively cultivated areas for subsistence agriculture. <i>Faidherbia albida</i> is present as it is promoted as an agroforestry species by the Ministry of Agriculture & Food Security due to its ability to fix nitrogen. Community woodlots were also present along the road.
2 – South Rukuru River Valley Figure 7-23 Plate 7-2	+/-31km – +/- 56.5km	Modified	<ul style="list-style-type: none"> Section 2 is located along the banks of the South Rukuru River and is typified by steeper valley slopes. There is a decrease in the density of homesteads and associated agricultural fields and an increase in natural vegetation. However, smaller fields are present on the valley sides and the floodplain is heavily utilised for subsistence agriculture. Due to the steepness of the valley slopes, there are a greater number of drainage lines present in this section, with increased evidence of erosion in this area. The existing road crosses the South Rukuru River once before the road climbs out of the valley through disturbed stands of natural forests.

³ PS6 and ESS6 require a differentiated risk management approach to habitats based on their sensitivity and values. This addresses all habitats, categorized as 'modified habitat', 'natural habitat', and 'critical habitat', along with 'legally protected and internationally and regionally recognized areas of biodiversity value' which may encompass habitat in any or all of these categories. A detailed critical habitat assessment was not undertaken for this study due to time constraints in the field and that the project is for an upgrade of an existing road. However, flora species that are protected or are of conservation significance were recorded via GPS. Once the final alignment and placement areas associated with the road upgrade has been confirmed and marked out, a process to identify flora species that are to be removed and or relocated will need to be undertaken.

Section Name	Section distance in relation to road upgrade	Habitat description ³	Description
			<ul style="list-style-type: none"> The Mchenga coal mine and artisanal quarrying can be found towards the end of this section. The road reaches its highest elevation of approximately 1100 m.a.m.s.l.
3 – Chiweta Pass Figure 7-24 Plate 7-3	+/- 56.5km – 66.5km	Natural	<ul style="list-style-type: none"> Section 3 is located on an extension of the Nyika Plateau and the steep slopes of the Lake Malawi Escarpment. This section is typified by Miombo woodland species. As the road descends through the Chiweta pass to the village of Chiweta. Evidence of major landslides were noted due to the heavy rainfalls earlier in the year. Troop of Yellow baboons (<i>Papio cynocephalus</i>) and antelope droppings were observed. Chiweta is located on a plain on the Lake Malawi shoreline.

A summary of the biodiversity related features observed while undertaking the field investigation is provided in Table 30. Table 31 provides a list of flora species identified in relation to their protection status. No biodiversity of significant importance was observed within 30 m of the road with exception of the protected *Khaya anthocea* and *Pterocarpus angolensis* species. All dambos identified during the survey were located outside of the project area. Riparian areas and river crossings of the road are transformed and contain invasive flora species.

The majority of the habitats in the project area is transformed and heavily modified due to current subsistence agricultural, human settlements and a prevalence of alien invasive flora. However, the degraded systems and transformed agricultural land, despite the presence of alien invasive flora, still provide habitat functionality and contribute to ecological processes and ecosystem services.

Table 31: Summary of observed biodiversity related features

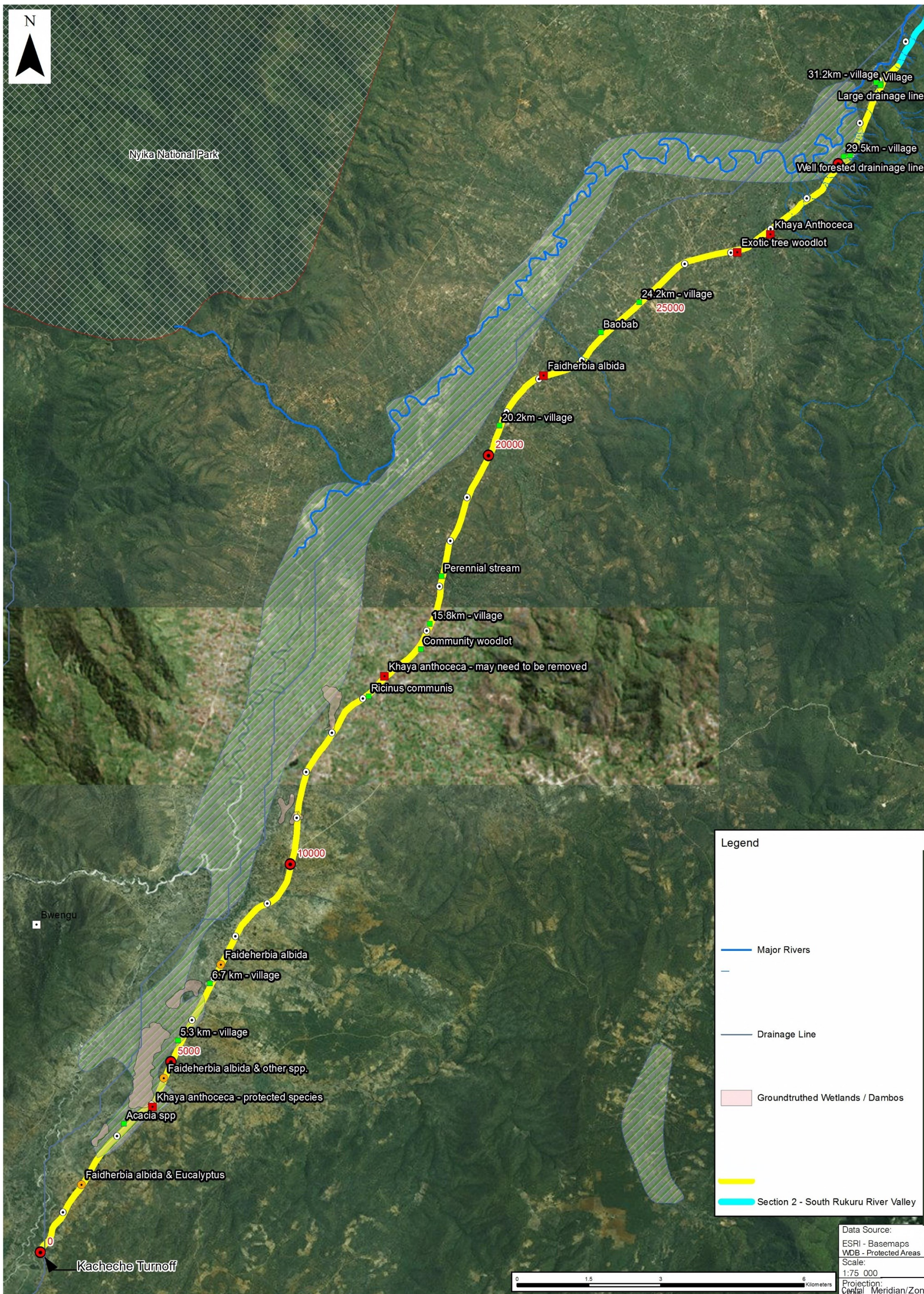
Section	Distance from start*	Description of baseline conditions
1 – Henga Valley Figure 7-22 Plate 7-1	0.0 km	<i>Acacia</i> dominated regenerating natural savannah. Present mostly to the east of the road
	1.7 km	<i>Faidherbia albida</i> trees present
	2.5 km	Dambo located on the western side of the road
	2.7 km	Agricultural fields associated with dambo above
	3.9 km	<i>Khaya anthocea</i> present
	4.6 km	Near Bwengu, before primary school grounds: A diversity of trees present including <i>F. albida</i> , <i>Eucalyptus</i> spp., mango (<i>Mangifera indica</i>), <i>Ficus</i> spp. and <i>Gmelina</i> spp., especially around homesteads
	5.4 km	<i>Faidherbia albida</i>
	6.1 km	Dambo on the western side of the road
	7.2 km	<i>Faidherbia albida</i> trees present
	8.5 km	Areas of revegetation following a disturbance, possibly flooding. Usually these areas would be cultivated but due to the drought, many fields along the road were fallow

Section	Distance from start*	Description of baseline conditions
	10.8 km	<i>Dambo</i> to the western side of the road – appears disturbed and used as a communal grazing area
	12.5 km	<i>Dambo</i> to the western side of the road
	12.7 km	<i>Acacia xanthophloea</i> indicating permanent water
	13.5 km	<i>Ricinus communis</i> in watercourse buffer area
	14.0 km	Probable woodlot with rows of <i>Eucalyptus</i> spp, <i>Melia azedrach</i> ; potential tamarind/Bwemba present
	16.5 km	Large dambo dominated by planted bananas, <i>Acacia</i> spp. and reeds
	17.8 km	Chigomezgo community: some shade trees present
		Mkombezi - <i>Eucalyptus</i> spp. woodlot
	20.3 – 20.5 km	Trees located adjacent to the road at a homestead
		Woodlot at Chaguwu, community secondary school, homesteads Mzokoto area
	22.9 km	Baobab (species not determined)
		<i>F. albida</i> , patches of regenerating natural forest, cultivated fields and homesteads on both sides of the road up to Phwezi
	25.9 km	Large <i>Brachystegia</i> used as a shade tree. Possible portion of the village courtyard
	27.1 km	<i>K. anthoceca</i> present
2 – South Rukuru River Valley Figure 7-23 Plate 7-2	34.8 km	<i>A. xanthophloea</i> and other <i>Acacia</i> spp. along a well-wooded drainage line
		Woodland just after Phwezi to eastern side of the road
		Limited area for settlements and fields hence encroachment on right of natural forest/ Savannah
	51.9 km	Cultivation is concentrated on the South Rukuru river banks
3 – Chiweta Pass Figure 7-24 Plate 7-3	57.6 km	<i>Pterocarpus angolensis</i> present
	54.6 km	Sheet erosion of mountain side (<i>Brachystegia</i> spp. dominated) due to strip cultivation
		Woodlot with <i>Acacia</i> spp. and <i>Melia azedrach</i> around the Bale school
	51.9 km	<i>K anthoceca</i> - row of planted trees
	54.6 km	<i>Julbernardia</i> spp. dominated regenerating natural forest
3 – Chiweta Pass Figure 7-24 Plate 7-3	57.6 km	Mchenga coal mine with stock yard on western side of the road
	60km – 66.5 km	Natural vegetation/woodland present

* The start was considered Kacheche and the end Chiweta

Table 32: Summary of flora species identified during the field survey (2016)

Species	Protected	Red Data List Status	Endemic	Economically important
<i>Brachystegia Spp</i>	No	No threatened <i>Spp</i> in Malaw i	No	Not determined
<i>Eucalyptus Spp</i>	No	No	No	Yes
<i>Faidherbia albida</i>	No	Not assessed	No	No
<i>Ficus Spp</i>	No	No threatened <i>Spp</i> in Malaw i	No	Not determined
<i>Gmelina Spp</i>	No	No threatened <i>Spp</i> in Malaw i	No	Not determined
<i>Julbernadia Spp</i>	No	No threatened <i>Spp</i> in Malaw i	No	Not determined
<i>Khaya anthoceca</i>	Yes	Vulnerable	No	Yes
<i>Mangifera indica</i>	No	Data deficient	No	Yes
<i>Melia azedrach</i>	No	Not assessed	No	No
<i>Pterocarpus angolensis</i>	Yes	No	No	Yes
<i>Ricinus communis</i>	No	Not assessed	No	Yes
<i>Vachellia xanthophloea</i>	No	Not assessed	No	No



Legend

- Major Rivers
- Drainage Line
- Groundtruthed Wetlands / Dambos
- Section 2 - South Rukuru River Valley

Data Source:	ESRI - Basemaps
WDB - Protected Areas	
Scale:	1:75 000
Projection:	Central Meridian/Zone:
Zone 36S	
Date:	Compiled by
3/09/2016	ALLK
Project No.	Fig No.
490005	20
Revision: A	Date: 01/09/2016



a) *Acacia* spp. in fields



b) Vegetable patches and fields alongside a dambo. A fire is noted in the background



c) Henga Valley



d) Brick-making



e) Cultivation with natural vegetation in the background



f) Cultivation and brick making



g) Large trees at the side of the road that would need to be moved



h) Communal grazing in a dambo



i) *Khaya anthoeca*



j) Typical view of the road in the first section

Plate 1: Biodiversity features associated with Section 1 (0km – 31km) of the project area

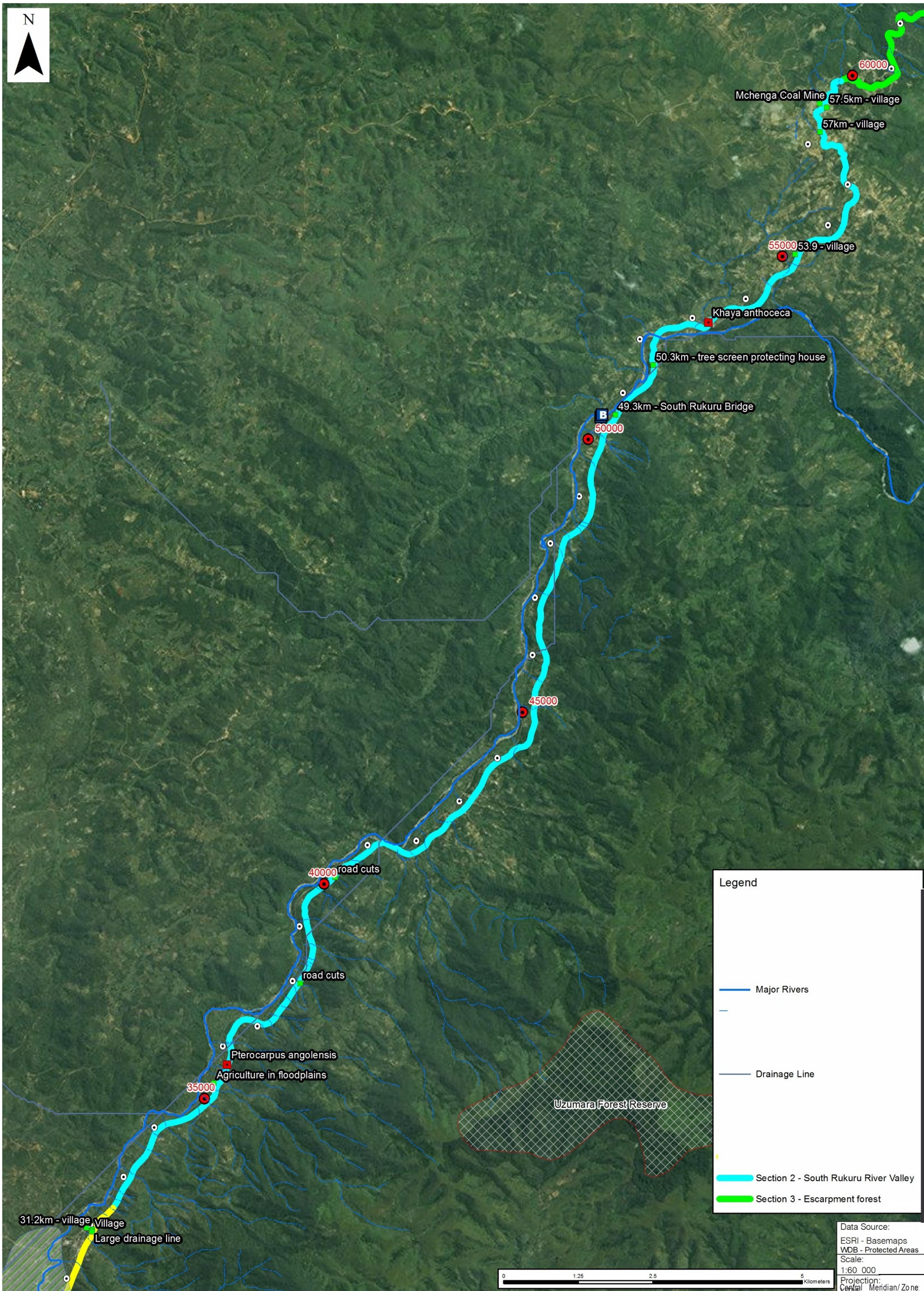
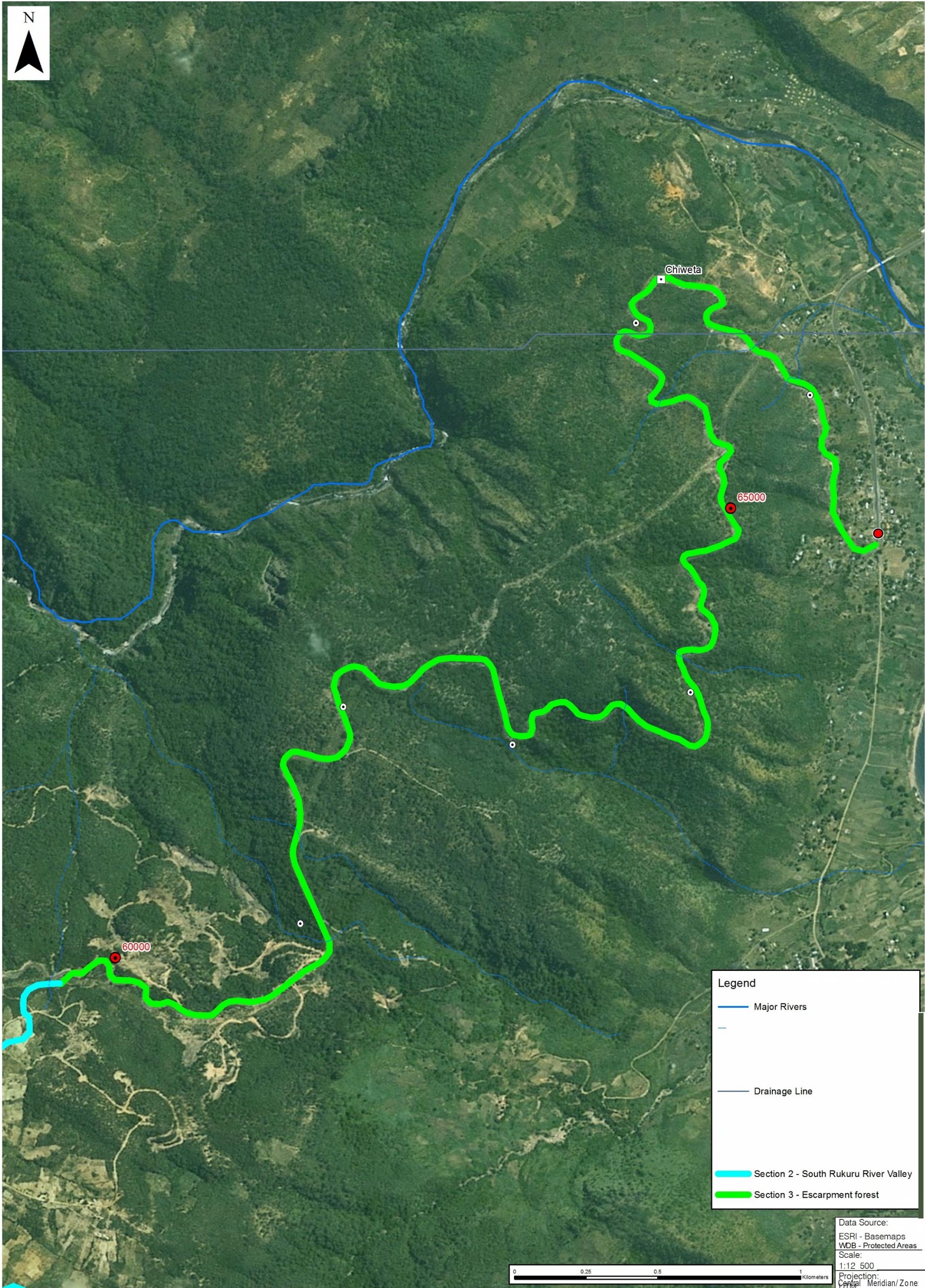




Plate 2: Biodiversity features associated with Section 2 (31km – 56.5km) of the project area



Legend

- Major Rivers
- Drainage Line
- Section 2 - South Rukuru River Valley
- Section 3 - Escarpment forest

Data Source:	
ESRI - Basemaps	
WDB - Protected Areas	
Scale:	
1:12 500	
Projection:	
Central Meridian/Zone	
Zone 36S	
Date	Compiled by
3/09/2016	ALLK
Project No.	Fig No.
490005	22
Revision: A Date: 01 09 2016	



a) Yellow Baboons on the pass



b) View on the pass



c) Road cut on the pass



d) View across the pass



e) View up the pass from Chiweta



f) View down the pass towards Lake Malawi

Plate 3: Biodiversity features associated with Section 3 (56.5Km – 66.5km) of the project area

7.8.5 Ecosystem services

Ecosystem services can be categorized into two types, services that there is a dependence on by communities (type 1) and services that there is a dependence on for the project operations (type 2). Priority ecosystem services are determined by understanding whether a project is likely to have an impact on the service; and if the project has direct management control or significant influence over that service. In the case of the project, the zone of influence for ecosystem services were considered to be within the road reserve. Based on the baseline analysis for the project area, it is unlikely that there will be priority ecosystem services impacted.

Type 1 ecosystem services are considered a priority if:

- Project operations are likely to result in a significant impact on the ecosystem service;
- The impact will result in a direct adverse impact on affected communities' livelihoods, health, safety and/or cultural heritage; and
- The project has direct management control or significant influence over the service.

Type 2 ecosystem services are considered to a priority if:

- The project directly depends on the service for its primary operations; and
- The project has direct management control or significant influence over the service.

Based on the desktop review, site investigation and stakeholder consultation, a number of priority ecosystem services were identified and are summarised in Table 33.

Table 33: Priority ecosystem services that may be impacted

Ecosystem service	Definition	Type	Reasons
Biomass - Timber, Fiber – impact	Reliance on the natural abundance of timber and fiber for survival. Timber, fiber, used for building material	1	The surrounding communities utilise the biomass resources located in the road reserve for building material and as a fuel source
Food provision – impact	Reliance on the natural abundance of flora and fauna for the provision of food	1	The surrounding communities utilise the flora resources located in the road reserve as a food source
Sense of place	The surrounding landscape, including flora and fauna, provide an intrinsic feeling for the community of belonging and comfort. It also enhances the scenic characteristics of the region	1	Findings from engagement with the community indicate the members of the community place an intrinsic value on the trees and flora communities in the area
Moderation of extreme events - dependence	Ecosystems and living organisms create buffers against natural disasters, thereby preventing possible damage	2	A well vegetated road reserve can assist in the moderation of extreme rainfall events and prevent landslides or erosion impacting the road
Erosion prevention – dependence	Vegetation cover provides a vital regulating service by preventing soil erosion	2	Vegetation on steep slopes and within the road reserve could assist with preventing erosive areas and facilitate maintenance

8 Socio-economic Baseline

8.1 Approach and methodology

8.1.1 Framework for the social baseline

The following perspectives have guided the social baseline presented in this report:

- The Social Impact Assessment (SIA) must be based on sound social assessment and the comprehensive description and understanding of social and economic baseline conditions.
- Based on the SIA, it is recommended that a RAP is undertaken. This RAP is documented in separate stand-alone report. Impacts are defined as the social and economic consequences of project driven changes in the baseline environment.
- Impacts might flow directly from project activities (for example loss of access to land due to construction activities), or they might be indirect. Indirect impacts could be a consequence of the project itself (for example increased local spending by local people employed during construction), or they might be a secondary outcome (for example investment in business along the route as a result of optimism regarding improvements in access).
- Impacts must be assessed for different phases of the project cycle, and the social baseline description must take this into account. For the purpose of the SIA two phases are considered: upgrade preparation and construction (termed “construction”) and ongoing road use (termed “operation”). Land clearance, resettlement planning and resettlement implementation will take place prior to construction, during the preparation phase. Livelihood restoration (where it applies) might be concurrent with construction and may even extend beyond it.
- Social impacts can be positive or negative. These are addressed in Section 9 of the report. The same change in baseline conditions might be experienced as positive by one section of an affected community, and as negative by another. In principle, all changes are seen to have the potential to initiate development, if the impacts are managed creatively and effectively. Proposed mitigation measures seek developmental outcomes where feasible.
- The management of impacts is addressed Section 10 of this report. Responses to impacts can range from focused and specific mitigation and compensation to broad and inclusive contributions to sustainable development, in the form of integrated management plans.

To focus of this section (Section 8) is on the social baseline to better assess the impacts of social baseline changes specifically related to the upgrade and rehabilitation of the M1 between the Kacheche turn-off to Chiweta. The key drivers for change are identified as follows (see Section 5 for a summary of construction activities):

- *The physical upgrade of a 67 km stretch of the M1 road.* The upgrade includes widening (road and shoulders), repair and resurfacing, vertical and horizontal alignment (only where deemed necessary), improvement and repair of drainage infrastructure, construction / upgrade of other infrastructure (e.g. bridges), signage and embankment protection. Land clearance and conversion of land use may be necessary as a result of widening and alignment changes, especially where agricultural and commercial activities have encroached the road reserve (Roads Authority, 2016).
- *The upgrade process.* The road upgrade process will require the acquisition and storage of construction materials (including gravel from borrow pits), the operation, maintenance and holding of construction vehicles and equipment, transport of soil and construction materials, setting up temporary diversion routes and access to quarries and water abstraction points, and the

establishment of contractor camps to accommodate construction workers who do not have access to existing local accommodation.

The operation of the road. The unimproved project road host a mix of vehicular, cycle, animal cart and pedestrian traffic. It is projected that Annual Average Daily Traffic (AADT) - vehicles only - will increase following the improvement of the road (between 2.5% per year and 6.2% per year, according to various growth scenarios). Heavy vehicle traffic will increase in general alignment with these forecasts (Malawi Roads Authority, 2016).

Procurement and jobs. The project will create construction-related employment. Requirements are to be determined in the context of the construction phase, with no details available at present. The Malawi Roads Authority has noted the need to employ suitably qualified people, but with a preference for local recruitment. For local labour, the emphasis will be on semi-skilled and unskilled work (Malawi Roads Authority, 2016). Information on the range of goods and skills procurement required by the project is not available at present, but some regional and local procurement is likely.

8.1.2 Objectives of the social baseline

The social baseline study is a collection and review of socio-economic data in order to develop an appropriate understanding of the existing social context, so as to be able to identify and assess potential impacts of the project with confidence, develop applicable management measures, and monitor and evaluate changes and impacts after project implementation.

The objectives of the social baseline are guided by the baseline contexts in which project related impacts are likely to occur. For the purposes of this assessment the contexts are the following:

Regional and local economies: This context includes baseline changes and impacts related to multipliers from improved regional and local access; local construction phase employment and local spending; opportunities for roadside and off-road trading, and potential loss of opportunity, and; potential financial leakage due to materials pilferage and theft.

Land, livelihoods and encroachment. This includes baseline changes and impacts related to the use and potential loss of access to land and natural resources; to road-linked livelihood practices, such as roadside trading, and; compensation arrangements (or absence thereof) expected by impacted people and implemented through the project.

Infrastructure and services. The infrastructure and services context includes changes and impacts related to temporary loss of services and service infrastructure, and improved access to important services (especially social services such as schools, clinics and hospitals).

Community organisation and wellbeing. Changes and impacts related to the functioning of communities and households within them, for example: community dissatisfaction with the distribution of jobs and compensation, and: community disruption through the presence and behaviour of non-local contractors and (in the longer term) long haul truckers.

Health and safety. This context focusses on changes and impacts in the context of general road safety among diverse road users, and in the context of the health and safety of communities exposed to diverse construction activities and to aspects of ongoing road operation. Facets of community health and safety considered are: exposure to noise, dust and chemical materials; hazardous materials associated with the operation of heavy machinery and with traffic, and; health risks related to the interface between community members and construction workers, on the one hand, and road users (for example truckers) on the other.

In light of these contexts, the social baseline aims to describe and understand the following:

- Macro- and micro economic situation, focussing on employment and skills levels, access to employment opportunities, economic activities, cost of living, and livelihoods activities.
- Land use within the Road Reserve Boundary (RRB), and the role it plays in the local and broader economy as well as culturally (e.g. burial sites and churches).
- Existing infrastructure and services alongside the 67km stretch of road, focussing on social services such as schools, clinics and hospitals.
- Community health and safety situation related to: current road users, household and economic activities, peoples' exposure to noise, dust and chemical materials, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/Aids) and Sexually Transmitted Infections (STIs).

Current community attitudes, perceptions and expectations regarding the project are addressed in section 9 as part of the assessment of social impacts.

8.1.3 Methods used to collect data

Primary and secondary data sources were consulted to collect social baseline information for this report. A comprehensive list of secondary sources can be found in the reference list in Section 13. Primary data was collected during a

- Scoping site visit to the study area on 8 July 2016;
- Public consultation meetings between 15 and 19 August 2016; and,
- Household surveys and asset inventories of a sample of project affected people (PAP) between 14 and 24 September 2016.

8.1.4 Areas of influence

The framework for, and the objectives of, the social baseline guide the identification of the primary, secondary and tertiary areas of influence (Aol) of the project. The primary Aol includes the stakeholders who are closest to the project site and who are very likely to be affected and impacted by the project activities on an almost daily basis. These include those who have dwellings, gardens and shops within the RRB; those living and working alongside the RRB, within a radius of approximately one kilometre (km); and, and those using this stretch of road on a daily basis.

The secondary Aol includes the stakeholders who are likely to be affected and impacted by the project activities on an almost daily basis, but the magnitude is potentially not as major as in the primary Aol. However, the impacts could be significant, for example injuries due to collisions. This zone includes frequent and occasional road users (i.e. not using the road on a daily basis); and, stakeholders who have to address issues and concerns related to the road, as well as implement management measures. The secondary Aol therefore include the Mzimba and Rumphu Districts;

Those in the tertiary Aol include stakeholders whose interactions with project related activities will be limited, or can be restricted to the construction phase of the project. These include those who will be benefiting economically during construction, for example by providing accommodation to workers. Although the interaction may be limited, the impacts could potentially be significant, for example the STIs could potentially cause major harm to the person infected.

The negligible zone includes stakeholders who could incidentally or occasionally be influenced by the project, but the likelihood of this interaction occurring is highly unlikely.

8.2 Social baseline overview

8.2.1 State and local governance overview

Malawi is divided into the Southern Region, Central Region and the Northern Region. The regions are divided into 27 districts and four cities, which represent local government. The cities include Blantyre and Zomba in the Southern Region, Lilongwe in Central Region and Mzuzu in the Northern Region. The Central Region is comprised of nine districts and the Southern Region of thirteen. The Northern Region has six districts: Rumphi, Mzimba, Chitipa, Karonga, Likoma, and Nkhata Bay. The project area, i.e. the 66.5km stretch M1 between the Kacheche turn-off and Chiweta, crosses the Mzimba District and Rumphi District. Mzuzu City is approximately 45 km south of the Kacheche turn-off (Figure 1).

Local government is formally made up of District Councils. The District Commissioner (DCo), and local heads of sectors, together forms the District Executive Committee (DEC). The DEC assists the commissioner and is the main political decision-making body. Area Development Committees, Group Village Development Committees, and Area Executive Committees render administrative support.

There are 250 Traditional Authority areas in Malawi in total. The Traditional Authority in Malawi has evolved to include democratic decision making and legislative responsibilities as per Malawi legislation. Malawians still tend to actively seek the advice and ruling of their traditional chiefs and village headmen, ahead of other governance role-players (BTI, 2016).

The project traverses the land of six Traditional Authorities: Mtwalo, Munthali, Mwahenga, Mwalweni, Mwamlowe, and Mwankhunikira. Each village within these authorities has a headman, with a group Village Headman responsible for five or more villages. Villages are named after the Group Village Headman. Traditional Authority Jaravikuba Munthali will be directly impacted by the project. Some of his assets fall within the RRB, albeit outside of the areas that will be changed to road infrastructure.

8.2.2 Economic overview

The World Bank (2016) reports a Gross Domestic Product (GDP) growth of 2.5% in 2015 for Malawi, down from 6.1% in 2013, and 5.7% in 2014. The GDP growth in 2013 was significant, mostly due to growth in agriculture and manufacturing, and 111.3% increase in tobacco output, according to BTI's Country Report on Malawi (2016).

The World Bank apportions adverse weather conditions and macro-economic instability to the negative change in GDP. BTI (2016) highlights emerging risks as contributing factors, including the uncertainty regarding donor support in light of the Cashgate scandal that involved the national looting of public resources, a fall in tobacco prices, and the ongoing rise in interest rates. Malawi's resource envelope in revenues and grants underperformed by 13.7% in the 2013/2014 financial year, which is linked to the reduction of donor grants by 67.1% (BTI 2016).

Against the backdrop of the above GDP figures, in 2016 the African Development Bank projects the economic growth is to reach from 4.0% to 4.9% in 2019, with agriculture as the main driver. These projections are based on the assumptions that weather conditions will be conducive to agricultural activities, that macroeconomic stability will be achieved, that policies will be implemented, and that the private sector will regain confidence in the government and the economy (African Development Bank, 2016).

In light of the weak GDP growth of 6.1% in the 2013/2014 financial year, Malawi's economy does not offer opportunities for competition, especially market-based competition (BTI, 2016). Small-scale

farmers compete when they sell their products, and there is no monopoly. Tobacco growers face some competition at tobacco auctions. The manufacturing sector's contribution to GDP has declined from 9.9% in 2011 to 9.5% in 2013 and 9.4% in 2014 (projected) with local firms closing down operations and remaining un-competitive. Affordable second hand vehicles and parts from Japan are tough competition for local franchises. The informal sector is growing, and its regulation is regarded as one way in which economic transformation can be achieved (BTI, 2016).

8.2.3 Socio-economic overview

Malawi's Human Development Index value of 0.414 in 2013, positioned the country at 174 out of 187 countries. In addition, the difference between the rich and the poor in Malawi is significant. The richest 10% of the population have an average per capita income that is nine times higher than an average per capita income of the poorest 10% (BIT, 2016).

The 2010/11 Integrated Household Survey (National Statistical Office Malawi (NSO), 2015) reported that over half of the population was poor and one quarter lived in extreme poverty. With about 85% of the population living in rural areas, close on 100% of the poor live in the rural areas as compared to only 6% of the poor living in urban areas. A difference between male and female headed households was reported: about 49% male-headed households were identified as poor compared to 57% female-headed households (NSO, 2015). According to the World Bank (2016), these numbers are not expected to change significantly for the 2019 estimates.

Figure 23 illustrates the poverty levels on National level, in relation to the areas relevant to the project. In the Northern Region, 26% of its population was deemed to be ultra-poor⁴, while Rumphi and Mzimba Districts were recorded to have over 50% of its total population living below the poverty line⁵ (NSO, 2015).

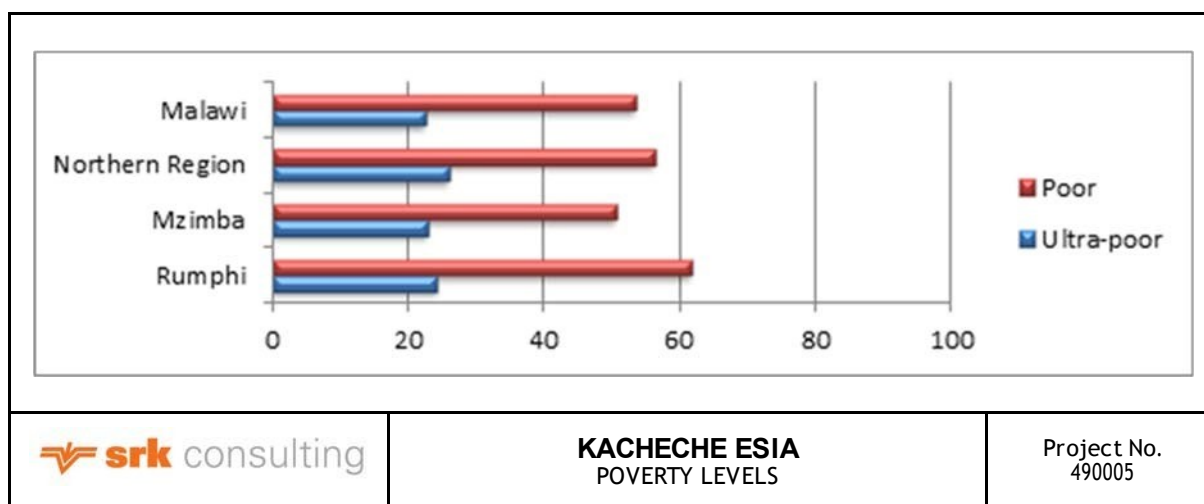


Figure 23: Distribution of poverty levels

(Source: NSO 2015)

⁴ Ultra-poor refers to a status amongst poorest of the poor in low-income countries as coined by Michael Lipton in 1986. He defines ultra-poor as receiving less than 80 percent of minimum caloric intake whilst spending more than 80% of income on food.

⁵ World Bank defines the poverty line as “a level of personal income defining the state of poverty” (currently \$1.90 a day)

8.2.4 Economic activities

The 80% of the Malawi's population living in rural areas are mostly dependent on subsistence agriculture. It follows that Malawi's economy is agriculture based. Low subsistence agricultural production contributes to the poverty situation. The staple crop for food security is maize, and its production dropped by 30.2% year on year. Approximately 2.8 million people (17% of the population) are therefore unable to meet their food requirements (BIT, 2016).

All three Aol relevant to the project has a formal economy that is largely based on agriculture; with tobacco, tomatoes, maize and sugar cane. The tobacco plantations are small-scale operations, and once tobacco has been dried in sheds, it is taken to the corporation on auction.

Apart from agricultural activities, non-agricultural enterprises also serve as a source of income for households in Malawi. Trading centres in the primary and secondary Aol include maize mills, grocery stores, brick making, restaurants and pubs, and syphoned fuel. The trading centres that are present in the primary and secondary Aol of the project are listed below. A sample of enterprises active in these centres was included in the survey conducted as part of the RAP. The RAP is to be developed as a management tool to mitigate the potential impacts of displacement of enterprises and households. Trading centres identified are; Bale, Banana, Bwengu Majiga, Chichi, Chinyolo, Chitokoto, Chiweta, Chizaula, Kandewe, Luzi, Mkombezi, Msambanyama, Mzokoto, Phwezi and Thumbi.

Regarding non-agricultural enterprises, the Integrated Household Survey (IHS, 2010-2012) concludes the following:

- Of the non-agricultural enterprises, just over half is engaged in trading followed by manufacturing at one third. Social services, transportation, construction, financial services and mining or quarrying together have a negligible share (just over 10%).
- Female headed households active in non-agricultural enterprises dominate the manufacturing sector, with a participation rate of four in 10 compared to male headed households with a participation rate of three in 10.
- A total of 87% of household non-farm enterprises are owned by a sole proprietor and 13% are partnerships. Almost 98% of enterprises owned by female headed households have sole proprietorship status compared to 85% for enterprises owned by male headed households. The Northern Region has the highest proportion of enterprises under partnership arrangement (18%).
- Half of the enterprises in the Northern Region are in the trading sector, followed by manufacturing (38%).
- In rural areas, the main source of household enterprise set up capital is own savings from agricultural activities (39%), followed by savings from proceeds from non-agricultural activities (17%). At 1%, loans from banks or other financial institutions barely register as a source of start-up capital.
- The proportion of enterprises whose set up capital is from loans from money lenders is higher in female headed households (4%) than in their male counterparts (2%). The results further show that very few male and female headed households obtained loans from financial institutions (2% and 1% respectively).
- About 43% of household non-farm enterprises are located within or near the home, and about 33% at traditional market places. Only 0.3% is located at industrial site, while 13% are owned by mobile vendors - people who move their goods or services from place to place.
- At the regional level, most enterprises are also located either in a traditional market or at home (outside the residence). Traditional market base is more common in the southern than in the

northern or in the central region (40% compared to less than 30% respectively). Outside residence base is more common in the Northern Region where 32% of enterprises are based outside the dwelling. The Northern region has the highest proportion of household non-farm enterprises operating by the roadside (9%).

Slightly over 84% of non-farm enterprises sell their products or services directly to final consumers. Most of the remaining 16% of these enterprises sell to traders, other small businesses, and large established businesses or institutions. Less than 1% of household enterprises sell their goods and services to manufacturers or marketing boards.

About 86% of the enterprises in the Northern Region sell their products to final consumers, 8% to traders, 4% to other small businesses and 1% to large established businesses.

The proportion of enterprises selling forest-based products the southern region has the highest proportion (17%) followed by the northern region (13%) and central region (11%).

The survey results further show that the highest source of forest-based products at the national level is from other sellers (51%). Forests and park reserves come second as a major source of forest-based products (26%) by communal land (13%) and own land (7%).

In terms of place of residence, most of the enterprises in urban areas purchase forest products from other businesses (76%) compared to 44% in rural areas. The second most important source of forest-based products in rural areas is the forest or park reserve at 28% compared to 17% in urban areas.

By sex of the household head, the proportion of enterprises sourcing products from the forest/park reserve is substantially higher in female-headed households (37%) relative to those in male-headed households (24%). The proportions are however higher in male headed households for enterprises that purchase the products from other traders at 55% compared to their female counterparts at 25%.

Looking at the three main regions of the country, the northern region has the highest proportion of enterprises sourcing forest-based products from their own land at 12%, followed by southern region at 7% and central region at 5%.

Nationally, the average total number of people engaged in household non-farm enterprises is 1.4 of which 1.2 is household members and 0.2 are non-household members.

Owners or managers of approximately 79% of household non-farm enterprises did not engage any other household members in their operations. The northern region does not engage non-household members in their operations at 90%.

The proportion of one person enterprises is higher in female-headed households (87%) than in male headed households (77%). The northern region has 73% one person enterprises.

Enterprises in female headed households are more likely to have no employees (95%) than in male headed households (91%).

The two largest categories of business costs are the purchasing of goods that are resold or transformed i.e. inventory and raw materials. Inventories account for nearly 46% of all costs and raw materials account for about 34%. Transportation or freight accounts for about 8% of the enterprises' total expenditure. Fuel and oil has about 3% share of the total expenditure and utilities (electricity and water) account for barely 1%, while insurance costs constitute less than 1% of the total costs.

8.2.5 Labour force characteristics and education

The Third Integrated Household Surveys (IHS3, 2010-2012) assessed the characteristics of the labour force⁶. The labour force participation rate (LFP) in Malawi is around 88%, the rate higher in rural areas than in urban areas, and higher amongst males than females. LFP in the labour market across age groups is fairly similar for those aged between 25 years and 64 years. However, those aged below 25 or above 64 are less likely to be working or looking for a job.

The LFP Survey (2013) found LFP at 89% nationally, 91% for the males and 88% for females. The rural figures are slightly higher and the urban figures lower. Nationally, employment was reported at 80%, with a 10%+ difference between males and females. Females in urban areas had the lowest employment rate (Table 34).

Table 34: LFP and employment figures (2014)

	Malawi	Urban	Rural
LFP			
Total	89.4	85.4	90.0
Male	90.9	87.3	91.6
Female	88.1	83.5	88.7
Employment			
Total	79.6	71.8	80.8
Male	85.7	82.4	86.2
Female	74.3	60.8	76.1

(Source: NSO 2013)

According to the study (IHS3, 2010-2012), over two-thirds of the population is involved in income generating activities while slightly half of the population are in household agricultural or fishing activities. Three out of 25 persons are engaged in casual, part time or ganyu (casual) labour. Approximately 18 out of 25 males and 16 out of 25 females participate in income generating activities.

According to the IHS3 (2010-2012), in the past seven days, people spent on average 40 hours on wage, salary, commission or any payment in kind (not including ganyu) activities; 24 hours on non-agricultural and non-fishing household business, 16 hours on household agricultural activities and 15 hours on casual or part time or ganyu labour. Another interesting aspect that was noted was that most people spend more hours on salaried activities followed by business regardless of age, education, location and economic status.

The IHS3 (2010-2012) further establishes that people with higher educational qualifications are less likely to participate in agriculture or fishing activities, and more likely to be active in activities related to salary, wage, commissions or any payment activities. However, *“those without any education have a similar labour force participation rate to those with secondary or tertiary education whereas those with primary education have a slightly lower LFP rate. Similarly, across all the regions, people with either secondary or higher education are more likely to participate in the labour market than those with primary education”*.

According to UNICEF's Malawi Annual Report (2016), only 13% of secondary school aged children actually attend secondary school. Therefore, for most people in Malawi, primary education is the

⁶ According to the IHS3 (2010-2012) labour force is “the population that provides the pool of labour for provision of services and production of goods in the economy. Labour force participation rate is the percentage of labour force in the total population. It indicates the share of the population aged 15 years and above working or seeking work. The labour force comprises the employed and the unemployed together. Labour force participation rate (LFP) is an indicator of the country's potential labour supply at a given time”.

highest level of education they will achieve. One of the reasons is that access to secondary education is limited and depends on the family's ability to pay school fees.

In terms of literacy, Malawi's national literacy rate for the proportion of the population aged 15 years and above was estimated at on average 71.8%, with female literacy estimated at 64.0% compared to 80.5% of men (Table 35). The estimated literacy rates of the urban population are higher than those of the rural population (NSO, 2014). The Northern Region has a high literacy rate, with the Rumphi District literacy rate at 82% and the Mzimba District literacy rate at 75% (NSO, 2011).

Table 35: Literacy rates (2014)

Gender	Malawi	Urban	Rural
Male	80.5	94.7	77.7
Female	64.0	58.7	59.8
Total	71.8	91.2	68.2

(Source: NSO 2015)

8.2.6 Socio-demographic overview

The NSO's census of 2008 established a population size of 13.1 million people in Malawi. The NSO (2014) estimates that the population of Malawi totalled at 15.8 million people in 2014, indicating a growth rate of 17.0% from 2008 to 2014. The World Bank estimates the population slightly higher at 16.8 million in 2014 and at 17.2 million in 2015 (World Bank, 2016). An assumed population growth of 2.8% a year will require consistent economic growth to reduce poverty.

Regarding Mzimba and Rumphi Districts, NSO (2014) estimates a population size of 869 202 and 203 054 respectively. Mzimba District houses 41.5% of the Northern Region population, in contrast to the 9.7% housed by Rumphi District. The population of Mzuzu City is similar to that of Mzimba District, totalling 209 000 people (Table 36). Mzuzu District is home to the Ngoni ethnic group and Rumphi District to the Tumbuka ethnic group. The language largely spoken in the primary and secondary Aol is Chitumbuka.

Despite the less developed infrastructure of the Northern Region in comparison to the Southern and Central Regions, it is the second fastest growing in terms of population (NSO, 2014).

Table 36: Population size

Place	Population 2008 (100's rounded)	Population 2014 (100's rounded)	Area (km ²)	Population Density 2014 (persons/km ²)
Malawi	13 077 000	15 805 000	94 276	167
Southern Region	5 858 000	6 890 000	31 753	217
Central Region	5 510 000	6 824 000	35 592	192
Northern Region	1 709 000	2 091 100	26 931	78
Mzimba District	727 900	869 000	10 382	84
Rumphi District	128 400	203 000	4 769	43

(Source: NSO 2015)

The number of households for 2014 could not be sourced, and therefore only the household numbers recorded during the 2008 census are reflected in Table 37.

Table 37: Household size (2008)

Place	Number of Households	Household size
Malawi	2 957 683	4.4
Northern Region	345 752	4.9
Mzimba District	142 980	5.1
Rumphi District	36 037	4.7

(Source: NSO 2015)

8.2.7 Health overview

Mortality and Fertility

The projected life expectancy of males for 2014 was 53.7 and for females 56.6 (NSO 2015), based on 2008 projections). Maternal and child mortality rates are currently estimated at 574 out of 1000 live births and 69 out of 1000 births, respectively (NSO, 2015). The major causes of these mortality figures include: early marriages and pregnancies, poverty and marginalization, harmful cultural practices, gender-based violence, malaria, tuberculosis and other opportunistic infections, lack of information and services, and religious beliefs (BTI, 2016).

Malaria

Malaria is endemic to the whole of Malawi, and as such is a major health concern. There are numerous initiatives between the Malawian government and development partners to combat the disease as part of the Roll Back Malaria campaign. The most significant component of this campaign is the distribution of long-lasting insecticide-treated nets, which seeks to minimise exposure to vectors of malaria.

In the Northern Region, 78% of households owned at least one mosquito net, the highest percentage when compared to the other two Regions (Malawi Ministry of Health, 2015); this translates to at least one net for every two people amongst 40% of the Northern District population. Treatment of children in the Northern region is also superior to other Regions, whereby 63% of children who showed signs of fever were treated at a health facility (Malawi Ministry of Health, 2015).

HIV/Aids

The HIV prevalence rate among the general population stands at 10.6%, with women and girls having higher infection rates than men and boys. The National AIDS Commission Response Progress Report (2015) indicates that 46% of all new HIV infections occur in the 10- to 29-year age group and that 69% of sexually active young people have multiple partners.

Of the estimated 13,317 pregnant women living with HIV in Malawi, 85% were on treatment in 2015, compared to 73% in 2014; an additional 1,584 women initiated antiretroviral therapy (ART) during breastfeeding, a period when HIV transmission to infants can be high. Also, 95% of HIV exposed infants received antiretroviral prophylaxis, decreasing the risk of HIV infection (UNICEF, 2016).

Hospitals

There are 31 health facilities and a District hospital servicing Mzimba District, with a fleet of seven ambulances. The cost of fuel often means that many of the fleet do not operate for large periods of time (Chunga S, 2016). Rumphi has one District hospital, 12 public health facilities and six mission health facilities (Coraid, 2016).

8.2.8 Vulnerable groups

In Malawi, at a glance specifically young women and children can be regarded as vulnerable⁷, based on information contained in the Population Data Sheet of 2012 (USAID, 2012):

- The age structure amongst the poorest 20% of the population is extremely youthful, with a median age of 13.
- Education level and fertility is closely related. Women with no education have on average three times as many children as those who continue their studies beyond secondary school.
- Among women aged 20 to 24, half were married by age 18.
- More than 1 in 5 girls have begun bearing children by age 17. In Malawi, a child is legally defined as a person under the age of 18.

One out of five females in Malawi had reportedly experienced at least one incident of sexual abuse prior to the age of 18, while nearly 50% experienced physical violence before 18 years. Of children, 25% experience multiple forms of violence (CDC, UK AID and UNICEF, 2014).

Children affected by HIV/Aids, including more than 500 000 orphans, have a high risk of entering the labour market. These children may be heads of households or primary caregivers to sick parents. In the absence of alternatives, these children may seek employment, where they could be exploited (Department of Labour, 2012).

8.2.9 Infrastructure and services

Housing

Nationally, as well as in the Northern Region, with Mzimba and Rumphi Districts, housing is traditional⁸, with most residents owning the houses in which they reside. The average number of people per room per household is between one and two on national and district level (NSO, 2011). A comprehensive breakdown of each indicator is provided in Figure 24. Traditional housing along with occupational ownership is in keeping with the land tenure situation. Land tenure is determined according to private, public or customary ownership.

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.

⁷ The World Health Organisation defines vulnerability as: “the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters”. The World Bank defines it as “a population that has some specific characteristics that make it at higher risk of falling into poverty than others”.

⁸ Traditional housing as defined by the Malawi Housing Corporation is “a dwelling with mud walls and a thatched roof”.

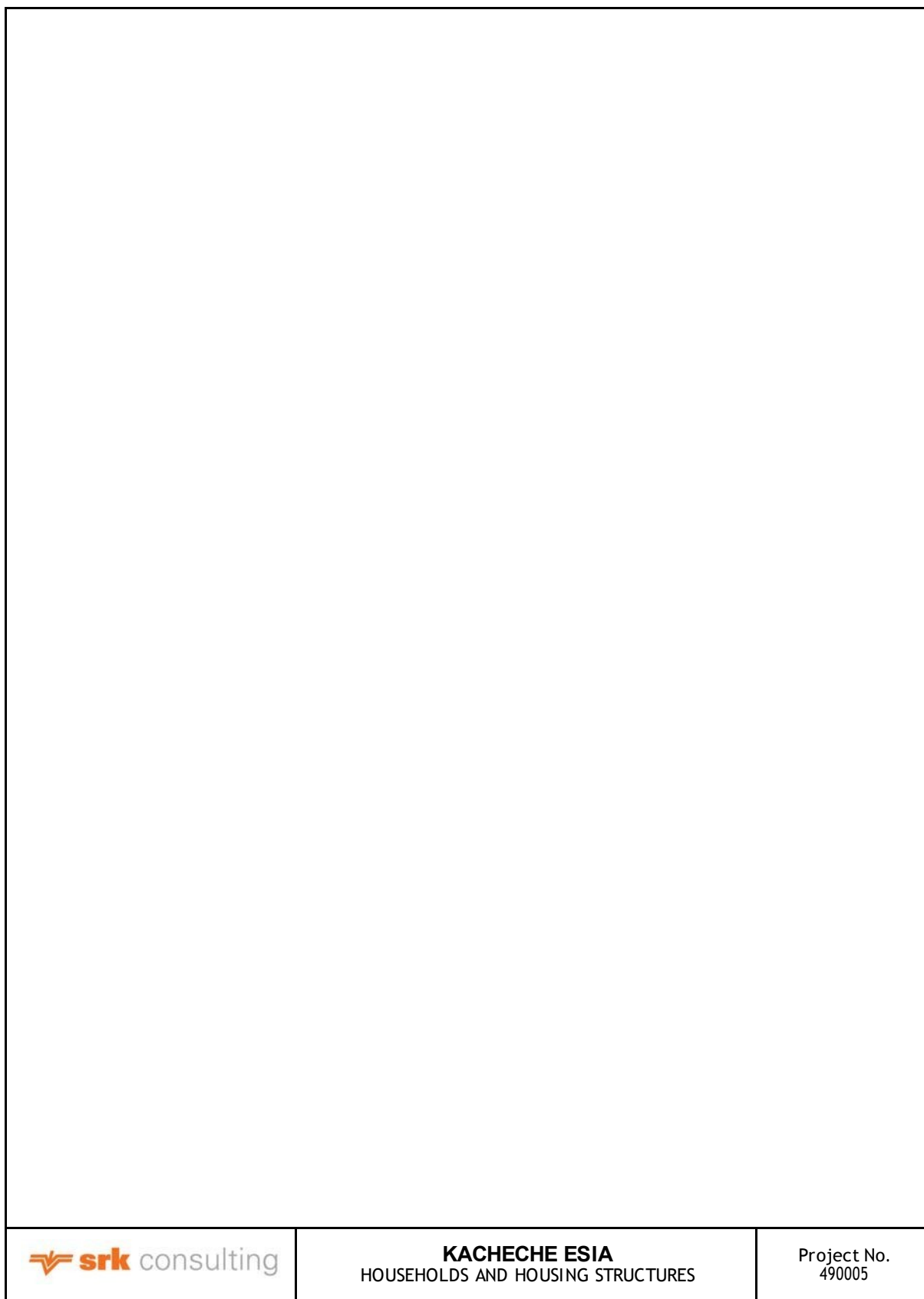


Figure 24: Households and housing structures

(Source: NSO 2011)

Sanitation

Nationally and in the Northern Region, with Mzimba and Rumphi Districts, the majority of households have access to a traditional latrine with a roof (Figure 25). These facilities represent 83% for Mzimba District and 61% for Rumphi District (NSO, 2011).

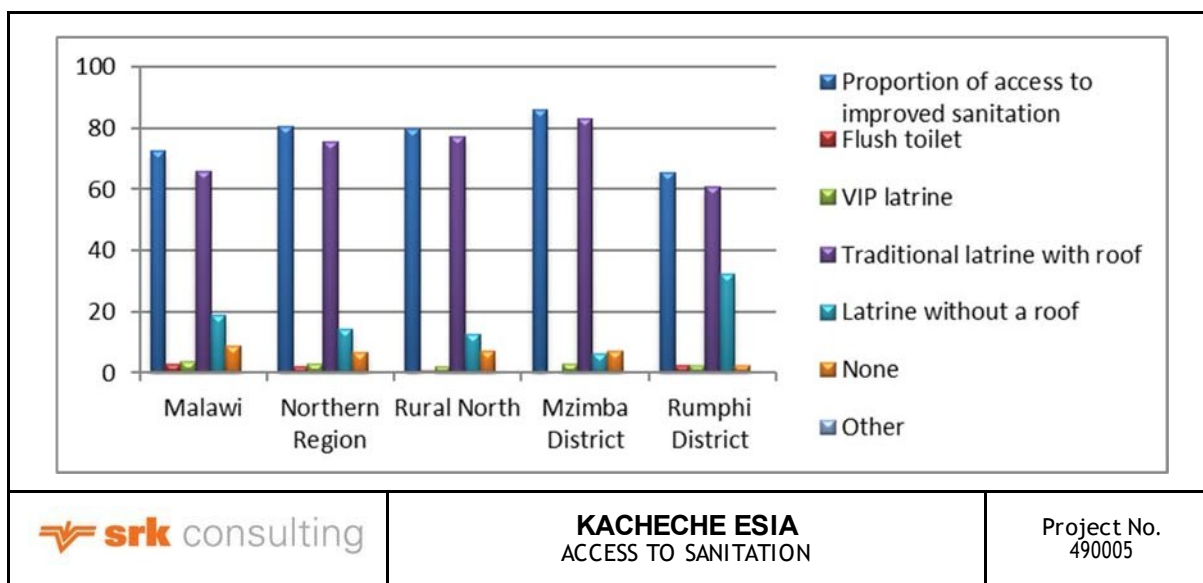


Figure 25: Access to sanitation

(Source: NSO, 2011)

Utilities

Table 38 illustrates households' sources of fuel for cooking and for lighting on a national level, in the Northern Region and its Mzimba and Rumphi Districts. On a district level, fuel for cooking is almost exclusively firewood, with charcoal accounted for 5% of cooking fuels (National Statistical Office, 2011). Half of the households in the country make use of paraffin for lighting, but lighting is largely battery powered in Mzimba District at 45% and in Rumphi District at 52%. The second most used source for lighting is paraffin, at 33% in Mzimba District and 35% in Rumphi District.

The use of firewood for fuel is the main cause of the rate of deforestation evident in Malawi. The high cost of electricity is a deterrent to most households, especially in rural areas (BTI, 2016).

Table 38: Fuel used for cooking and lighting

Place	Source of fuel for cooking (%)					Source of fuel for lighting (%)					
	Firewood	Electricity	Charcoal*	Crop residue / animal waste / sawdust	Other	Firewood	Paraffin	Electricity	Battery	Candles	Other
Malawi	87.7	2.5	8.9	0.8	0.2	7.6	51.8	7.6	27.3	4.6	1.1
Northern Region	95.3	1.1	3.5	0.1	0.1	7.2	39.5	6.1	40.8	4.3	2.1
Mzimba District	99.7	0.2	0.0	0.0	0.1	12.0	33.2	1.8	44.9	4.2	4.0
Rumphi District	94.7	0.3	5.0	0.0	0.0	2.3	35.4	5.7	52.0	3.3	1.4

(Source: NSO 2011)

Basic Needs Perceptions

In terms of household perceptions over basic needs, in keeping with the high levels of poverty in the country and study area, most households felt they had inadequate access to food, clothing, housing and healthcare (Table 39). Clothing was noted as the largest inadequacy in the Mzimba and Rumphi Districts, and perceptions of food security exceeded 30% in both districts (NSO 2011).

Table 39: Basic needs perceptions of households

Place	Inadequate food	Inadequate housing	Inadequate clothing	Inadequate health care
Malawi	38.3%	40.5%	55.6%	32.7%
Northern Region	28.0%	34.0%	50.5%	25.5%
Mzimba District	31.1%	35.5%	49.6%	23.0%
Rumphi District	33.2%	40.6%	57.2%	41.7%

(Source: NSO, 2011)

8.3 Household and business survey

This section discusses the results of the survey that was conducted with a sample of households and businesses within the RRB of the M1 between the Kacheche turn-off and Chiweta during the period of 16-24 September.

8.3.1 Sample characteristics

Interviews were conducted with the Heads of Households and businesses. In their absence, their representatives were interviewed. In the absence of the representative/a suitable representative, the interview was not conducted. The sample was not a representative sample, but an opportunity sample: those that were available were interviewed; those that were not available were passed. The interviews were conducted within the timeframe available, and therefore

Table 40 gives a breakdown of the key characteristics of the 245 people who participated in the survey. The longest section of the road falls within the Rumphi District in the Mwankhirikira Traditional Authority area, and the majority of the surveys were conducted alongside this section.

Just about an equal number of businesses and households were interviewed. The majority had buildings in the RRB and did not consider the land as belonging to them.

The main language spoken was Chitumbuka; second languages spoken were mostly Chichewa and Chinkhonde; English as a language spoken in the household were mentioned by 12 participants only. All participants considered themselves to be Christians. Of the 227 participants whose gender was recorded, close on two thirds were male (62%) and one third female (38%).

Table 40: Sample characteristics

Aspect		Number (total=245)	
District			
Mzimba District		92	
Rumphi District		150	
No response		3	
Traditional Authority			
Munthali		82	
Mw alw eni		10	
Mw anlow e		13	
Mw ankhirikira		122	
Jalaniluw a		7	
No response		11	
Household and Businesses interviewed			
Business ow ner		89	116
Business ow ner representative		27	
Head of Household		73	109
Head of Household representative		36	
No answ er		20	
Main language	Tribe	Main language	Tribe
Chitumbuka	Tumbuka	203	233
Nkhonde	Nkhonde	8	6
Lambya	Lambya	7	8
Chichew a	Chew a	5	
Ngoni	Ngoni	5	5
Chinamw anga	Namw anga	1	1
Nyakyusa	Nyakyusa	1	2
Yao	Yao	1	2
Ndali/Mlomw e	Ndali/Mlomw e		2
No answ er	No response	14	10

8.3.2 Household demographics

A household size of seven people was in the majority. Households with between three and seven people was the trend. The average household size came to six persons per household (Table 41).

Table 41: Household size

Household size	Number of households	Number of household members
Single	6	6
Two person	8	16
Three person	13	39
Four person	13	52
Five person	15	75
Six person	12	72
Seven person	17	119
Eight person	4	32
Nine person	8	72
Ten person	2	20
Eleven person	5	55
Twelve person	2	24
Thirteen person	1	13
Fourteen person	1	14
Fifteen person	1	15
Twenty one person	1	21
Not recorded		4
Total recorded	109	649

Of all the household members recorded, 27% fell in the 0-10-year-old bracket. The young adults of 18-25 years old represented 19% of the household members recorded

Table 42: Age distribution

Age group	Number of household members
0-5	70
6-10	103
11-14	71
15-17	47
18-25	126
26-34	79
35-39	34
40-59	76
60+	37
Total recorded	643
Total adults	352
Total children (0-17)	291
Not recorded	24

A large majority of the adult sample who answered the question on marital status, defined themselves as “single” (28%), possibly in line with the high prevalence of 18-25-year olds. The sample was composed of 8% widows/widowers, and traditional polygamy was recorded for 3%. Marriage by law was in the majority, at 31%. Reportedly, no children were married, i.e. under the age of 18 years (Table 43).

Table 43: Marital status

Marital status	Number of adults
Widow /w idow er	29
Traditional polygamy	10
Traditional monogamy	65
Single divorced	25
Single	100
Living with partner	16
Law fully married	112
Total adults recorded	357
Children	292
Total recorded	659
Adults not recorded	10

Reportedly, the 46% of the adult population had completed a secondary school education, with those who had completed primary school following close at 41% (Table 44).

Table 44: Education level

Education level	Number of adults
University	2
Certificate	6
Diploma	2
Primary school	152
Secondary school	168
None	37
Total recorded	367

In the past year, 18 households had people joining their households; the reasons being family matters (9), education (7), and jobs (2). They came from:

Chitamba	Karonga	Mzokoto
Chiweta	Karonga District	Mzuzu
Embangweni	Lilonge	South Africa
Gowola	Luhomelo	Uzimala
Hewe	Luzi	
Jalawe	Mzimba	

In the past year, 16 households had participants leave their homes. The main reasons cited were jobs (6), education (4), family matters (4), other reasons (4 – reasons not cited). They moved to:

Along the lake	Lilongwe	Phwezi
Blantyre	Mangochi	Rumphi
Chitimba	Mzuzu	Uzumara

8.3.3 Household livelihoods

Households experienced a shortage of staple food during the course of this year (2016), and the reasons were mostly apportioned to floods. Other reasons cited were: not producing enough food, lack of money, cost of food.

The majority of households reported to have beds, bicycles, chairs, hand hoes, mobile phone(s), radios and tables. A minority of households reported to have: sewing machines, generators, televisions, carts, motorbikes, refrigerators, solar panels, mattresses and telephones.

A quarter of the households that were willing to divulge the amount of money the household collected annually, reported an amount of between MKW1-100 000.00, followed by one fifth at MKW101 000.00 to MKW200 000.00. The sources of income were reportedly business related activities, crop farming, casual labour, tobacco, vegetables, fruit, livestock, salaries, maize, and wood.

Table 45: Income distribution

Salary range in MKW	Number of salaries generated
1-100000	24
101000-200000	18
201000-300000	5
301000-400000	8
401000-500000	2
501000-600000	8
601000-700000	8
701000-800000	2
801000-1000000	6
1010000-2000000	5
2010000-3000000	5
4000000-8000000	4
25000000	1
Total	96
Not recorded	13

A total of 47 households reportedly had trees in the RRB, 25 had livestock and 21 gardens. Households harvested wild fruits to sustain themselves, made use of medicinal plants, went fishing, and made their own bricks. Harvesting of wood for household use was reported by the majority of households. Only 28 adults were formally employed, and 101 were looking for employment.

Reporting on the top three items households spent money on, food emerged as the top expenditure (all households), followed by a cluster consisting of: clothes (57), groceries (50), agricultural activities (48), school (43).

Only 38 participants reported having a bank account, and NBS, FMB, Standard Bank and OIBM were mentioned. A total of 29 households reported to belong to a village savings or a banking scheme.

8.3.4 Household access to services

Water

The majority of households (76) get their water from a water pump, followed by a tap in the yard (15), a river/dam (7), a communal tank (5), a communal tap/tap at Phwezi Technical Collge (6), and a spring (1) (5 not recorded). The majority reported to fetch 0-80 litres a day, with 18 households stating that they did not get enough water a day (Table 46). Five households paid to transport water.

Table 46: Water quantity per day

Amount	Number of households/businesses
0-80 litres	44
100-180 litres	37
200-280 litres	18
300-400 litres	4
Total	103
Not recorded	5

Lighting, heating and cooking

- The majority of households reportedly used torches for lighting (28), solar power was reported to be used by 24 households (solar touch), electricity by 22 households, the chinese lamp by 21, and candles by six. (not reported: 8 households).
- For heating, 23 households reportedly used charcoal, and 23 households used wood. (not reported: 53).
- For cooking, 88 households reportedly used wood and 14 charcoal. Only five reportedly used electricity. (not reported: 2)
- The majority commented on the scarcity of firewood, and the long distances that had to be covered to find firewood. The cost of charcoal was mentioned as well as the electricity blackouts.
- A total of 29 households reportedly paid for wood and/or charcoal.

Sanitation

All households reported to have a pit latrine with no ventilation.

Waste disposal

All households reported to have household pits to dispose of their waste.

Structures

The main buildings were recorded as being multi-residential, consisting of a living area and bedrooms. Kitchens were generally separate from the main structure. Structures were mostly built with clay bricks or mud bricks, and windows and doors had wooden frames. Windows were either open or covered with glass or reeds. Most main buildings had verandahs. Granaries were generally made of reeds. Approximately 50 main buildings were also used for business – the residential area were attached to the back of the building.

8.3.5 Household health

The main ailment experienced by households was reported to be Malaria (90). One participant mentioned that it was becoming a normal part of their lives; they forget to mention it as a disease. Couging was mentioned second most (60), followed by diarrhoea/stomach ache (45). Flu was

mentioned by 11 participants, asthma by three. Single mentions included: dental problems, HIV/STI related, headache, high blood pressure, and arthritis. A total of 21 lives were reportedly lost across the 108 households during the course of the year, due to still births, accidents and illnesses.

The clinics and hospitals used medical assistance included (households made use of multiple hospitals/clinics):

- Nthenji (38)
- Mozokoto (37)
- Bwengu (24)
- Ekwendeni (23)
- Rumphu (15)
- Luzi (7)
- Phwezi (5)
- Jalawe (4)
- Muhuju (2).

8.3.6 Businesses

Business type

The majority of shops recorded within the RRB were recorded as grocery shops (37%) (Table 47). The majority of the businesses reportedly remained stagnant since they opened the business, with five reporting growth and one reporting a decline. They mostly serve the surrounding communities

Table 47: Business types

Business type	Number of businesses
Agricultural chemicals	1
Barbershop / salon	5
Brick making shop	1
Building	1
Business structure for rent	3
Clothes	1
Grocery Shop	37
Grocery, saloon and barbershop	1
Incomplete structure	1
Liquor and retail shop	1
Liquor shop	1
Maize mill	2
Money bureau	1
Pub	5
Restaurant	1
Rest-house, hair salon	1
Restaurant, Rest-house, Video show	1
Retail shop	15
Retail shop/grocery shop	1

Business type	Number of businesses
Vegetable stand	1
Sell maize	2
Shop	3
Spare parts shop	2
Tailor shop	3
Tobacco shed	1
Tuckshop	5
Tuckshop and bottle store / bar	1
Video and audio studio	1
Warehouse and Video Show	1
Total	100
Not recorded	16

Business supplies

Business supplies are sourced mostly from Rumphi and Mzuzu (Table 48).

Table 48: Business supplies

Supplier	Number
Mzuzu	25
Rumphi	24
Mzuzu and Rumphi	3
Local farmers	3
Rumphi and Mzuzu	3
Phw ezi	3
Karonga, Chitipa and Tanzania	1
Mzuzu, Rumphi, Karonga	1
Bolero	1
Karonga	1
Mzuzu and Tanzania	1
Mzuzu, Rumphi, Karonga, Ntcheu and many different areas	1
Phw ezi, Rumphi and Chw eta	1
Household garden	1
Rumphi and Karonga	1
Rumphi and Phw ezi Trading	1
Rumphi Boma	1
Rumphi District	1
Rumphi District	1
Rumphi, Karonga and other within Phw ezi	1

8.3.7 Business Income

Business income is illustrated in Figure 26, and should be interpreted with caution. The majority fall in the category of MKW5 000.00 to MKW15 000.00 before deductions. The difference in income after deductions differ between business owners, with some not dropping in income and others dropping by 50% and more.



Figure 26: Business income

Access to services

Water

The majority of businesses get their water from a water-pump (Table 49 below), with all reportedly getting sufficient clean water from these sources. For 54 businesses, it reportedly took ten minutes or less to get their water supplies, for 20 it took 20-30 minutes, for nine it took 30-60 minutes, and four reported that it took more than an hour. (not reported: 36). A correlation between the time it took and the volume of water required was not evident. The majority of businesses who reported the volume of water they fetched per day, fetched 0-80 litres (73 out of 89), followed by 100-180 litres (15 out of 89), and only one business fetching 200 litres a day.

Table 49: Business water sources

Water source	Number of businesses
Water-pump	69
Tap - yard	7
Tap - communal	6
Spring well	4
Tap - house	2
River / dam	2
Bottled water	2
Restaurant	1
Tap – community	1
Total	94
Not recorded	22

Problems cited regarding business' water sources mostly related to its distance from the business, and the inadequate number of water sources (Table 50 below).

Table 50: Business water sourcing problems

Problems with water sources	Number of businesses
One borehole/source only for all the people "The four taps in the community are not enough to cater for over one hundred households"	5
Access to clean water is difficult	1
Access to safe water is once in a while	2
Water becomes scarce during rainy season	1
Boreholes are far from our business	10
Boreholes get damaged very often which makes us fetch water from the rivers	1
Clean water is not ready available	1
Costly	1
Maintenance of boreholes is a problem	1
October water levels go down hence shortage of water	1
Salty water	2
Shortage of water	3
The water is only fit for brickmaking process and he lacks clean water for consumption	1

Electricity

The majority of businesses reportedly most often used electricity for lighting (Table 51 below). However, for cooking wood are used most often. Only 26 households reportedly required heating, with charcoal and electricity used equally.

Table 51: Energy sources of lighting

Energy source for lighting	Number
Electricity	48
Candles	11
Torch	11
Solar	10
Chinese lamp	8
Wood	3
Paraffin	1
Total	92
Not recorded	24

Table 52: Energy sources for cooking

Energy source for cooking	Number
Wood	21
Charcoal	17
Electricity	13
Paraffin	1
Total	52
not recorded/not cooking at shop	64

Regarding problems with electricity, the majority complained about the electricity black-outs, the cost of the source, and the scarcity of wood (Table 53).

Table 53: Energy source problems

Problems experienced with energy sources	Number of businesses
Unreliable electricity supply	13
Difficult to access wood	9
Candles become difficult to use especially when weather is windy	3
Electricity is expensive	3
Charcoal is expensive	2
Wood is expensive	2
Difficult to get charcoal	2
Candles are expensive	2
Electricity tokens are bought far	1

Sanitation

All the businesses reported to have pit latrines without ventilation.

Waste disposal

Businesses reported to make use of their own or a communal waste pit, with three reporting that the waste was dumped anywhere.

Bank accounts

A total of 50 businesses reported having a bank account, with some having more than one. NBS was the most mentioned. A total of 37, reported membership to a village savings or banking scheme (Table 8-21).

Table 54: Bank membership

Bank	Number of businesses
NBS	25
Opportunity International Bank Malawi	10
Malawi Savings Bank	6
Standard Bank	3
FDH	3
National Bank of Malawi	3
First Merchant Bank	2

8.3.8 Road Specific Feedback

Just over half of the participants heard of the proposed upgrade and rehabilitation of the M1 road, and the majority described it using the words: widening of the road, road extension, road construction. Some mentioned it in connection with resettlement, in all cases with trepidation: *“we will be forced to evacuate as the land on each side belongs to the RA.”* Some were under the impression that the widening would be up to the beacons.

All the participants claimed to not have been part of a project related survey before, such as Simbanet and the proposed Fufu Dam.

The main problem experienced with the road was reported as the road accidents (50 households), and three participants mentioned the noise. One participant lost two children in road accidents.

For a summary of key issues expressed during the RAP survey refer to Section 6.

8.4 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, some graveyards have been noted along the M1 road. 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.

9 Environmental and Social Impact Assessment

9.1 Introduction

This section describes the assessment of environmental and social impacts associated with the activities of the project.

9.2 Identifying impacts

Generally, impact assessment is divided into three parts:

- Issue identification –The project team and specialists evaluated the ‘aspects’ arising from the project description and ensured that all impacts in their area of expertise have been identified;
- Impact definition – The purpose of the definition statement is to clearly explain how impacts have been interpreted so that others can see the weight attached to different factors and can understand the rationale of the assessment. positive and negative impacts associated with these impacts have been defined – the definition statement includes the activity (source of impact), aspect and receptor as well as whether the impact is direct, indirect or cumulative:
 - Direct impacts occur through explicit interaction of an activity with an economic, environmental or social aspect (e.g. loss of livelihoods due to resettlement without any compensation);
 - Indirect impacts are those that arise due to secondary effects (multiple causes), which are often unexpected if not adequately considered and investigated due to the complexity of their pathways (e.g. loss of species due to increased bush meat consumption as a result of influx to project surrounds due to perceived employment opportunities) (European Commission, 2001; WSDOT, 2015); and
 - Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.
- Impact evaluation – this is not a purely objective and quantitative exercise. It has a subjective element, often using judgement and values as much as science-based criteria and standards. The impact rating is expanded on the impact description in order to understand the rationale of the assessment.

In order to understand the impact evaluation, the sensitivity of the receiving environment, the effect on the receiving environment and the significance of the impacts need have been described. These characteristics are summarised in Table 56 below.

9.3 Impact assessment methodology

The impact assessment is conducted in an integrated manner that links the biophysical components with the socio-economic components of the environment. The impact assessment is divided into issue identification, impact definition and impact evaluation.

Elements for determining impact significance

The basic elements used in the evaluation of impact significance are described in Table 55 presents the characteristics that are used to describe the consequence of an impact.

Table 55: Key elements in the evaluation of impact significance

Element	Description	Questions applied to the test of significance
Consequence	<p>An impact or effect can be described as the change in an environmental parameter, which results from a particular project activity or intervention. Here, the term "consequence" refers to:</p> <ul style="list-style-type: none"> (a) The sensitivity of the receiving environment, including its capacity to accommodate the kinds of changes the project may bring about. (b) The type of change and the key characteristics of the change (these are magnitude, extent and duration). (c) The importance of the change (the level of public concern/ value attached to environment by the stakeholders and the change effected by the project). <p>The following should be considered in the determination of impact consequence:</p> <ul style="list-style-type: none"> (a) Standards and guidelines (thresholds). (b) Scientific evidence and professional judgment. (c) Points of reference from comparable cases. (d) Levels of stakeholder concern. 	<p>Will there be a change in the biophysical and/or social environment?</p> <p>Is the change of consequence (of any importance)?</p>
Probability	Likelihood/chances of an impact occurring.	What is the likelihood of the change occurring?
Effectiveness of the management measures	<p>Significance of the impact needs to be determined both without management measures and with management measures.</p> <p>The significance of the unmanaged impact needs to be determined so there is an appreciation of what could occur in the absence of management measures and of the effectiveness of the proposed management measures.</p>	Will the management measures reduce impact to an acceptable level?
Uncertainty/ Confidence	<p>Uncertainty in impact prediction and the effectiveness of the proposed management measures.</p> <p>Sources of uncertainty in impact prediction include:</p> <ul style="list-style-type: none"> (a) Scientific uncertainty – limited understanding of an ecosystem (or affected stakeholders) and the processes that govern change. (b) Data uncertainty – restrictions introduced by incomplete, contradictory or incomparable information, or by insufficient measurement techniques. (c) Policy uncertainty – unclear or disputed objectives, standards or guidelines. <p>There are a number of approaches that can be used to address uncertainty in impact prediction, including:</p> <ul style="list-style-type: none"> (a) 'Best' and 'worst' case prediction to illustrate the spread of uncertainty. (b) Attaching confidence limits to impact predictions. (c) Sensitivity analysis to determine the effect of small changes in impact magnitude. 	What is the degree of confidence in the significance ascribed to the impact?

Table 56: Characteristics used to describe impacts and impact consequences

Characteristics used to describe consequence	Sub-components	Terms used to describe the characteristic
Type		Biophysical, social or economic
Nature		Direct or indirect, cumulative etc.
Status		Positive (a benefit), negative (a cost) or neutral
Phase of project		During pre-construction (if applicable), construction, operation, decommissioning or post closure
Timing		Immediate, delayed
Magnitude	Sensitivity of the receiving environment/ receptors	High, medium or low sensitivity Low capacity to accommodate the change (impact)/ tolerant of the proposed change
	Severity/ intensity (degree of change measured against thresholds and/or professional judgment)	Gravity/ seriousness of the impact Intensity/ influence/ power/ strength
	Level of stakeholder concern	High, medium or low levels of concern All or some stakeholders are concerned about the change
Spatial extent or population affected The area/population affected by the impact The boundaries at local and regional extents will be different for biophysical and social impacts.		Area/ volume covered, distribution, population Site/Local (social impacts should distinguish between site and local), regional, national or international
Duration (and reversibility / sustainability) Length of time over which an impact occurs and potential for recovery of the endpoint from the impact		Short term, long term Intermittent, continuous Reversible, irreversibility (negative impacts) Sustainable, unsustainable (positive impacts) Temporary, permanent
Confidence		High, Medium, Low

Impact significance rating

Practicable management measures are recommended that avoid, and if avoidance is not possible, then reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design (WB ESF, Standard 12016). The impact significance rating system is presented in Table 57.

- Part A: Defines impact consequence using the three primary impact characteristics of magnitude, spatial scale and duration;
- Part B: Uses the matrix to determine a rating for impact consequence based on the definitions identified in Part A;
- Part C: Uses the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence; and
- Part D: Defines the confidence level.

Table 57: Method of rating the significance of impacts

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE		
<i>Use these definitions to define the consequence in Part B</i>		
Impact characteristics	Definition	Criteria
MAGNITUDE	Major	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor+	Minor improvement; change not measurable; or threshold never exceeded
	Moderate+	Moderate improvement; within or better than the threshold; or no observed reaction
	Major+	Substantial improvement; within or better than the threshold; or favorable publicity
SPATIAL SCALE	Site or local	Site specific or confined to the project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
DURATION	Short term / reversible / unsustainable	Less than 3 years
	Medium term / partially reversible / sustainable	3 to 15 years
	Long term / irreversible / sustainable	>15 years

B: DETERMINING CONSEQUENCE RATING PART					
Rate consequence based on definition of magnitude, spatial extent and duration					
			SPATIAL SCALE/ POPULATION		
			Site or Local	Regional	National
MAGNITUDE					
Minor	DURATION	Long term	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	DURATION	Long term	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	DURATION	Long term	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High
PART C: DETERMINING SIGNIFICANCE RATING					
Rate significance based on consequence and probability					
			CONSEQUENCE		
			Low	Medium	High
PROBABILITY (of exposure to impacts)	Definite	Medium	Medium	High	
	Possible	Low	Medium	High	
	Unlikely	Low	Low	Medium	
PART D: CONFIDENCE LEVEL					
High		Medium	Low		

Management recommendations and post management significance

The significance of impacts is re-assessed **with** assumed management measures in place (“**after management**”). The project team and specialists also recommend and describe appropriate **monitoring** and review programs to track the efficacy of management measures.

9.4 Biophysical impacts during construction

The project will be undertaken in two phases, namely construction and operation phases. Refer to the detailed project activities expected during construction in the Project Description (Section 2). General activities associated with the construction phase include site clearing, setting up contractor’s camps, stormwater management, road upgrade construction activities and rehabilitation.

Comments raised by stakeholders during the scoping phase applicable to construction activities are included in the relevant biophysical impacts below. The specialist comments have been taken into consideration for the impact rating and identification of applicable and relevant management measures.

This section describes and assesses the biophysical impacts (i.e. related to air quality, surface and groundwater and biodiversity) that are likely to occur during the construction phase of the proposed project. Management measures are also provided in the tables below to mitigate identified impacts.

Detailed management plans, which expand on the provided management measures, are introduced in the tables below, and expanded on further in Section 10.

9.4.1 Air quality

Issues raised by stakeholders

Dust:

- ☐ Dust pollution affecting communities along the road
- ☐ Concerns that mitigation measures such as wetting the road will not be implemented
- ☐ Request for dust abatement exercise every morning on roads that will pass through residential areas to minimize dust pollution

Impact AQ1: Dust affecting adjacent land users

The project area and surrounding land use is mostly rural and characterised by rural, industrial, natural vegetation and subsistence cultivation activities. (Section 7.2.2). These activities contribute to dust generation in the area. Increased dust from construction activities is considered to be the most important air quality impact during the construction phase. The major construction activities are expected to occur along the proposed project area. The following are the major dust generating sources:

- ☐ Materials handling;
- ☐ Excavation and grading;
- ☐ Site clearance, i.e. removal of vegetation and topsoil;
- ☐ Entrainment of dust from heavy and light motor vehicles.
- ☐ Wind erosion;
- ☐ Windblown dust of stockpiled soil; and.
- ☐ Deposition of dust from haul trucks.

In addition to the dust generation sources introduced above, all temporary roads constructed to divert traffic off the main road for construction will be dirt roads. This will result in increased dust generation during the construction phase. The magnitude is considered “minor” as the concentration of dust generated during the construction phase is anticipated to be low, however dust may still pose a nuisance to nearby receptors. Most work done during the construction phase will be site specific and completed during the day, which will allow for dust emissions to disperse adequately into the atmosphere. Trading centres in range of the construction activities are not expected to be impacted significantly.

Table 58: Impact AQ 1

Impact AQ1: Dust generation during construction activities impact on adjacent land users								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+/-	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Restricting heights from which materials are dropped as far as practicable to minimise the fugitive dust arising from loading and unloading. All stockpiles of excavated materials should be covered or dampened during dry or windy conditions. Effective water sprayers should be used to control potential dust emission sources such as unpaved haul roads and active construction areas specifically during dry and windy conditions. Haulage vehicles have the potential to create dust while transporting materials. These vehicles should be covered, with the cover properly secured and extended over the edges of the side of the vehicle. Materials should be sprayed with water, if necessary, before transportation. Vehicle speeds should be controlled to reduce the vehicle entrainment of dust and re-suspension within the site from the operating haul trucks. Roads should be swept or dust suppression used at intersections to minimise the dust generated from construction activities. Should there be instances where there are very high wind speeds, work may be stopped to reduce the entrainment of dust into the air, where possible. This can apply to work areas that are close to sensitive receptors. Any stockpiles should be removed or grassed at the end of the construction phase. All bare ground areas not previously exposed should be grassed to reduce the potential for windblown dust at the end of the construction phase 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact AQ2: Increased vehicle emissions from vehicle movement and fumes from generators

In addition to dust, gaseous emissions such as SO₂ and NO₂ will be emitted from diesel powered vehicles and equipment such as generators as and when these are used. Vehicles such as motorbikes, cars, trucks or vans pass along the proposed route upgrade as well as the main local roads in and around the project area (Preliminary Design Report, Civil Planning 2016 and the Final Design Report, (March 2019). Traffic count data for vehicles is provided in Table 1. A total of 6,633 vehicles were counted over a five-day period along the route of the existing road. Vehicles are sub divided into four classes, light, medium, heavy and 2-wheel vehicles. Light motor vehicles and 2-wheel vehicles observed over the traffic study account for 66.9% of vehicles on the route, whereas medium to heavy vehicles account for 33.1%.

The tailpipe emissions are expected to increase during construction due to additional construction vehicles along the road. It is expected along the road upgrade that certain sections will be stop and go points and other at sections traffic will be diverted onto a temporary dirt road located within the road servitude. It is anticipated that that vehicles will be stopping and idling at stop and go signs resulting in additional spike emissions. This impact will be limited to the road reserve and will extend for the full extent of the construction phase.

At all contractor camps, generators will be used for temporary electricity provision. It is anticipated that fumes will be generated as a result of the operation of generators. It is anticipated that generators will only be used at night time for a limited period of time.

Table 59: Impact AQ2

Impact AQ2: Increased vehicle emissions from vehicle movement and fumes from generators								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+/-	Confidence
Before Management	<i>Medium</i>	<i>Medium</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium		<i>Medium</i>
Management Measures Ensure construction vehicles and equipment such as generators are adequately maintained to ensure efficient combustion of fuel thus reducing emissions into the air. Establish stop and go points for vehicles using the road at a distance from trading centres.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Unlikely</i>	Low		<i>Medium</i>

9.4.2 Soils

Issues raised by stakeholders

- Rehabilitation of areas disturbed during construction to protect soil resource

Impact S1: Loss of soil resources due to erosion

There are currently a number of culverts along the road upgrade area. Within the first 50km of the road where the gradient is flat culverts are spaced reasonably far apart, with drainage lines on average 10m wide. After the confluence of the South Rukuru River and the Kasitu River the topography is much steeper and the number of culverts increase significantly. This trend continues until the end of the project area at Chiweta. During construction of the project a number of watercourse crossings and storm water culverts will be upgraded that could result in erosion and the potential for erosion increases from the confluence of the South Rukuru River until Chiweta. In addition, erosion is currently evident along sections of the road that could be exacerbated by the construction activities. It is anticipated that erosion during the construction phase is most likely to take place in the last fifteen kilometres towards Chiweta as this section of the road cuts through the Chiweta pass which has steep gradients (Refer to the typical cross section of road in Section 2). Erosion will be increased as a result of heavy rains, mountainous topography as well as the current road being constructed of subgrade dispersive clay material. A resultant effect of erosion is the occurrence of landslides and embankment failures.

Table 60: Impact S1

Impact S1: Loss of soil resources due to erosion								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Suitable erosion management measure are detailed in the management section below. Construction of suitable storm water management structures. Installation of suitable erosion control infrastructure (i.e. Gabion boxes or mattresses). Rehabilitation and re-vegetation of existing erosion areas caused as a result of the existing road. Restriction of construction vehicles within road reserve. 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact S2: Landslides due to construction activities

The road section from 35km to 66.6km passes through mountainous topography with the last 15km dropping from the escarpment to Chiweta at the shores of Lake Malawi. In addition to the undulating topography the Mzuzu weather station indicates that this part of Malawi receives high rainfall levels.

Slope failure has occurred at the steep sections directly adjacent to the existing road (Section 8.4). Construction activities during the road upgrade may exacerbate erosion of unstable slopes lead to further slope failure, especially at steeper part of the road, through the Chiweta Pass. The combination of the steep topography and high rainfall events could result in increased erosion. If unmitigated, this impact will remain throughout the operation phase. The resultant impact of potential landslides on health and safety has been addressed in Section

Table 61: Impact S2

Impact S2: Landslides due to construction activities								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Suitable slope stabilisation measures to be included by the appointed contractor in the construction philosophy for the construction phase of the project. Installation of suitable slope stabilising infrastructure (i.e. Gabion boxes or mattresses). Rehabilitation and re-vegetation of destabilized slopes. Restriction of construction vehicles within road reserve. 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

9.4.3 Surface and groundwater

Issues raised by stakeholders

Stormwater:

- ☐ High runoff from the road cuts onto roads (potentially also affecting stability), from borrow pits and other cleared areas causing damage to crops
- ☐ Flooding presumed, with possible causes noted as silting of the culvert or diversion of a river or culverts discharging to people's houses and not to the natural stream) damaging houses in general, and particularly in the Mkombezi, Mzokoto and Phwezi areas

Pollution:

- ☐ Oil and grease pollution of water during construction
- ☐ Pollution of rivers in general, which still has good quality water according to the community

Water use:

- ☐ Damage or destruction of boreholes and water pipes beside the existing road
- ☐ Damming of the river to supply water to construction activities

Impact SG1: Decrease in water quality of water resources caused by pollution events

The M1 road between Kacheche and Chiweta follows the South Rukuru River. The project area crosses many streams, most of which were dry during field investigations which were undertaken during the dry season and many of these streams may be therefore be perennial. There are no wetlands in close proximity to the project area. In the initial sections of the road, tributaries are largely slow flowing due to the topography. Large rainfall events, however, may result in high velocity flow due to the volume of water exiting a defined drainage area. The Rukuru-Kasitu River valley, located approximately 30 km from the Kacheche start point of the project area, features high velocity stream flow as the norm. Water use in the river is mostly for irrigation, domestic and industrial water supply and a small portion is licenced to rural piped water supply schemes (Refer to Section 7.7). During the construction phase vegetation will be cleared, topsoil stripped and civil works will be undertaken as part of the preparation of the area for the road upgrade. Construction camps will be erected and construction equipment such as dozers, graders and haul trucks¹ will be mobile throughout the project area.

Direct and indirect impacts may arise from:

- ☐ Erosion of soils during rainfall events, with elevated suspended solids in the runoff water
- ☐ Resultant elevated suspended solids in the watercourses, as well as sedimentation in the watercourses
- ☐ Hydrocarbon spillages from fuel storage, servicing areas or construction equipment itself, with resultant elevated hydrocarbon concentrations in runoff water and watercourses
- ☐ Litter and other wastes generated at construction camps polluting watercourses.

Impacts on water quality may have negative effects on biodiversity, communities and adjacent water users utilising streams and rivers along the road.

The impacts on water quality will be localised and will only occur during rainfall events.

Table 62: Impact SG1

Impact SG1: Decrease in water quality of water resources caused by pollution events								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Regional</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures <p>Implement the environmental and social monitoring plan.</p> <p>Water quality sampling will be undertaken prior to construction at all flowing water course crossings. Monitoring parameters are included in the Environmental and Social Monitoring Plan, Section 11.</p> <p>Construction will be limited to the project footprint.</p> <p>"No-go" zones will be delineated for the contractor's camp.</p> <p>Construction of suitable surface and storm water management structures, including the temporary diversion of upstream run-off from the construction and laydown areas.</p> <p>Servicing of construction vehicles will take place only in dedicated areas that are equipped with drip trays.</p> <p>Waste oil will be stored for removal by a recycling company to a suitable licenced facility.</p> <p>Bunded containment and settlement facilities will be provided for hazardous materials, such as fuel and oil.</p> <p>Spill-sorb or a similar product will be kept on site, and used to clean up hydrocarbon spills in the event that they should occur.</p> <p>Develop and implement a waste management plan for the construction phase.</p> <p>Water quality monitoring will be undertaken downstream of the construction areas, before and during construction where practical, in order to detect any increase in suspended solids or turbidity.</p> <p>If erosion is evident, or the water quality monitoring indicates an increase in suspended solids, water management around the construction areas will be reviewed.</p> <p>Store all fuel or hazardous material in secondary containments, with a capacity of the largest tank/volume or 25% of the combined tank volumes (whichever greater).</p> <p>Record all hazardous materials entering and leaving the project area.</p> <p>Inspect storage and transfer areas weekly.</p>								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low		<i>Medium</i>

Impact SG2: Decrease in water quality due to cement and bitumen mobilisation effecting macro invertebrates

The project falls within the catchment of Lake Malawi, with all the watercourses that cross the project area ultimately discharging into the lake. The Kasitu River crosses the M1 after 10km from the Kacheche turnoff and flows into the South Rukuru River which is one of the three main rivers feeding Lake Malawi. The lake also has a greater diversity of fish species than any other lake in the world, which is the principal reason for it being declared a UNESCO World Heritage Site (Sheila, 2000). A recent study indicated that the fish population has declined dramatically in recent years with research suggesting that overfishing and water quality changes due to poor agricultural practices, deforestation and biomass burning (Jorgensen, 2005).

Cement and bitumen will be used during the construction of the road upgrade. If during rainfall events cement/and or bitumen is washed into the adjacent watercourses and wetlands (see Figure 20) this will have an impact on water quality resulting in a rise in ph. However, cement is generally not highly mobile and therefore limited dispersion of cement in the watercourse is expected. In addition, the impact on water quality as a result of cement and bitumen mobilisation is anticipated to be highly localised. However, the South Rukuru River and Kasitu River flow into Lake Malawi and any impact downstream will have an impact on the water quality of Lake Malawi.

Table 63: Impact SG2

Impact SG2: Decrease in water quality due to cement mobilisation effecting macro invertebrates								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>High</i>
Management Measures								
Implement environmental and social monitoring plan.								
Store cement in a designated bunded area with suitable liner and cover to prevent mobilisation of cement.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Unlikely</i>	Low	-	<i>High</i>

Impact SG3: Decrease in water quality of surface and groundwater due to sewage contamination

The water uses in the project area is mainly for irrigation, domestic and industrial uses. It is anticipated that a temporary construction camp will be set up during construction housing contract workers. It is assumed that a temporary/portable sewage system will be installed at the construction camp and will be regularly serviced during the construction period. The exact location of the construction camp and the number of contractors that will be housed there, as well as the sewage system to be used will only be confirmed when the contractor is appointed for the construction phase. Spillage of sewage as a result of temporary contractor camps will impact on surface and groundwater quality resulting in deterioration of water user's resource. This could cause sickness (e.g. diarrhoeal disease from e-coli bacteria) and even death from those who drink the contaminated water. This impact is considered to be localised as dilution within the water course is anticipated downstream of the impact.

Table 64: Impact SG3

Impact SG3: Decrease in the quality surface - and groundwater due to sewage contamination								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>Local</i>	High	<i>Definite</i>	High		<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Provide sufficient temporary chemical toilets for construction workers. Develop and implement a sewage management plan. Implement the environmental and social monitoring plan. 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Unlikely</i>	Low	-	<i>High</i>

Impact SG4: Disruption to water supply due to damaged water pipelines

There are a number of water supply pipelines within the existing road servitude. If any of these pipelines are impacted during construction of the road upgrade this could result in disruption of water supply to the region. As the size, location and distribution of the water pipeline is uncertain a low confidence rating has been used to rate the impact.

Table 65: Impact SG4

Impact SG4: Disruption to water supply due damaged water pipelines								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Low</i>
Management Measures Identify existing services (including water pipelines) within the road reserve when the contractor has been appointed and prior to commencement with construction repair a damaged water pipeline to an equivalent standard and restore water supply as soon as possible. In instances, where water supply cannot be restored within 24 hours, and no alternative water supply exists in the affected area, provide alternative water supply								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Regional</i>	Medium	<i>Unlikely</i>	Low	-	<i>Low</i>

Impact SG5: Reduced flows caused by construction in watercourses

The project traverses many perennial and non-perennial watercourses along its length. A large number of culverts were plotted along the 65.5km length of the road. The number of crossings increases after the confluence of the South Rukuru and Kasitu River as the project passes through more mountainous areas, specifically the last 15km towards Chiweta. Construction work will be carried out in many non-perennial water courses during the project, as there are many streams that will be crossed during the undertaking of construction activities. Mzuzu experienced high rainfall during November and April and rainfall is experienced throughout the year. A reduction in stream flow may impact water quality and quantity downstream as well as macro invertebrates and water users.

Table 66: Impact SG5

Impact SG5: Reduced flows caused by construction in watercourses								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures Conduct a detailed survey to identify and plot all watercourses when the construction philosophy is being finalised prior to construction. Identify and delineate "no-go" zones prior to construction using these to inform potential crossing options. Prepare and implement a method statement for watercourse crossings. Where possible, construction at watercourses should only take place during the season when rain is less, between January and September. The footprint of disturbed areas will be minimised. Implement the environmental and social monitoring plan.								
After Management	<i>Minor</i>	<i>Medium term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Low</i>

Impact SG6: Flooding caused by blockage of culverts

Under Malawi's tropical rainfall regime, local flooding is common. The wet season is between November and April and the average rainfall during the wettest month (April) in Rumphi is 134.5mm. Flooding of fields and loss of crops has been reported along the Kacheche – Chiweta stretch of the M1 (Malawi Roads Agency, 2016), with some attributed to poor drainage and deteriorating drainage infrastructure such as the culverts along the road (Malawi Roads Agency; Stakeholder engagement). There are many culverts along the road, with the number increasing after the confluence of the South Rukuru River with the Kasitu River approximately 50km from the start point at the Kacheche turnoff. Refer to the maps indicating the position and number culverts along the road in Figure 7-15 - Figure 7-18. Construction activities and upgrading of culverts might increase flooding potential temporarily, e.g. further blocking of culverts or that certain culverts will not be operational during the process of upgrading.

Table 67: Impact SG6

Impact SG6: Flooding caused by blockage of culverts								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Temporary clearance of culverts and drainage channels prior to upgrading, especially where flooding potential is high. Provide drainage alternatives during culvert repair and rebuilding. Upgrading of culverts to reduce flooding potential 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Unlikely</i>	Low	-	<i>Low</i>

9.4.4 Biodiversity

Issues raised by stakeholders

- ☐ Destruction of trees and bird habitats and request for clear mitigation measures including the planting of trees
- ☐ Involvement of forestry department to do an inventory of trees
- ☐ Impact on scenic beauty due to destruction of trees
- ☐ Request not to disturb animal habitats and movements

Impact BD1: Loss or degradation of subsistence agricultural habitat and related ecological processes due to site clearing and construction activities

The land adjoining the existing road is mostly transformed by agricultural uses and large portions of the floodplain characteristic of the first 35km of the road has been converted to agricultural land. (Section 7.7.1). Agricultural land still provides habitat for a limited number flora and fauna species and ecological processes. However, the agricultural land does not warrant classification as critical habitats or priority ecosystem services in terms of the respective lender standards. There will be a small loss of the agricultural land during site clearing, site levelling, and access for construction equipment.

Table 68: Impact BD1

Impact BD1: Loss or degradation of subsistence agricultural habitat and related ecological processes due to site clearing and construction activities								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Route alignment and areas for clearing need to be defined and clearly demarcated with dropper poles and danger tape prior to site clearing. No personnel to access areas beyond those demarcated for construction. Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed. Implement the environmental and social management plan to include measures for controlling land clearing. Rehabilitate areas disturbed by project. Undertake a search and rescue operation for sessile and slow moving fauna (e.g. amphibians, reptiles etc.) prior to the commencement of construction. This operation must be overseen by a suitably qualified and experienced zoologist. Conduct a detailed species survey of the flora species along the road through Chiweta Pass to identify and mark species of special concern requiring relocation, where such relocation is practically possible (i.e. not tall trees). Key flora species to be relocated prior to the commencement of construction. This operation must be overseen by a suitably qualified and experienced botanist. Should the discovery of fauna species be made whilst clearing the site, care should be taken to avoid injury and harm to the animals. Any species deaths as a result of site clearing should be noted and the appropriate disposal method be undertaken with the local wildlife and or veterinary services An independent Environmental Control Officer to be appointed to undertake regular auditing (daily, weekly or monthly, as appropriate) of all environment and social management measures 								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

Impact BD2: Loss or degradation of natural woodland habitat and related ecological processes due to site clearing and construction activities

A small portion of the road upgrade will be undertaken in a natural Miombo woodland area (defined as Section 3 - Chiweta Pass in the baseline description section) (Section 7.8.4). This could also affect the sense of place (an intrinsic ecosystem service) that the woodland provides for the local community and tourism in the region. However, due to the nature of the topography in this area, the space for expansion, re-alignment and clearing is limited and the impact is expected to be minimal.

Table 69: Impact BD2

Impact BD2: Loss or degradation of natural woodland habitat and related ecological processes due to site clearing and construction activities								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Route alignment and areas for clearing need to be defined and clearly demarcated with dropper poles and danger tape prior to site clearing, avoidance of unnecessary road realignment, dumping and blasting in this area (Section 3) is recommended Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas is to be allowed Clearing procedure to be undertaken as per the Construction and Land Clearing Control Plan Rehabilitation of areas disturbed according to the Construction and Land Clearing Control Plan Bank stabilisation using gabions (or similar) is recommended to minimise erosion and avoid edge effects further impacting the woodland habitat A search and rescue operation for sessile and slow moving fauna (e.g. amphibians, reptiles etc.) to be undertaken prior to the commencement of construction. This operation must be overseen by a suitably qualified and experienced zoologist. Should the discovery of fauna species be made whilst clearing the site, care should be placed as to avoid injury and harm to the animals. Any species deaths as a result of site clearing should be noted and the appropriate disposal method be undertaken with the local wildlife and or veterinary services 								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	Medium

Impact BD3: Modification or degradation of aquatic, riparian and dambo habitats due to altered flow and surface or groundwater quality

The first portion of the M1 road passes through the wide Henga valley for approximately 32 km before the road approaches the South Rukuru River and enters a stepper valley section. The M1 road in the project areas follows the South Rukuru River. The South Rukuru River approaches the project area from the West, and joins with the Kasitu River approximately 10 km from the start point at the Kacheche turnoff of the M1 road (see Section 7.7). The hydrological regimes of the Henga Valley and South Rukuru River are likely to be impacted by modification of the landscape surrounding them and associated surface run-off upon construction of the road upgrade. Aquatic habitats may be impacted on by increased sediment in the water courses resulting from construction activities, as well as impacts from spillage from hydrocarbons, bitumen and cement.

Table 70: Impact BD3

Impact BD3: Modification or degradation of aquatic, riparian and dambo habitats due to altered flow and surface or groundwater quality								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Determine and source water requirements for the construction phase from permitted sources. Water will not be abstracted from any of the adjacent rivers, streams, dambos or groundwater sources. Construction in or near to the streams/rivers will be avoided to the greatest practical extent possible and carefully managed. Implement the environmental management plan including measures relating to stormwater management. Particular attention will be given to minimising increased pollutants entering the adjacent streams and rivers or increased turbidity. Areas disturbed during construction will be rehabilitated. Leak and spill management systems will be in place at all potential major sources of pollution such as fuel, lubricant and hazardous product storage facilities, vehicle servicing areas and workshops. All vehicles will be serviced within the designated workshop areas. 								
After Management	<i>Moderate</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

Impact BD4: Loss and / or relocation of protected species

Two protected flora species were identified along the existing road route, *Khaya anthoeca* and *Pterocarpus angolensis*. *Khaya anthoeca* is considered vulnerable in the 2016 IUCN Red Data List. Potential trees that will be affected during construction will only be determined when the contractor is appointed prior to construction. At that time, consultation with the Department of Forestry will be undertaken to ensure necessary permitting and proper process is followed. The exact number and species of trees is currently unknown.

Table 71: Impact BD4

Impact BD4: Loss and / or relocation of protected species								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Low</i>
Management Measures <ul style="list-style-type: none"> Final road design will take into consideration protected flora species, and will be avoided to the greatest extent practically possible. An inventory process with the Department of Forestry will be undertaken with an appropriate botanist including the marking of trees requiring relocation and/or permits for destruction. Where possible, flora species that can be relocated should be done so under the guidance of a suitable qualified and experienced botanist. Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas will be allowed. Should the discovery of additional protected flora species be made whilst clearing the site, care should be taken to avoid damage to the flora species and/or permits obtained prior to their destruction. Should the discovery of protected fauna species be made whilst clearing the site and upgrading the road care should be taken to avoid injury and harm to the animals. Any species death as a result of site clearing or construction should be noted and the appropriate disposal method be undertaken with the local wildlife and or veterinary services. 								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

Impact BD5: Loss of flora species with importance for ecosystem service provision

During the site visit, it was noted that the community use of biomass resources for food, materials and energy was common. In addition, there is a strong sense of place (intrinsic value) that was placed on the surrounding flora by the community. Tree species were also considered as a natural visual screen. It is anticipated that there will be a loss of this ecosystem services for the surrounding community. Integration with the resettlement and economic/livelihood compensation process will be undertaken through the inclusion of ecosystem services. The loss flora species will be confined to the road servitude and therefore the impact is considered to be localised.

Table 72: Impact BD5

Impact BD5: Loss of flora species with importance for ecosystem service provision								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Medium	-	<i>High</i>
Management Measures <ul style="list-style-type: none"> The final road design will take into consideration the flora species utilised by the community during site clearing. An inventory process with the Department of Forestry and an appropriate social scientist will be undertaken prior to commencement of construction, as part of the economic compensation process. Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed. A strict fines system for environmental non-conformances (e.g. destruction of trees outside of demarcated construction areas) to be implemented and recorded by all contractors 								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

Impact BD6: Increased poaching of flora and fauna by construction contractors

A table summarising the biodiversity and land uses of the project areas is given in Section 7. No biodiversity of significant importance was observed within 30m of the road with the exception of the protected species *Khaya anthoceca* and *Pterocarpus angolensis* species. All dambos identified during the survey were located outside of the study area. Riparian areas and river crossings of the road are transformed and with invasive flora species notes.

During field investigations, the team observed that the majority of the habitats in the study area are transformed and heavily modified due current subsistence agricultural, human settlements and a prevalence of alien invasive flora. However, the degraded systems and transformed agricultural land, despite the alien invasive flora present, still provide habitat functionality and contribute to ecological processes and ecosystem services. Contractors and their construction workers present an increased likelihood of poaching of flora and fauna, either to complement their livelihoods or for subsistence purposes. The number of construction workers required for the project has not been determined and will only be defined once the contractor has been appointed and the final construction philosophy has been finalised.

Table 73: Impact BD6

Impact BD6: Increased poaching of flora and fauna by construction contractors								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Site / Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>
Management Measures During induction contract workers will be informed that poaching of flora and fauna is prohibited. A fines system for poaching will be implemented and recorded for all contractors								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Site / Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact BD7: Increased number of alien invasive plants due to site clearing and disturbance of vegetation

Invasive alien plants are very prevalent in the landscape surrounding the project area and road route (see Section 7). The clearing and site preparation during construction is likely to result in the further introduction of alien invasive plants into the project area.

Table 74: Impact BD7

Impact BD7: Increased number of alien invasive plants due to site clearing and disturbance of vegetation								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Minimise the footprint of construction activities. Implement a programme for the control of alien invasive plants in line with in-country requirements and the existing RA procedures, if available.								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Possible</i>	Low	-	<i>Medium</i>

9.5 Biophysical impacts during operation

The following activities are expected during operation of the road:

- Maintenance of the road surface;
- Maintenance of the road reserve;
- Maintenance of the water management infrastructure and stormwater drainage; and
- Maintenance of rehabilitated areas.

9.5.1 Air quality

Issues raised by stakeholders

- Dust pollution during operation

Impact AQ3: Increased dust and vehicle emissions during operation phase impacting on adjacent communities and land users

An increase in dust and vehicle emissions is expected due to a potential increase in vehicle usage of the upgraded road. Villages in range of the road upgrade are not expected to be impacted significantly, as a result of the project being improvements to the current state of the road. This impact is expected to be limited to the extent of the road footprint and will be ongoing for the use of the road.

The impact will be localised as dust and gas concentrations will decrease significantly away from the road activities.

The confidence is “medium” based on the observations made during this assessment regarding location of villages relative to construction activities. This impact will be further informed by a traffic study that will be undertaken prior to commencement of construction

Table 75: Impact AQ3

Impact AQ3: Increased dust and vehicle emissions during operation phase impacting on adjacent communities and land users								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures								
Restrict vehicle speeds at specific locations along the route, for example next to communities, villages and trading centres								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

9.5.2 Surface and groundwater

Issues raised by stakeholders

Stormwater:

- High runoff from the road cuts, onto roads (potentially also affecting stability), from borrow pits and other cleared areas causing damage to crops
- Flooding presumed, with possible causes noted as silting of the culvert or diversion of a river or culverts discharging to people's houses and not to the natural stream) damaging houses in general, and particularly in the Mkombezi, Mzokoto and Phwezi areas

Impact SG7: Increase in flow velocity as a result of increased runoff from additional road surface

Addition road surface will result in increased surface water runoff impacting on downstream water users and environment. This impact could result in additional erosion and impact on agricultural practices. It is anticipated that this impact will be localised, impacting the area directly adjacent to the road reserve. If unmitigated this impact will remain throughout the life of the road. A large percentage of the road upgrade area has development in the form of households, businesses and agricultural practices directly adjacent to the road reserve. This impact will have a direct impact on adjacent land users.

Table 76: Impact SG7

Impact SG7: Increase in flow velocity as a result of increased runoff from additional road surface								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Low</i>
Management Measures <ul style="list-style-type: none"> · Compile storm water management and erosion management plans prior to commencement of construction. · Consideration of location of land use practices and households as part of the RAP · Construct adequate side drains to avoid flooding. · Regular maintenance of stormwater and erosion management measures 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Unlikely</i>	Low	-	<i>Medium</i>

Impact SG8: Increase in accidents as a result of unsafe driving conditions caused by road flooding

Mzuzu receives approximately 1226mm of rain per year and is classified as wet for the purposes of road design. The rainy season is between November and April however rain is experienced throughout the year. If water pools on the road during or after rain events this will result unsafe driving conditions. This impact will be short term as it will be experienced only after a rainfall event. However, if an incident is experienced as a result of flooding, the magnitude is considered high as this could result in a loss of life.

Table 77: Impact SG8

Impact SG8: Increase in accidents as a result of unsafe driving conditions caused by road flooding								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> Implement operational stormwater management plan. Inspect and maintain stormwater management infrastructure and drains to prevent excess water flowing onto the road 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

9.5.3 Biodiversity

Issues raised by stakeholders

- ☐ Destruction of trees, animal and bird habitats during operation
- ☐ Impact on scenic beauty due to destruction of trees
- ☐ Introduction of alien invasive flora and fauna

Impact BD8: Increased poaching in the region due to improved access to natural habitat areas and adjacent national parks

The upgraded road will facilitate easier travel in the region and provide opportunity for greater access into the natural areas and the adjacent Nyika National Park. This could result in increased poaching activities of flora and fauna in the region.

Table 78: Impact BD8

Impact BD8: Increased poaching in the region due to improved access to natural habitat areas and adjacent national parks								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Regional</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures <ul style="list-style-type: none"> · Create awareness through engagement with conservation management agency and wildlife authorities to communicate the potential for increased poaching activity in the national park and surrounding area. · Create awareness of poaching through engagement with the community to facilitate community policing efforts to reduce poaching in the area. 								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Regional</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact BD9: Increased potential for fauna road fatalities

The M1 road is part of a larger North South Corridor (NSC) between East and South Africa between Dar-es-Salaam and Durban. Section of the M1 road is in poor condition and require upgrading to assist the movement of traffic. Upgrading of the road will result in a better road surface and increased vehicle speed and numbers. This could potentially result in increased road fatalities for fauna crossing the road.

Table 79: Impact BD9

Impact BD8: Increased potential for fauna road fatalities								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Short term</i>	<i>Site / Local</i>	Low	<i>Possible</i>	Low	-	<i>High</i>
Management Measures Place relevant road signage warning of potential wildlife collisions, including awareness campaigns and slogans.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Site / Local</i>	Low	<i>Possible</i>	Low	-	<i>High</i>

Impact BD10: Introduction of alien invasive flora and fauna

Invasive alien plants are prevalent in the proposed project area and the surrounding landscape (Section 7). The increased intra- and inter-country traffic and trade may result in the introduction of new alien invasive flora and fauna into the project area, or into part of the site where such species currently are not present.

Table 80: Impact BD10

Impact BD10: Introduction of alien invasive flora and fauna								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>
Management Measures Implement a programme for the control of alien invasives in line with the in-country requirements and existing RA procedures.								
After Management	<i>Minor</i>	<i>Long term</i>	<i>Site / Local</i>	Medium	<i>Unlikely</i>	Low	-	<i>Medium</i>

9.6 Socio-economic impacts during construction

9.6.1 Economic

Issues raised by stakeholders

- ☐ Concern over theft of materials and equipment
- ☐ Tree cutting close to the road, mainly to supply local charchoal sellers
- ☐ Tree cutting resulting in affecting the aesthetic value of the area
- ☐ Request for information regarding compensation for physical or economic losses especially if located in the road reserve
- ☐ Concern over encroachment in the road reserve of farming practices, dwellings and small businesses
- ☐ Concern about the disruptive potential on non-local construction workers at community and household levels
- ☐ Concern regarding pilferage from vehicles carrying valuable cargo, especially fuel
- ☐ Concern over vandalism of new infrastructure
- ☐ Request for adequate road safety measures along the road
- ☐ Request to include communities throughout the process
- ☐ Concern over impact of road on small scale farming
- ☐ Request for gender equality in local employment and use of locals
- ☐ Request to use infrastructure such as contractor camps for community development after construction

Impact EC1: Disruption of local and through traffic during construction, with associated delays and operator costs.

The schedule for construction remains to be developed, and will be finalised when the contractor has been appointed for the construction phase.

The M1 road presently carries substantial local and through traffic, with volumes expected to increase following the upgrade (Malawi Roads Authority, 2016). Traffic will be disrupted and delayed along sections of the route as a result of road and infrastructure upgrade activities, with regulated diversions where required.

The economic impacts of the delays for local users are difficult to describe and assess based on the current lack of information, but will apply only where construction is active. The most tangible economic impacts will be on commercial operators using the full length of the project road. In these cases, delays will incur operator costs.

Table 81: Impact EC1

Impact EC1: Disruption of local and through traffic during construction, with associated delays and operator costs.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Regional</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures Effectively manage choke points and detours along the road. Train people to direct / divert traffic and design detours to promote the easiest possible traffic flow. Publish accessible construction schedules enabling users to plan routes and timing. Remove (where feasible) obstacles to traffic flow during periods of construction down time (for example machinery and vehicles).								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Regional</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>

Impact EC2: Local employment and income generation.

The scale of project employment has yet to be determined. The RA has committed to local preference in recruitment, but numbers cannot be predicted without definition of the total workforce. Similarly, the opportunities available for local semi-skilled and unskilled workers have not been determined or quantified.

If local employment is indeed opened up, the short-term impacts on those securing the work and associated income could be considerable, given prevailing levels of unemployment and poverty. Since the construction phase has a limited duration, most local employment will be lost when construction is completed.

Table 82: Impact EC2

Impact EC2: Local employment and income generation.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	+	<i>Low</i>
Management Measures Develop a detailed construction phase staffing plan, taking into account tasks and skills required. The plan should make provision for optimal local employment. Develop a local recruitment strategy and plan, including ways to optimise access – readily available information on opportunities, clear and simple recruiting procedures and requirements, focussed training (where feasible) to improve threshold skills and access to jobs. Working with local leadership where appropriate, disseminate employment information, including the likelihood of job loss at the conclusion of construction								
After Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	+	<i>Medium</i>

Impact EC3: Increased spend in local economies by construction workers and contractors.

The 2010/11 Integrated Household Survey (National Statistical Office Malawi (NSO), 2015) reported that over half of the population was poor and one quarter lived in extreme poverty. With about 85% of the population living in rural areas, close on 100% of the poor live in the rural areas as compared to only 6% of the poor living in urban area (Section 8.2.3). When on site, construction workers and contractors will spend money on local goods and services, bringing benefits to local economies for the duration of the construction phase. This impact will be significant given the poverty of the local rural communities. Spending is likely to be spread across formal and informal business. Positive impacts may be especially meaningful to informal traders and service providers, where markets are small and unpredictable. Goods and services might include alcohol and prostitution (see Impacts CO1 and CO3).

Table 83: Impact EC3

Impact EC3: Increased spend in local economies by construction workers and contractors.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	<i>Medium</i>	<i>Possible</i>	<i>Medium</i>	+	<i>Medium</i>
Management Measures Encourage local administrations and business organisations to provide information to contractors and workers on legal goods and services available. Permit approved small and informal traders to market goods and services in proximity to construction camps, and possibly provide simple facilities. Note: The extent to which measures can improve spending benefits is limited. Hence consequence and significance ratings are unlikely to change.								
After Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	<i>Medium</i>	<i>Possible</i>	<i>Medium</i>	+	<i>Medium</i>

Impact EC4: Loss of materials and equipment as a result of theft and illegal trading.

In the course of stakeholder engagement, some respondents expressed concern about theft of materials and equipment, noting that some materials could be used locally, and that the sale of stolen goods could secure income for poor households. The likely extent of these activities is unknown, but stakeholders were sufficiently concerned to raise the issue.

Table 84: Impact EC4

Impact EC3: Loss of materials and equipment as a result of theft and illegal trading.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	<i>Low</i>	<i>Possible</i>	<i>Low</i>	-	<i>Low</i>
Management Measures Secure storage for all materials and equipment, with guarding as required. Prepare and disseminate rules regarding theft for all contractors and contract workers, with clearly articulated consequences, Cooperate as necessary with local police								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	<i>Low</i>	<i>Possible</i>	<i>Low</i>	-	<i>Low</i>

9.6.2 Land, livelihoods and compensation

Impact LC1: Temporary and localised loss of land utility and crops due to construction-linked flooding.

Under Malawi's tropical rainfall regime, local flooding is common. The wet season is between November and April and the average rainfall during the wettest month (April) in Rumphi is 134.5mm. Flooding of fields and loss of crops has been reported along the Kacheche – Chiweta stretch of the M1 (Malawi Roads Agency, 2016), with some attributed to poor drainage and deteriorating drainage infrastructure such as the culverts along the road (Malawi Roads Agency; Stakeholder engagement). There are many culverts along the road, with the number increasing after the confluence of the South Rukuru River with the Kasitu River approximately 50km from the start point at the Kacheche turnoff. Refer to the maps indicating the position and number culverts along the road in Figure 7-15 - Figure 7-18. Construction activities might increase flooding potential temporarily, or flooding might be linked to construction in the perceptions of impacted people.

Table 85: Impact LC1

Impact LC1: Temporary and localised loss of land utility and crops due to construction-linked flooding.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures Attend to flooding potential and avoid actions that might exacerbate flooding (for example the positioning of gravel dumps). Temporary clearance of culverts and drainage channels prior to upgrading, especially where flooding potential is high. Provide drainage alternatives during culvert repair and rebuilding.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact LC2: Permanent loss of land and land linked livelihoods on road margins.

The main land uses along the Kacheche to Chiweta section of the M1 road are agriculture and cultivation, settlement and trading centres and wetland/riparian habitat and dambos (See Section 7.8.4). Road and shoulder widening and alignment adjustment might result in permanent but limited loss of land used for agriculture. In some cases, the lost land might be situated outside the road reserve, but in many instances land used for planting within the reserve might be lost. Compensation consequences are discussed further under Impact LC7.

Table 86: Impact LC2

Impact LC1: Permanent loss of land and land linked livelihoods on road margins.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>Local</i>	High	<i>Definite</i>	High	-	<i>Medium</i>
Management Measures Clarify compensation rules that apply to land and crop loss within the road reserve, and communicate these rules (see Impact LC7 for a fuller discussion of differential compensation). Implement appropriate compensation and livelihoods restoration (where necessary) under a Resettlement Action Plan. Investigate re-use of construction infrastructure such as contractor camps as a community development initiative.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Low</i>

Impact LC3: Permanent limited loss of structures and linked livelihoods on road margins.

Structures such as houses, road side stalls, agricultural and vegetable gardens, brickmaking areas are found in the road reserve. Road and shoulder widening and alignment adjustment might result in permanent but limited loss of structures and linked livelihoods (for example roadside stalls, brick making and vegetable gardens). In some cases, the lost structures and livelihoods might be situated outside the road reserve, but in many instances structures and livelihoods within the reserve might be lost. Compensation consequences are discussed further under Impact LC7.

Table 87: Impact LC3

Impact LC1: Permanent loss of land and land linked livelihoods on road margins.								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures Clarify compensation rules that apply to land and crop loss within the road reserve, and communicate these rules (see Impact LC7 for a fuller discussion of differential compensation). Implement appropriate compensation and livelihoods restoration (where necessary) under a Resettlement Action Plan.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact LC4: Loss of crops and associated livelihoods at borrow pits and lay down sites as well as along quarry access roads and temporary detours.

Construction activities will require lay down sites, borrow pits and quarries, access roads and temporary diversions and detours. Apart from agricultural activities, non-agricultural enterprises also serve as a source of income for households in Malawi. Trading centres in the primary and secondary area of influence include maize mills, grocery stores, brick making, restaurants and pubs, and syphoned fuel. Land, crops, vegetable gardens that are currently occurring within the road reserve as well and associated livelihoods will be lost for the duration of construction, or over a longer term if rehabilitation is not undertaken.

Table 88: Impact LC4

Impact LC4: Loss of crops and associated livelihoods at borrow pits and lay down sites as well as along quarry access roads and temporary detours								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>Local</i>	High	<i>Definite</i>	High	-	<i>High</i>
Management Measures Implement appropriate compensation for temporary loss under a negotiated Resettlement Action Plan. Rehabilitate sites where necessary, and return to original use and users.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Definite</i>	Low	-	<i>Medium</i>

Impact LC5: Temporary loss of access to land-based livelihoods and roadside business due to construction activities.

80% of Malawi's population living in rural areas are mostly dependent on subsistence agriculture. Agriculture common along the project area is the growing of tobacco, tomatoes, maize and sugar cane (Section 8.2.4) Other livelihood activities are road side businesses, vegetable gardening, grocery stores, brick making, restaurants and pubs and trading centres.

Localised construction activities may temporarily interrupt access to fields adjacent to the M1, especially for vehicles. Similarly, these activities may limit owner and customer access to fixed location roadside businesses and other livelihood practices.

Table 89: Impact LC5

Impact LC5: Temporary loss of access to land-based livelihoods and roadside business due to construction activities								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures Provide information to proximate communities prior to the start of construction. Implement a grievance and issue collection and response mechanism, allowing the reporting of short term impacts. Ensure quick resolution of access issues where possible. Implement appropriate compensation for temporary loss, possibly under a quick response provision included in the Resettlement Action Plan.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact LC6: Opportunistic building, planting and tree removal on road margins.

The 2010/11 Integrated Household Survey (National Statistical Office Malawi (NSO), 2015) reported that over half of the population was poor and one quarter lived in extreme poverty. With about 85% of the population living in rural areas, close on 100% of the poor live in the rural areas (Section 8.2.3). This is typical of the communities living next to the project area. Several opportunistic practices may emerge in anticipation of construction, and in some cases of possible compensation. In the latter case building of structures and planting of trees can be expected. Stakeholders report that tree cutting is already taking place close to the road, mainly to supply local charcoal sellers. This situation adds complexity to compensation planning and has the potential to cause community discontent where compensation is not granted.

Table 90: Impact LC6

Impact LC5: Opportunistic building, planting and tree removal on road margins, adding complexity to compensation planning and with potential for community discontent where compensation is not granted								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Clarify compensation rules that apply to land and crop loss within the road reserve, and wide communication these rules to all affected communities (see Impact LC7 for a fuller discussion of differential compensation). Provide for tree cutting in areas where trees will be lost, and communicate this to relevant local communities.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	+/-	<i>Medium</i>

Impact LC7: Unhappiness among people displaced from road margins due to perceived compensation exclusions.

There are structures within the road reserve such as dwellings, grave sites, shops, road side trading stalls that will potentially be affected by the road upgrade. These areas are situated in the more populated areas. Malawi Roads Agency has made it clear that no compensation will be paid for structures and activities that encroach on the road reserve (Malawi Roads Agency – in response to questions from stakeholders). The RA noted that this is a matter of law in Malawi. Those excluded from compensation may contest this position, possibly citing lack of communication of the exclusion, loss of important livelihoods, and possibly other precedent. A precedent was set by the private company, Simbanet, who made provision for compensation when installing fibre optic cables along the M1 road. Documentation suggests that local laws would guide compensation, but the details of actual compensation are not available (Simbanet, 2014).

Table 91: Impact LC7

Impact LC5: Unhappiness among people displaced from road margins due to perceived compensation exclusions								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Clarify possible differences between International Standards and domestic laws on the issue of land use with no rights. Note that the WBESF no 5: dealing with Land Acquisition, Restrictions and Land Use and Involuntary Resettlement) requires that non-land assets be replaced or retained where project affected people have no land rights, and that provisions are made to restore lost livelihoods. Clarify compensation rules that apply to land and crop loss within the road reserve, and undertake wide and early communication thereof (see Impact LC7 for a fuller discussion of differential compensation). Determine possible livelihood restoration provisions for this group of impacted people.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact LC8: Difficulty securing and unhappiness over alternative sites for displaced structures, agricultural activities and businesses.

The extent of project-based displacement along the Kacheche – Chiweta road remains to be determined (as part of resettlement planning). It is likely, however, that alternative sites will have to be found for displaced structures, agricultural activities and business. In some situations, land availability and tenure patterns might impede access to alternative sites, and the size and location of sites might cause unhappiness among some of those affected.

Table 92: Impact LC8

Impact LC8: Difficulty securing and unhappiness over alternative sites for displaced structures, agricultural activities and businesses								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Low</i>
Management Measures Determine the extent of displacement as soon as possible (through the finalisation of the RAP process) and assess requirements for alternative land. Explore access to the land required, and processes to secure it early in the resettlement planning process. Where appropriate, discuss arrangements around alternative sites with affected people (through the RAP process) and secure alignment. Where appropriate, discuss arrangements around alternative sites with hosts (through the RAP process) and secure alignment.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

9.6.3 Infrastructure and services

Impact IS1: Temporary loss of access to social and other services and unplanned interruption of services through infrastructure damage.

Construction activities may change levels of access to social and other services, where access roads and entrances are temporarily blocked, or where detours and diversions extend distances and travel times. Services with linear infrastructure close to the road such as water, power and telecommunications might also be disrupted by unintended damage to lines.

Table 93: Impact IS1

Impact IS1: Temporary loss of access to social and other services and unplanned interruption of services through infrastructure damage								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Definite</i>	Medium	-	<i>Medium</i>
Management Measures Identify access potential access problems prior to the commencement of road works, and make arrangements to retain reasonable access. Identify all roadside linear infrastructure and marking locations where the infrastructure is buried during finalisation of the construction philosophy prior to commencement of construction. Provide access to specialised repair teams capable of repairing breaks and restoring services as quickly as possible. Implement the environmental and social management plan.								
After Management	<i>Minor</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

9.6.4 Community organization and wellbeing

Impact CO1: Community disruption by construction workers (especially in the vicinity of camps), including cultural conflicts, alcohol abuse and the promotion of prostitution.

The road upgrade project will require teams of construction workers. The number has yet to be determined, but it is proposed that non-local workers be housed in dedicated construction camps (Malawi Roads Agency, 2016). Away from families and with disposable income, it is probable that some of the construction workers will visit community based taverns and restaurants, and seek the services of prostitutes. Respondents in stakeholder engagement meetings expressed particular concern about the disruptive potential of non-local construction workers, at community and household levels.

Table 94: Impact CO1

Impact CO1: Community disruption by construction workers (especially in the vicinity of camps), including cultural conflicts, alcohol abuse and the promotion of prostitution								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	<i>Medium</i>	<i>Possible</i>	<i>Medium</i>	-	<i>Medium</i>
Management Measures Develop a code of practice for contractors and construction workers, including requirements for interacting with local people and communities. Cooperate with local police to apprehend and potentially prosecute workers who break the law. Meet with community leaders prior to construction in a particular area to agree strategies to address disruptive behaviour. Move camp locations as frequently as economically and practically feasible, to avoid impacts falling on a few communities.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	<i>Low</i>	<i>Possible</i>	<i>Low</i>	-	<i>Medium</i>

Impact CO2: Unhappiness and social division due to perceived preferential access to construction phase jobs.

In a socio-economic environment characterised by limited opportunities (7.2.3), high levels of unemployment and widespread poverty, employment (albeit temporary) and compensation will be highly valued. Jobs will be limited, however, and compensation will vary according to entitlement, if offered at all. In addition, construction phase jobs will be lost when construction is completed (Section 2). In this context, elements of the affected communities are likely to be disaffected if they feel they have lost an opportunity while others have benefitted, with potential to cause social division.

Table 95: Impact CO2

Impact CO2: Unhappiness and social division due to perceived preferential access to construction phase jobs								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Determine local recruitment policy and practice, and prioritise local employment. Based on the above implement robust, fair and transparent local recruitment processes, preferably led by a neutral party. Monitor recruitment processes for compliance. Clarify the temporary nature of the construction work offered and include termination arrangements in the contract.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Definite</i>	Medium	-	<i>High</i>

9.6.5 Public health and safety

Impact HS1: Hazard to pedestrians and cyclists from heavy vehicles and machinery during construction .

The Kacheche to Chiweta road carries mixed traffic, including heavy and light motor vehicles, cyclists, animal-drawn vehicles and pedestrians (Malawi Roads Agency, 2016). Cyclists and pedestrians are already at risk, but will be more so when construction vehicles and machinery enter the traffic mix. Hazards include encounters with construction vehicles and passing active construction sites.

Table 96: Impact HS1

Impact HS1: Hazard to pedestrians and cyclists from heavy vehicles and machinery during construction								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Secure the perimeter of active working sites. Draft and implement a code of practice for construction vehicle drivers, including speed limits and respect for cyclists and pedestrians. Set up general construction phase safety posters in public places close to construction works. Provide safe bypass arrangements at active work sites. Implement environmental and social management plan.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Definite</i>	Medium	-	<i>High</i>

Impact HS2: Health risk from the storage and use of hazardous and toxic materials (bitumen, gasoline, diesel, lubricating oil).

Materials necessary for the road improvement process will be stored at various sites along the project road. The materials are likely to include some that are hazardous or toxic, including sealing materials such as bitumen, gasoline, diesel and lubricating oil. In addition, cement used during construction, hydrocarbons and heavy metals (Section 7.7.1) Health risks include inhalation of fumes and gases, direct contact with these materials and contaminants polluting local water sources.

Table 97: Impact HS2

Impact HS2: Health risk from the storage and use of hazardous and toxic materials (bitumen, gasoline, diesel, lubricating oil)								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures Secure storage for all materials and equipment, with guarding as required. Store toxic and/or hazardous materials according to Malawi standards, and informed by international best practice. Put in place procedures and arrangements for stormwater management and remediation of spills.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact HS3: Community health risk from noise and airborne pollutants, including dust and vehicle emissions.

There are a number of trading centres along the route where many people congregate for business and where settlements occur. Construction vehicles, machinery, sites, quarries and borrow pits and access roads will generate a variety of airborne pollutants, including dust and vehicle emissions. Sites and construction traffic will also be a source of noise. The primary risk is among construction workers, but there is a secondary risk to community members exposed to construction-related pollutants and noise (Section 7.6).

Table 98: Impact HS3

Impact HS3: Community health risk from noise and airborne pollutants, including dust and vehicle emissions								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Maintain vehicles and machinery to ensure compliant emission and noise levels. Undertake dust suppression and management, especially where dust is likely to be generated for a significant portion of each day, and where the proximity of structures and settlements may lead to ongoing exposure. Provide dust and noise nuisance reporting, possibly through a grievance collection and response mechanism (see Impact LC5). Undertake periodic health monitoring through selected local clinics. Reduced vehicle speed in the construction area.								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact HS4: Danger to uninformed onlookers (especially children) at construction sites, borrow pits and quarries.

Road upgrading activities may be of interest to local communities, and onlookers can be expected from time to time, and especially at construction sites, borrow pits and quarries close to towns and villages. There is potential danger for all onlookers, but children are particularly at risk. Quarries and borrow pits may seem attractive as play areas for local children.

Table 99: Impact HS4

Impact HS4: Danger to uninformed onlookers (especially children) at construction sites, borrow pits and quarries								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures Provide perimeter protection at active construction sites, with warning signage incorporating clear imagery and local languages. Undertake safety monitoring at all construction sites, with a specific brief to warn onlookers and to move them to safety if necessary. Provide perimeter protection, especially at borrow pit and quarry sites where access will place casual visitors in acute danger. Provide warning signage as a minimum around these sites, and along access roads. Undertake safety briefings at local schools – possibly using trained volunteers working through designated teachers								
After Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

Impact HS5: Risk of increased HIV, STD and other infectious diseases.

Community disruption impacts associated with interaction between construction workers and communities are described under Impact CO1. Among the disruptive activities are alcohol abuse and the promotion of prostitution. The latter activities will enhance the risk of HIV and STD transmission, but will extend more broadly to unprotected sexual intercourse. Tuberculosis is among the other infectious diseases that might be transmitted through worker interaction with communities. Several health care facilities and non-government organisations seek to promote awareness and to treat infected people, with an emphasis in HIV and AIDS (Stakeholder Engagement, 2016). These institutions will be placed under pressure if infection rates increase.

Table 100Table 9-46: Impact HS5

Impact HS5: Risk of increased HIV, STD and other infectious diseases								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Develop a code of practice for contractors and construction workers, including requirements for interacting with local people and communities. Cooperate with local police to apprehend and potentially prosecute workers who break any laws that may be transgressed when not abiding by the code of practice of contractors. This may also be in relation to actions that are transgressed as set out in the Gender Equality Act and the HIV and AIDS Response and relevant gender equality policies. Brief local NGOs and clinics, and assist the former to provide counselling and information on infectious diseases. Aid agencies, international NGOs and government ministries involved with HIV, TB and other diseases might be willing to assist. Move camp locations as frequently as economically and practically feasible, to avoid impacts falling on a few communities. Note: the consequence and significance of this impact has not changed after implementation of the proposed mitigation measures as it is not anticipated that these mitigation measures will be effective enough to reduce the impact to low								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>

9.6.6 Cultural heritage

Impact CH1: Loss of or damage to sites of cultural heritage importance.

A number of graveyards have been observed along the road during field investigations. Construction activities may damage or cause the loss of sites of cultural and heritage significance. Such sites may include graves, archaeological materials, sacred objects (trees, water sources) and places used for religious gatherings.

During the scoping consultations the Antiquities Department recommended that a heritage survey and rescue plan be undertaken by their department officials prior to construction. During field visits approximately five graveyards were identified along the Kacheche – Chiweta road. These grave sites will be further assessed during the heritage survey.

Table 101: Impact CH1

Impact CH1: Loss of or damage to sites of cultural heritage importance								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>Local</i>	<i>High</i>	<i>Possible</i>	<i>High</i>	-	<i>Low</i>
Management Measures Engage with appropriate local leadership and community representatives to determine the nature and location of potential sites and objects. This should be done in the context of the RAP planning process, and should be supplemented by specialist heritage research as required. Undertake heritage survey and rescue plan through the Department of Antiquities prior to commencement of construction. Formulate a chance find procedure and for contractors, detailing roles, responsibilities and steps to be taken in the event of a find. Where finding an alternative site or compensation is required, address the negotiation and the entitlement / compensation under the RAP. Implement the environmental and social management plan.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	<i>Medium</i>	<i>Possible</i>	<i>Medium</i>	-	<i>Medium</i>

9.7 Social impacts during operation

9.7.1 Economic

Impact EC5: Improved international and regional access due to improvement of the M1 with associated national and regional economic benefits (cumulative).

The improvement of the M1 road between Kacheche and Chiweta is part of a broader programme to improve the M1 as a whole and associated corridor. The M1 is the major north-south arterial in Malawi, and serves to link Malawi to countries to the north, south and west (Malawi Roads Authority, 2016). The upgrade of the 66.5 km between Kacheche and Chiweta, coupled with a broader upgrade initiative will improve international and regional access, with national and regional economic benefits for Malawi.

Table 102: Impact EC5

Impact EC5: Improved international and regional access due to improvement of the M1 with associated national and regional economic benefits (cumulative)								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Long term</i>	<i>National</i>	<i>High</i>	<i>Possible</i>	<i>High</i>	+	<i>Medium</i>
Management Measures Inspection of the road and road reserve Maintenance of the road. Investigate upgrade requirements for other sections of the M1.								
After Management	<i>Major</i>	<i>Long term</i>	<i>National</i>	<i>High</i>	<i>Possible</i>	<i>High</i>	+	<i>Medium</i>

Impact EC6: Improved local access along the upgraded road.

The M1 between Kacheche and Chiweta is already extensively used by a variety of local users (heavy and light motor vehicles, cycles, animal-drawn carts, pedestrians – Malawi Roads Authority, 2016). Improvements to the road and shoulders should permit improved traffic flow, and safer use by all traffic forms, improving access to local and regional destinations. Multiple social and economic benefits should accrue from better access (for example reduced travel times and better access to schools and clinics).

Table 103: Impact EC6

Impact EC6: Improved local access along the upgraded road								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	<i>Medium</i>	<i>Definite</i>	<i>Medium</i>	+	<i>High</i>
Management Measures Maintain and repair upgraded road and shoulders.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	<i>Medium</i>	<i>Definite</i>	<i>Medium</i>	+	<i>Medium</i>

Impact EC7: Improved opportunity for the offering and sale of roadside and near off-road goods and services.

Goods and services are offered for sale along populated stretches of the M1 between Kacheche and Chiweta, and in towns and villages along the route. Increased use of the road should increase the number of potential customers and hence improve the sales opportunities.

Table 104: Impact EC7

Impact EC7: Improved opportunity for the offering and sale of roadside and near off-road goods and services								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	+	<i>Medium</i>
Management Measures Provide roadside areas where traders can legally establish stalls and sell their goods. Provide signage for trading areas to enhance safety and visibility.								
After Management	<i>Major</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	+	<i>High</i>

Impact EC8: Ongoing and potentially increased pilferage from vehicles carrying valuable cargo.

Stakeholder engagement respondents have indicated that pilferage from vehicles carrying valuable cargo (especially fuel) is relatively common, with an impact on operator profits. Hence the practice is already an element of the socio-economic baseline in section 8. Improvement of the road will not change the practice significantly, but an increase in the number of vehicles may provide more opportunity for pilferage.

Table 105: Impact EC8

Impact EC8: Ongoing and potentially increased pilferage from vehicles carrying valuable cargo								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Raise awareness among haulage operators on possible pilferage. Cooperate with local police, and prosecution of offenders.								
After Management	<i>Moderate</i>	<i>Long term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>

Impact EC9: Vandalisation and theft of new infrastructure

Stakeholders raised the issue of vandalism and theft of new infrastructure. Items at risk were not specified, but it is assumed that signage might be prone to vandalism, and that items like steel from roadside barriers and signposts might have value elsewhere, with potential for theft.

Table 106: Impact EC9

Impact EC9: Vandalisation and theft of new infrastructure								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures Regular inspections by RA of the status of infrastructure along the route. Cooperate with local police and prosecution of offenders. Implement environmental and social monitoring plan during construction and operation.								
After Management	<i>Minor</i>	<i>Medium term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	-	<i>Medium</i>

9.7.2 Public health and safety

Impact HS6: General improvement in the safety of road use due to the road upgrade.

An average vehicle count, of approximately 6600 vehicles during a 12-hour period has been observed on the M1 road between Kacheche and Chiweta (Section 7). In addition, vehicles congregate at trading centres along the route. The road upgrade is based on widely accepted road engineering standards (Malawi Roads Agency, 2016). In combination, the elements of the upgrade (e.g. wider road and shoulders, improved surface, adjusted alignments and better signage) should secure a general improvement in the safety of road use (at least in the short to medium term). Increased traffic and speeds may place pedestrians and cyclists at risk (see Impact HS7), but the safety improvement should benefit motor vehicle drivers and passengers.

Table 107: Impact HS6

Impact HS6: General improvement in the safety of road use due to the road upgrade								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Regional</i>	Medium	<i>Possible</i>	Medium	+	<i>High</i>
Management Measures Promote safe driving, through awareness-building signage and through appropriate road safety campaigns. Maintain road and infrastructure. Road patrols and infringement prosecution. Implement the environmental and social monitoring plan during construction and operation.								
After Management	<i>Major</i>	<i>Medium term</i>	<i>Regional</i>	Medium	<i>Possible</i>	Medium	+	<i>High</i>

Impact HS7: Hazard for pedestrians and cyclists due to increasing traffic volumes and higher vehicle speeds.

Road design studies predict an increase in Annual Average Daily Traffic (AADT) following the improvement of the road (Malawi Roads Agency, 2016). In general, the road upgrade will also permit higher motor vehicle speeds. The Kacheche to Chiweta road is characterised by a mix of road users, including pedestrians and cyclists, with high concentrations around villages and towns (refer to socio-economic baseline in Section 8). This latter group of users is vulnerable to higher motor vehicle traffic volumes and increased vehicle speeds, especially pedestrians seeking to cross the road, and cyclists on the road or using road verges and shoulders.

Table 108: Impact HS7

Impact HS7: Hazard for pedestrians and cyclists due to increasing traffic volumes and higher vehicle speeds								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Regional</i>	Medium	<i>Definite</i>	Medium	-	<i>High</i>
Management Measures Establish marked and signposted pedestrian crossings, with clearly indicated speed restrictions at the approach to such crossings. Facilitate the use of culverts already serving as safe pedestrian crossings (maintaining or increasing pipe diameters where appropriate, making access easier and safer, signage warning hazards during rainy periods and storms). Install traffic calming measures (for example speed humps) at all major pedestrian crossings, and in areas considered to pose specific risks to pedestrians (e.g. in and around settlements). Apply and enforce general speed limits. Erect awareness-building signage and posters as part of a safety campaign.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Regional</i>	Medium	<i>Possible</i>	Medium	-	<i>High</i>

Impact HS8: Health and safety hazard at borrow pits and quarries.

The RA has indicated a general commitment to site rehabilitation, but details of the nature and extent of rehabilitation at borrow pits and rock quarries are not available. There will be significant differences between borrow pit and quarry sites, but in un-rehabilitated or partially rehabilitated form, many may be health and safety hazards. Among the hazards are stagnant water bodies hosting malaria-bearing mosquitos and slopes that might cause people to slip and fall. Water bodies might also be a drowning hazard, especially among children. With limited rehabilitation information to hand, this assessment assumes that a proportion of the borrow pits and quarries serving the project will embody one or several of the hazards described above.

Table 109: Impact HS8

Impact HS8: Health and safety hazard at borrow pits and quarries								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Major</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>
Management Measures Implement rehabilitation plans for borrow pit and/or quarry sites demonstrating the community health and safety hazards listed under this impact. Measures might include the filling of ponds and the grading of hazardous slopes in order to make borrow-pits and quarries free draining. Where mitigation through rehabilitation is not feasible / possible, perimeter protection around particularly hazardous areas, and warning signage with understandable graphics and in local languages as a minimum. Safety awareness briefings at local schools – possibly using trained volunteers working through designated teachers.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>

9.7.3 Infrastructure and services

Impact IS2: Improved access to key social and other services situated on or in near proximity to the improved road.

The upgraded road will enhance general access, due to improved traffic flow. Where communities and individuals use the M1 to access social and other services, reaching them should be easier than pre-improvement conditions.

Table 110: Impact IS2

Impact IS2: Improved access to key social and other services situated on or in near proximity to the improved road								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ /-	Confidence
Before Management	<i>Moderate</i>	<i>Short term</i>	<i>Local</i>	Low	<i>Possible</i>	Low	+	<i>High</i>
Management Measures Undertake a traffic study prior to commencement of construction. Install clear signposting for major services. Ensure safe and easy access to on-road services, with turning lanes if appropriate. Ensure safe and adequate off-road parking in cases where this is not available								
After Management	<i>Major</i>	<i>Short term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	+	<i>Medium</i>

9.7.4 Community organisation and wellbeing

Impact CO3: Potential community disruption at trucking stops, including alcohol abuse and prostitution.

As an international and regional arterial road, the M1 will host many long-haul trucks. There is potential for alcohol abuse and prostitution at trucking stops, and for more general community disruption.

The number and size of trucking stops have not been determined in the design report and will only be finalised when the contractor has been appointed and the construction philosophy has been finalised prior to commencement of construction. This impact will be in direct relation to the number and size and location of trucking stops provided.

Table 111: Impact CO3

Impact CO3: Potential community disruption at trucking stops, including alcohol abuse and prostitution								
	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+ / -	Confidence
Before Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Definite</i>	Medium	-	<i>Low</i>
Management Measures Provide a spread of trucking stops to avoid an over-concentration of disruptive behaviours, if possible. The location of villages and communities will be taken in consideration for the identification of suitable trucking stops. Cooperate with local police to monitor trucking stops. Meet with community leaders to discuss ways to address disruptive behaviour.								
After Management	<i>Moderate</i>	<i>Medium term</i>	<i>Local</i>	Medium	<i>Possible</i>	Medium	-	<i>Medium</i>

9.8 Cumulative impacts

This section outlines consideration of cumulative impacts of the project and other key past, present and future developments impacting on the receiving environment.

9.8.1 Objectives for assessing cumulative impacts

The objectives of the cumulative impact assessment (CIA) is to:

- ▮ Present the rationale for the consideration of cumulative impacts, outlining the most important international guidelines;
- ▮ Identify the valued environmental and social components (VECs) that require consideration and describe their potential reaction to stresses;
- ▮ Identify the area of influence for cumulative impact consideration;
- ▮ Undertake a high level assessment of potential key cumulative impacts in the area of influence; and
- ▮ Recommend management strategies to address potential cumulative impacts.

9.8.2 Rationale for consideration of cumulative impacts

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones (IFC, 2013). For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities.

The IFC's Good Practice Handbook for *Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets* (IFC, 2013) sets out the procedure to identify cumulative impacts and includes detail requirements and methodology to identify and quantify cumulative impacts for past, present and future activities in a receiving environment. The undertaking of a Cumulative Impact Assessment (CIA) requires extensive cumulative knowledge and data of developments and their impacts on the receiving environment, of which little is currently known in the project area. In addition, the project is merely an upgrade of an existing road as opposed to a new Greenfields project that will have far reaching impacts on the receiving environment. A full CIA has therefore not been undertaken for the project area.

9.8.3 Identification of valued environmental and social components

Valued environmental and social components (VECs) are environmental and social attributes that are considered to be important in assessing risks that may be: physical features, habitats, wildlife populations (e.g. biodiversity), ecosystem services, natural processes (e.g. water and nutrient cycles, microclimate), social conditions (e.g. health, safety, economics) or cultural aspects (e.g. burial areas).

While VECs may be directly or indirectly affected by a specific development, they often are also affected by the cumulative effects of several developments. VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways.

Understanding the existing condition of VECs as well as their potential reaction to stresses and trends are therefore important. The most important VECs were identified through, social and ecological scoping, stakeholder engagement, specialist studies and the impact assessment (refer to Chapter 8). The VEC's relate to water resources, biodiversity economic development and road safety.

Area of influence

The area of influence for the project is the South Rukuru River Catchment, which is part of the greater Malawi Lake Catchment into which all rivers drain.

9.8.4 Natural and social external influences and stresses

The key natural and social external influences and stresses that may impact on the VECs that are located in the area of influence are presented below.

Floods

The South Rukuru catchment experiences high rainfall and the average annual rainfall varies between 725mm – 2500 mm. There are numerous water courses in the project area of all of which drain into Lake Malawi. The high annual rainfall together with deforestation and extensive clearing for agriculture contributes to flooding, erosion and siltation. The reliance of local communities on surface water means that many villages are located in close proximity to rivers and streams, and hence are vulnerable to flooding events, such as the severe flooding experienced in Malawi in 2015.

Micro climate, alien invasive plants and pollution

Although Mzuzu experiences rain throughout the year, Malawi is characterized by dry and strongly seasonal weather and have experienced severe droughts in recent years, highlighting the need for secure surface water supply and food security. The issues of climate change, exacerbating droughts and floods, invasive alien species and pollution was mentioned as significant stresses experienced in the Malawi catchment including the South Rukuru River Catchment (Regional Workshop on Ecosystem Based Management of Lake Malawi Catchment, November 2014).

Erosion and sedimentation

Due to the high rainfall conditions and fairly steep topography in certain sections of the catchment, erosion and landslides are evident. This is further exacerbated by agricultural practices and land use activities resulting in deforestation. Erosion results in increased sedimentation within water courses, which ultimately results in increased sedimentation in Lake Malawi.

Social and environmental importance of Lake Malawi

Lake Malawi has a greater diversity of fish species than any other lake in the world, which is the principle reason for it being declared a UNESCO World Heritage Site. (Sheila, 2000). A recent study indicated that the fish population has declined dramatically in recent years with research suggesting that overfishing and water quality changes due to poor agricultural practices, deforestation and biomass burning (Jorgensen, 2005) are the main reasons. The major threats to the water quality in the lake include increased nutrient inputs, and possible sediment loading (Jorgensen, 2005). The most significant livelihood activity in the lake is fishing and is extremely important for the economy and food supply of Malawi. Fisheries in Malawi are largely dependent on the lake, which supports nearly 1.6 million people, and contributes about 4% to the Gross Domestic Product (FAO, 2005). Water from Lake Malawi is also used for irrigation and domestic supplies.

International Transportation Corridor Development

As outlined in the project motivation in Section 2, the M1 is the main north-south arterial road in Malawi and is part of the larger North-South Corridor (NSC) running for 3900km from the port city of Dar-es-Salaam in Tanzania to Durban in South Africa. This corridor provides social and economic benefits to the receiving environment as well as presents social and health risks to the existing communities and

services. As the M1 is essential for access and trade between neighbouring countries, the road upgrade will have a positive cumulative impact on the national and regional economy.

9.8.5 Key past, present and future developments in the South Rukuru catchment

In addition to the M1 road, there are other past, present and future developments that might have caused, are causing, or may cause impacts, which when interact with impacts caused by the road upgrade are presented in Table 9-58 below. Information pertaining to these activities was collected through site investigation, stakeholder engagement and review of existing documentation.

Table 9-58: Past, existing and future activities

Past activities	Existing activities	Future activities
<p>Approximately 700 small dams in Malawi, most of which are situated in the South Rukuru and Ruo River Basins (Malawi National Consultative meeting in the World Commission of Dams Report, 2004). These dams are degraded and silted up</p> <p>Abandoned agricultural projects</p> <p>Abandoned shops and villages</p>	<p>Upgrading of the M1 road</p> <p>Many small and medium irrigation schemes</p> <p>Schools and trading centres</p> <p>Villages</p> <p>Machenga Coal Mine</p> <p>Kafwe Maize Mill</p> <p>Malawi-Zambia Transfrontier Conservation Area (TFCA)</p> <p>Nyika National Park</p> <p>Vwaza Marsh Wildlife Reserve</p>	<p>A number of hydro-power dams are planned in the catchment, one of which is the 175MW Fufu Hydropower project at Fufu Falls</p> <p>A large irrigation scheme that will irrigate an area of 4000 hectares in the Rumphu District planed by the Department of Irrigation.</p>

9.8.6 Impact identification

Although the project is unlikely to give rise to many cumulative impacts, the road upgrade will contribute to high sediment loads in watercourses in the study area. However, this impact is likely to be of low significance given the limited geographic and temporal scale of the project. The improvement of the M1 road, is likely to have a number of economic and safety impacts. The improvement of the road is likely to have a moderate positive impact to the southern and East African region as a whole, and Malawi in particular. However, the road improvements are also likely to contribute to increased ribbon development as well as lead to a greater volume of traffic. The combined effect of increased density along the road and higher traffic flows will increase the risk of road accidents, resulting in human injury and morality. The road related impacts are deemed to be of moderate significance.

9.8.7 Management of cumulative impacts – design and implementation

The management of cumulative impacts will depend on the context in which the development is occurring (i.e. the impacts from other projects and natural drivers that affect the VECs) and the characteristics of the road upgrade project. As cumulative impacts result from the actions of multiple stakeholders, the responsibility for their management is collective.

Project design and mitigation

In the context of the road upgrade, most negative cumulative impacts can be mitigated through proactive project design and management. Project-specific impacts identified in the ESIA need to carefully managed to control the cumulative effects of the project.

Section 10 presents the detailed environmental and social management plan containing measures that will address project related impacts.

Mitigation of projects impacts by other projects

In some instances, prevention of unacceptable cumulative impacts and enhancement of cumulative positive impacts by project mitigation alone is not possible. A case in point is high sediment loads in surrounding rivers caused by erosion. The associated cumulative impacts arising from erosion and siltation, deforestation, spread of agriculture and spread of alien invasives are known to contribute to the overall degradation of Lake Malawi. Given the scale of the problem, a collective approach will be required as the lake is the ultimate receiving environment for the many current and future developments impacts in the catchment.

Lake Malawi is a shared resource between Malawi, Tanzania and Mozambique and although there are several sectors working in the Lake Malawi basin the efforts are uncoordinated (Regional Workshop on Ecosystem Based Management of Lake Malawi Catchment, November 2014). It was the objective of the 2014 workshop to work towards on an integrated Watershed Management Plan within the Lake Malawi Catchment. This initiative will involve transboundary basin management including all key Malawian stakeholders as well as interested parties in Tanzania and Mozambique. It is recommended that the RA and departments such as the Department of the Environment, Irrigation and Dams collaborate with representatives who are furthering the objectives of this workshop which will include the management of other cumulative impacts that can significantly impact on Lake Malawi such as erosion and siltation and the spread of alien invasives.

The upgraded M1 road, in addition to stimulating trade, will encourage further ribbon development along the road. Given that the road will also attract greater flow of traffic, there will be an increased risk of accidents. In order to manage these impacts, the RA will need to ensure that residents do not move into the servitude and that the authorities responsible for traffic management control the flow and speeds of traffic/

Management of impacts associated with increased international access due to improvement of the NSC will rely on collaboration with other Malawian government department such as the Department of Economic Affairs, Trade and External Affairs. In addition, collaboration with the governments of Tanzania and Mozambique on initiatives to enhance access, trade and strategies for optimising the transportation of goods between these countries will be required.

10 Environmental and Social Management Plan

10.1 Introduction

The purpose of the ESMP is to ensure that potential environmental and social impacts identified during the ESIA process are effectively managed throughout all phases of the project. The ESMP specifies the mitigation and management measures to which the RA is committed and shows how the project will mobilise organizational capacity and resources to implement these measures. The ESMP also shows how mitigation and management measures will be scheduled.

The key objectives of the ESMP are to:

- Formalize and disclose the programme for environmental and social management; and
- Provide a framework for the implementation of environmental and social management measures.

The WBESF recommends the adoption of a mitigation hierarchy to anticipate and avoid risks and impacts. Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels. Once risks and impacts have been minimized or reduced, mitigate and where significant residual impacts remain, compensate for or offset them, where technically⁹ and financially¹⁰ feasible. Good practice principles (IFC, 2007) require that every reasonable effort be made to avoid, and if avoidance is not possible, then reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design. These principles are guiding the ESIA process.

The ESMP covers information on the management and/or mitigation measures that will be taken into consideration to address identified impacts in respect of construction and operation.

It is necessary to note that the ESMP is a living document that will be periodically reviewed and updated. The ESMP should be read in conjunction with the assumptions, limitations and exclusions noted in Section 5.4 of the ESIA.

As part of ongoing implementation, this ESMP will be publicly disclosed during the stakeholder engagement process. An opportunity will be offered to participating stakeholders to provide comment.

⁹ Technical feasibility is based on whether the proposed measures and actions can be implemented with commercially available skills, equipment, and materials, taking into consideration prevailing local factors such as climate, geography, demography, infrastructure, security, governance, capacity, and operational reliability

¹⁰ Financial feasibility is based on relevant financial considerations, including relative magnitude of the incremental cost of adopting such measures and actions compared to the project's investment, operating, and maintenance costs, and on whether this incremental cost could make the project nonviable for the Borrower

Table 112: E S M P

Phase of the Road and Expected Impacts	Proposed mitigation measures	Responsible authorities for implementation	Recommendation period for implementation	Cost Estimates
Preconstruction phase of the road				
Loss of property such as buildings and land	<ul style="list-style-type: none"> Identify and value the property and land affected Organise meetings with local leaders and property owners Compensate the affected people 	RA, Mbelwa and Rumphi Council, Traditional Leaders, Ministry of Lands	Prior to commencement of construction works	K1, 000, 000,000.00
Construction/Rehabilitation phase of the Road				
Dust affecting adjacent land users	<ul style="list-style-type: none"> All stockpiles of excavated materials should be covered or dampened during dry or windy conditions. Effective water sprayers Haulage vehicles should be covered 	Contractors	Throughout the project	5,000,000.00
Increased vehicle emissions from vehicle movement and fumes from generators	<ul style="list-style-type: none"> construction vehicles and equipment such as generators are adequately maintained to ensure efficient combustion of fuel 	Contractors	Throughout the project	
Loss of soil resources due to erosion	<ul style="list-style-type: none"> Construct suitable storm water management structures. Install suitable erosion control infrastructure (i.e. Gabion boxes or mattresses). Rehabilitate and re-vegetate existing erosion areas caused as a result of the existing road. Restrict construction vehicles within road reserve. 	DFO, EDO, Contractors	Throughout the project	5,000,000.00
Landslides due to construction activities	<ul style="list-style-type: none"> Install suitable slope stabilising infrastructure (i.e. Gabion boxes or mattresses). Rehabilitate and re-vegetate destabilized slopes. 	RA, DFO, EDO, DADO Contractors	Throughout the project	
Decrease in water quality of water resources caused by pollution events	<ul style="list-style-type: none"> Service construction vehicles only in dedicated areas that are equipped with drip trays. Store waste oil for removal by a recycling company to a suitable licenced facility. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil 	Contractors	Throughout the project	2,000,000.00
Decrease in the quality surface- and groundwater due to sewage contamination	<ul style="list-style-type: none"> Provide sufficient temporary chemical toilets for construction workers 	Contractors	Throughout the project	3,500,000.00
Flooding caused by blockage of culverts	<ul style="list-style-type: none"> Temporary clear culverts and drainage channels prior to upgrading, especially where flooding potential is high. Provide drainage alternatives during culvert repair and rebuilding 	Contractors	Throughout the project	
Loss or degradation of subsistence agricultural habitat, natural woodland and related ecological processes due to site clearing and construction activities	<ul style="list-style-type: none"> Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed Rehabilitate areas disturbed by project Bank stabilisation using gabions 	DFO, EDO, DADO Contractors	Throughout the project	5,000,000.00
Loss of flora species with importance for ecosystem service provision	<ul style="list-style-type: none"> Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed 	DFO, EDO, Contractors	Throughout the project	1,000,000.00
Increased poaching of flora and fauna by construction contractors	<ul style="list-style-type: none"> Induct contract workers on prohibition of poaching of flora and fauna 	Contractors	Throughout the project	
Disruption of local and through traffic during construction, with associated delays and operator costs	<ul style="list-style-type: none"> Train people to direct / divert traffic and design detours to promote the easiest possible traffic flow Publish accessible construction schedules enabling users to plan routes and timing. 	RA, Contractors	Throughout the project	5,000,000.00
Local employment and income generation	<ul style="list-style-type: none"> Work with local leadership where appropriate, Disseminate employment information, including the likelihood of job loss at the conclusion of construction 	RA, Contractors	Throughout the project	600,000.00
Loss of materials and equipment as a result of theft and illegal trading	<ul style="list-style-type: none"> Secure storage for all materials and equipment, with guarding as required. 	RA, Contractors	Throughout the project	5,000,000.00
Permanent loss of land and land linked livelihoods on road margins	<ul style="list-style-type: none"> Compensate and restore livelihoods 	RA, Rumphi and Mbelwa Councils, Ministry of Lands	Throughout the project	5,000,000.00

Loss of crops and associated livelihoods at borrow pits and lay down sites as well as along quarry access roads and temporary detours	<ul style="list-style-type: none"> Implement appropriate compensation for temporary loss under a negotiated Resettlement Action Plan Rehabilitate sites where necessary and return to original use and users. 			
Unhappiness among people displaced from road margins due to perceived compensation exclusions	<ul style="list-style-type: none"> Clarify compensation rules that apply to land and crop loss within the road reserve 	RA, Ministry of Lands	Throughout the project	1,000,000.00
Community disruption by construction workers (especially in the vicinity of camps), including cultural conflicts, alcohol abuse and the promotion of prostitution	<ul style="list-style-type: none"> Develop a code of practice for contractors and construction workers, including requirements for interacting with local people and communities. Cooperate with local police to apprehend and potentially prosecute workers who break the law 	RA, Rumphi and Mbelwa Councils, Ministry of Lands	Throughout the project	2,000,000.00
Hazard to pedestrians and cyclists from heavy vehicles and machinery during construction	<ul style="list-style-type: none"> Secure the perimeter of active working sites Set up general construction phase safety posters in public places close to construction works 	Contractor	Throughout the project	4,000,000.00
Health risk from the storage and use of hazardous and toxic materials (bitumen, gasoline, diesel, lubricating oil)	<ul style="list-style-type: none"> Secure storage for all materials and equipment, with guarding as required. Store toxic and/or hazardous materials according to Malawi standards 	Contractor	Throughout the project	2,500,000.00
Risk of increased HIV, STD and other infectious diseases	<ul style="list-style-type: none"> Provide counselling and information on infectious diseases Provide condoms 	RA, Rumphi and Mbelwa District Councils, Contractor	Throughout the project	
Loss of or damage to sites of cultural heritage importance	<ul style="list-style-type: none"> Engage with appropriate local leadership and community representatives to determine the nature and location of potential sites and objects 	RA, Rumphi and Mbelwa District Councils, Contractor	Throughout the project	1,000,000.00
Operation Phase				
Increased dust and vehicle emissions during operation phase impacting on adjacent communities and land users	<ul style="list-style-type: none"> Restrict vehicle speeds at specific locations along the route, for example next to communities, villages and trading centres 	RA, Road Traffic Directorate	After construction	1,000,000.00
Increase in flow velocity as a result of increased runoff from additional road surface	<ul style="list-style-type: none"> Construct adequate side drains to avoid flooding Regular maintain stormwater 	RA	After construction	5,000,000.00
Increase in accidents as a result of unsafe driving conditions caused by road flooding	<ul style="list-style-type: none"> Inspect and maintain stormwater management infrastructure 	RA	After construction	1,500,000.00
Increased potential for fauna road fatalities	<ul style="list-style-type: none"> Place relevant road signage warning of potential wildlife collisions, including awareness campaigns and slogans 	RA, Road Traffic Directorate	After construction	2,000,000.00
Improved international and regional access due to improvement of the M1 with associated national and regional economic benefits (cumulative)	<ul style="list-style-type: none"> Inspect the road and road reserve Maintain the road. 	RA, Road Traffic Directorate	After construction	3,000,000.00
Improved local access along the upgraded road	<ul style="list-style-type: none"> Maintain and repair upgraded road and shoulders. 	RA	After construction	5,000,000.00
Vandalisation and theft of new infrastructure	<ul style="list-style-type: none"> Regular inspections by RA of the status of infrastructure along the route. Cooperate with local police and prosecution of offenders. 	RA, Police	After construction	2,000,000.00
Hazard for pedestrians and cyclists due to increasing traffic volumes and higher vehicle speeds	<ul style="list-style-type: none"> Establish marked and signposted pedestrian crossings, with clearly indicated speed restrictions at the approach to such crossings Install traffic calming measures Apply and enforce general speed limits. Erect awareness-building signage and posters as part of a safety campaign. 	RA, Road Traffic Directorate	After construction	5,000,000.00
Health and safety hazard at borrow pits and quarries	<ul style="list-style-type: none"> Rehabilitate borrow pit and/or quarry sites 	RA	After construction	20,000,000.00

11 Environmental and Social Monitoring Plan

11.1 Introduction

Provisional environmental and social variables that are to be monitored during the various project phases are set out in Table 113 below. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

The full monitoring plan and chosen indicators will need to fulfil requirements including the following:

- Information gathered needs to be specific for meaningful interpretation covering the material potential impacts;
- Indicators need to be measurable and auditable, so that results can be verified;
- Monitoring needs to be relevant to specific receptors potentially impacted within the project area of influence; and
- Monitoring programmes further need to be time-bound with a clear schedule of monitoring activities.

Some environmental aspects will require continuous monitoring. A pragmatic approach needs to be taken to ensure that monitoring of relevant aspects is undertaken at the appropriate level

A high level annual budget has been allocated for monitoring to be undertaken during construction and operation. A number of assumptions have been made to calculate the budget and these are documented below Table 113.

11.2 Responsibilities

Responsibility for each of the monitoring aspects is included in the table below. The main responsible parties for the implementation of the ESMP is as follows:

- Contractor: Responsible for the implementation of the ESMP during construction;
- External Supervisor: Responsible for the external supervision (appointed external firm) of the implementation of the ESMP during construction; and
- Roads Authority through the Environmental and Social Management Unit: Responsible for all follow-up activities of the ESMP during subsequent phases of operation and closure.

11.3 Code of Conduct

During construction there needs to be a Code of Conduct to which Contractors should adhere to at all times. This should cover the following issues:

- Relationships with surrounding communities – violence towards communities, unauthorised use of community assets and resources etc.
- Sexual misconduct; and
- Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed.

- Measures should be based on the national or international labour principles. The WB ESF Standard 2 on labour and working conditions must apply.
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

Table 113: Environmental and Social Monitoring Plan

Phase of the Road and Expected Impacts	Proposed mitigation measures	Monitoring Indicators	Principal Monitoring Authority	Frequency	Cost Estimates
Preconstruction phase of the road					
Loss of property such as buildings and land	<ul style="list-style-type: none"> Identify and value the property and land affected Organise meetings with local leaders and property owners Compensate the affected people 	<ul style="list-style-type: none"> Number of properties valued Number of affected people compensated 	Ministry of Lands	Yearly	1, 000,000.00
Construction/Rehabilitation phase of the Road					
Dust affecting adjacent land users	<ul style="list-style-type: none"> All stockpiles of excavated materials should be covered or dampened during dry or windy conditions. Effective water sprayers Haulage vehicles should be covered 	<ul style="list-style-type: none"> Number of water sprays 	RA, EDO	Quarterly	2,000,000.00
Increased vehicle emissions from vehicle movement and fumes from generators	<ul style="list-style-type: none"> Construction vehicles and equipment such as generators are adequately maintained to ensure efficient combustion of fuel 	<ul style="list-style-type: none"> Number of vehicle services 	RA	Quarterly	500,000.00
Loss of soil resources due to erosion	<ul style="list-style-type: none"> Construct suitable storm water management structures. Install suitable erosion control infrastructure (i.e. Gabion boxes or mattresses). Rehabilitate and re-vegetate existing erosion areas caused as a result of the existing road. Restrict construction vehicles within road reserve. 	<ul style="list-style-type: none"> Number of storm water drains maintain Number of sites rehabilitate 	DFO, EDO, RA	Quarterly	2,000,000.00
Landslides due to construction activities	<ul style="list-style-type: none"> Install suitable slope stabilising infrastructure (i.e. Gabion boxes or mattresses). 	<ul style="list-style-type: none"> Number of sites rehabilitated 	RA, DFO, EDO, DADO Contractors	Yearly	2,000,000.00

	<ul style="list-style-type: none"> Rehabilitate and re-vegetate destabilized slopes. 				
Decrease in water quality of water resources caused by pollution events	<ul style="list-style-type: none"> Service construction vehicles only in dedicated areas that are equipped with drip trays. Store waste oil for removal by a recycling company to a suitable licenced facility. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil 	<ul style="list-style-type: none"> Litres of oil disposed off 	RA, EDO, EAD	Yearly	1,000,000.00
Decrease in the quality surface- and groundwater due to sewage contamination	<ul style="list-style-type: none"> Provide sufficient temporary toilets for construction workers 	<ul style="list-style-type: none"> Number of toilets constructed 	RA, Rumphi and Mbelwa council	Yearly	1,500,000.00
Flooding caused by blockage of culverts	<ul style="list-style-type: none"> Temporary clear culverts and drainage channels prior to upgrading, especially where flooding potential is high. Provide drainage alternatives during culvert repair and rebuilding 	<ul style="list-style-type: none"> Number of culverts installed 	RA, NCIC, Rumphi and Mbelwa council	Yearly	1,000,000.00
Loss or degradation of subsistence agricultural habitat, natural woodland and related ecological processes due to site clearing and construction activities	<ul style="list-style-type: none"> Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed Rehabilitate areas disturbed by project Bank stabilisation using gabions 	<ul style="list-style-type: none"> Number of areas rehabilitated Number of gabions installed 	DFO, EDO, DADO	Yearly	1,000,000.00
Loss of flora species with importance for ecosystem service provision	<ul style="list-style-type: none"> Clear only the areas necessary for the upgrade of the road and no deviations from the demarcated areas to be allowed 	<ul style="list-style-type: none"> Number of areas cleared 	DFO, EDO	Yearly	1,000,000.00
Increased poaching of flora and fauna by construction contractors	<ul style="list-style-type: none"> Induct contract workers on prohibition of poaching of flora and fauna 	<ul style="list-style-type: none"> Number of induction meetings 	DFO, EDO, EAD	Yearly	1,000,000.00
Disruption of local and through traffic during construction, with	<ul style="list-style-type: none"> Train people to direct / divert traffic and design detours to promote the easiest possible traffic flow 	<ul style="list-style-type: none"> Number of people trained 	RA, Rumphi and Mbelwa Councils	Quarterly	2,000,000.00

associated delays and operator costs	<ul style="list-style-type: none"> Publish accessible construction schedules enabling users to plan routes and timing. 				
Local employment and income generation	<ul style="list-style-type: none"> Work with local leadership where appropriate, Disseminate employment information, including the likelihood of job loss at the conclusion of construction 	<ul style="list-style-type: none"> Number of information materials developed 	RA, Rumphi and Mbelwa Councils	Quarterly	1,000,000.00
Loss of materials and equipment as a result of theft and illegal trading	<ul style="list-style-type: none"> Secure storage for all materials and equipment, with guarding as required. 	<ul style="list-style-type: none"> Number of storage spaces established 	RA	Yearly	1,000,000.00
Permanent loss of land and land linked livelihoods on road margins	<ul style="list-style-type: none"> Compensate and restore livelihoods 	<ul style="list-style-type: none"> Number of livelihoods restored 	RA, Rumphi and Mbelwa Councils, Ministry of Lands	Yearly	2,000,000.00
Loss of crops and associated livelihoods at borrow pits and lay down sites as well as along quarry access roads and temporary detours	<ul style="list-style-type: none"> Implement appropriate compensation for temporary loss under a negotiated Resettlement Action Plan Rehabilitate sites where necessary and return to original use and users. 	<ul style="list-style-type: none"> Number of sites rehabilitated 	RA, Rumphi and Mbelwa Councils, Ministry of Lands	Yearly	1,000,000.00
Unhappiness among people displaced from road margins due to perceived compensation exclusions	<ul style="list-style-type: none"> Clarify compensation rules that apply to land and crop loss within the road reserve 	<ul style="list-style-type: none"> Number of compensation meetings held 	RA, Ministry of Lands	Yearly	1,000,000.00
Community disruption by construction workers (especially in the vicinity of camps), including cultural conflicts, alcohol abuse and the promotion of prostitution	<ul style="list-style-type: none"> Develop a code of practice for contractors and construction workers, including requirements for interacting with local people and communities. Cooperate with local police to apprehend and potentially prosecute workers who break the law 	<ul style="list-style-type: none"> Number of code of practice developed Number of prosecutions 	RA, Rumphi and Mbelwa Councils, Ministry of Lands, Malawi Police	Yearly	2,000,000.00

Hazard to pedestrians and cyclists from heavy vehicles and machinery during construction	<ul style="list-style-type: none"> Secure the perimeter of active working sites Set up general construction phase safety posters in public places close to construction works 	<ul style="list-style-type: none"> Number of safety signage developed 	RA, Ministry of Labour, NCIC	Yearly	4,000,000.00
Health risk from the storage and use of hazardous and toxic materials (bitumen, gasoline, diesel, lubricating oil)	<ul style="list-style-type: none"> Secure storage for all materials and equipment, with guarding as required. Store toxic and/or hazardous materials according to Malawi standards 	<ul style="list-style-type: none"> Number of storage spaces established 	RA	Yearly	1,500,000.00
Risk of increased HIV, STD and other infectious diseases	<ul style="list-style-type: none"> Provide counselling and information on infectious diseases Provide condoms 	<ul style="list-style-type: none"> Number of counselling sessions 	RA, Rumphi and Mbelwa District Councils, Contractor	Yearly	1,000,000.00
Loss of or damage to sites of cultural heritage importance	<ul style="list-style-type: none"> Engage with appropriate local leadership and community representatives to determine the nature and location of potential sites and objects 	<ul style="list-style-type: none"> Number of community engagement meetings 	RA, Rumphi and Mbelwa District Councils, Contractor	Yearly	1,000,000.00
Operation Phase					
Increased dust and vehicle emissions during operation phase impacting on adjacent communities and land users	<ul style="list-style-type: none"> Restrict vehicle speeds at specific locations along the route, for example next to communities, villages and trading centres 	<ul style="list-style-type: none"> Number of road safety signage 	RA, Road Traffic Directorate	Yearly	1,000,000.00
Increase in flow velocity as a result of increased runoff from additional road surface	<ul style="list-style-type: none"> Construct adequate side drains to avoid flooding Regular maintain stormwater 	<ul style="list-style-type: none"> Number of storm water drains 	RA	Yearly	1,000,000.00
Increase in accidents as a result of unsafe driving conditions caused by road flooding	<ul style="list-style-type: none"> Inspect and maintain stormwater management infrastructure 	<ul style="list-style-type: none"> Number of inspections 	RA	Yearly	1,500,000.00
Increased potential for fauna road fatalities	<ul style="list-style-type: none"> Place relevant road signage warning of potential wildlife collisions, including awareness campaigns and slogans 	<ul style="list-style-type: none"> Number of wildlife signage install 	RA, Road Traffic Directorate	Yearly	1,000,000.00

Improved international and regional access due to improvement of the M1 with associated national and regional economic benefits (cumulative)	<ul style="list-style-type: none"> Inspect the road and road reserve Maintain the road. 	<ul style="list-style-type: none"> Number of inspections 	RA, Road Traffic Directorate	Yearly	1,000,000.00
Improved local access along the upgraded road	<ul style="list-style-type: none"> Maintain and repair upgraded road and shoulders. 	<ul style="list-style-type: none"> Number of shoulders repaired 	RA	Yearly	1,000,000.00
Vandalisation and theft of new infrastructure	<ul style="list-style-type: none"> Regular inspections by RA of the status of infrastructure along the route. Cooperate with local police and prosecution of offenders. 	<ul style="list-style-type: none"> Number of inspections 	RA, Police	Yearly	1,000,000.00
Hazard for pedestrians and cyclists due to increasing traffic volumes and higher vehicle speeds	<ul style="list-style-type: none"> Establish marked and signposted pedestrian crossings, with clearly indicated speed restrictions at the approach to such crossings Install traffic calming measures Apply and enforce general speed limits. Erect awareness-building signage and posters as part of a safety campaign. 	<ul style="list-style-type: none"> Number of signage established 	RA, Road Traffic Directorate	Yearly	2,000,000.00
Health and safety hazard at borrow pits and quarries	<ul style="list-style-type: none"> Rehabilitate borrow pit and/or quarry sites 	<ul style="list-style-type: none"> Number of borrow pits and/or quarry rehabilitated 	RA, EAD, Mines Department, Rumphi and Mbelwa Councils	After construction	20,000,000.00

12 Conclusions and Recommendations

12.1 Key conclusions

- The Malawi Roads Authority plan to upgrade the existing M1 road between Kacheche and Chiweta. Upgrading of the M1 road has been prioritised by the Malawi government as it is an important corridor between eastern and southern Africa, connecting the ports in Dar-es-Salaam and Durban and other regional cities to the Malawi road network. The road upgrade will improve national and international access to this area, benefitting the local, regional and national economy.
- An ESIA, was undertaken in compliance with relevant Malawi environmental legislation, national policy framework and guidelines, including environmental standards. In addition, the study was aligned with international requirements including the World Bank EHS guidelines and Environmental and Social Framework (2016). The assessment included review of existing information and field investigations by specialists to understand the current receiving environment in which the M1 road is located.

The ESIA were undertaken in a phased manner comprising project inception, scoping and impact assessment management planning, disclosure and authority review. As part of the scoping phase relevant stakeholders were identified and the project was introduced and discussed to obtain stakeholder comments about the project. Stakeholders included national, provincial, district and local government, traditional authorities, village heads, NGOs, parastatals and businesses. Stakeholder engagement was an integral part of the development of the terms of reference of specialist studies and identification of impacts and mitigation measures.
- A number of biophysical and socio-economic impacts were identified based on specialist studies (i.e. air quality, surface water, biodiversity and social and resettlement), review of existing information and stakeholder feedback. A number of potential environmental and social impacts were determined for the construction and operation phases of the project, including positive and negative impacts.
- Based on the ESIA, it is recommended that a RAP is undertaken for this project. The RAP process has commenced and will be submitted in a separate stand-alone document.
- Identified potential impacts were evaluated using a standardized assessment methodology. Using magnitude, duration, spatial scale and probability criteria, identified impacts were awarded an impact significance rating system (refer to Section 9.3).
- Potential project biophysical and socioeconomic impacts can be avoided and/or mitigated through the application of a range of management measures. These management controls are presented in a comprehensive environmental and social management plan (ESMP) (refer to Section 10).
- Monitoring of ESMP implementation is an essential to ensure that impacts are effectively mitigated and managed. An environmental and social monitoring plan has been prepared and sets out the nature, frequency and cost of monitoring activities. It also indicates the individuals and parties responsible for monitoring (refer to Section 11).
- Taking into consideration the findings of the ESIA it is anticipated that impacts associated with the upgrade of the M1 road between Kacheche and Chiweta will have no fatal flaws that prevent the project from proceeding.

12.2 Key recommendations

- The ESIA team and specialist are of the opinion that the upgrade of the M1 road can proceed provided that the recommendations for mitigation and monitoring as set out in the ESIA are followed.
- It is recommended that the environmental and social management plan be revised prior to the commencement of construction based on the appointed contractor's recommendations for the construction phase.
- The RA and its contractors will need to implement the procedures set out in the RAP to minimize any potential resettlement impacts. Mitigation principles contained in the RAP give guidance to stakeholder engagement, grievance management, livelihoods restoration, eligibility and entitlement, land planning, governance structures and monitoring and evaluation.
- It is recommended that the RA and departments such as the Department of the Environment, Irrigation and Dams collaborate with governments of Tanzania and Mozambique to work together regarding management of cumulative impacts in the project area, specifically on Lake Malawi that it the ultimate receiving environment in the catchment to manage impacts such as erosion and siltation and the spread of alien invasive.
- Management of impacts associated with increased international access due to improvement of the NSC will rely on collaboration with other Malawian government department such as the Department of Economic Affairs, Trade and External Affairs. In addition, collaboration with the governments of Tanzania and Mozambique on initiatives to enhance access, trade and strategies are recommended to optimise the transportation of goods between these countries.

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Appendices

Appendix A: 1:50 000 Map

Appendix b: Stakeholder database

Name	Surname	Company
Aaron	Luwe	Ministry of Gender
Abraham	Mhlanga	Rumphi District Agriculture Office
Aggrey	Nyirenda	Rumphi District Council
Alefa	Chigulu	Environment
Alex	Mhango	Village headman Matchonga
Alfred	Topeka	Department of Antiquities
Alfred	Butao	Ward Councillor
Allan	Chitete	Rumphi District Agriculture Office
Andrew	Chima	Rumphi District Agriculture Office
Anita	Bron	SRK Consulting
Annettie	Chitsonga	Community Development Office
Annox	Mbeba	Land Resource and Conservation (LRCO)
Arrow	Nyirenda	Malondanimaso
Aubrain	Kumwenda	Rumphi District Council
Austen	Chibkiana	Rumphi Prison
Austin	Mhomgo	Area Development Committee Member
Boster	Mhango	Area Development Committee Member
Boyson	Ngwira	Group Village Headman Bombo
Bywell	Mwalwenda	Area Development Committee Member
Catherine	Singh	Mzokoto
Charity	Nyirenda	Area Development Committee Member
Charles	Mpezeni	Rumphi Police
Charles	Gondwe	Area Development Committee Member
Charles	Lungu	Malawi Defense Force
Chawezi	Chumia	Plant Vehicle Hire Organization (PVHO)
Chimwemwe	Kumwenda	Department of Trade-One Village One Product (OVOP)
Chris	Chiumia	Vineyard Consulting Services
Chrispine	Chakhumbira	MEC (Mmbelwa District Council)
Chrissy	Chiumia	Department of Antiquities
Christon	Mlenga	Area Development Committee Member
Cleaverson	Nyando	M'mbelwa District Council
Clement	Ndlovu	Mzimba Radio
Cleverson	Nyando	Mmbelwa District Council
Cuthberth	Phiri	Judiciary
Davie	Chilonga	Ministry of Housing, Lands Urban Development
Dumisani	Mbekeyani	Mzuzu City Council
Edward	Moyo	District Forest Office
Edward	Mkandawa	District Fisheries Office
Edward	Khonje	Rumphi District Council
Edwin	Mwase	Chimphamba
Elisah	Khunga	Ward Councillor
Emmanuel	Kamangira	Malawi Energy Regulatory Authority
Emmanuel	Masongola	Feed The Children International
Enerst	Luhanga	Northern Region Education Division

Name	Surname	Company
Ernest	Msiska	Area Development Committee Member
Ethel	Chipeta	Area Development Committee Member
Ezeckiel	Mkandawire	Group Village Headman
Fanny	Ngwira	Group Village Headman Bombo
Fedwin	Nyirenda	Ward Councillor
Florence	Sapwe	Area Development Committee Member
Flyton	Chiwenda-Mwale	Area Development Committee Member
Foster	Mhango	Traditional Authority Mwahenga Mhuju
Francis	Chidandale	Tourism Department
Francis	Puleni	Rumphi District Council
Francis	Zuma	Village Development Committee Chairperson
Francis	Nyirenda	Mzuzu Meteorological Office
Francis	Mtambo	Region Water Office
Frank	Mkandawire	Director of Planning and Development (DPD)
Fryness	Nyienda	Village Development Committee Chairman
George	Mlowoka	Youth Network and Counselling (Yoneco)
George	Nxumayo	Parks and Wild life Office
Georgina	Thindwa	Village Development Committee Chairman
Getrude	Mhango	Kakoloha Village Development Committee
Gibson	Nyirenda	Department of Mines
Gift	Nyirenda	District Forestry Office
Goodnews	Gumbo	Wildlife Department
Grant	Theu	SRK Consulting
Harris	Kumwenda	Ministry of Local Government and Rural Development
Harrison	Lungu	Office of President and Cabinet (OPC)
Harry	Mnyenyembe	Ward Councillor
Harvey	Chihana	Area Development Committee Member
Haward	Msewa	Meteorological Department (MET)
Hendrix	Mphangamo	Malawi Carer
Henry	Zimba	Judiciary
Herbert	Mweuka	Synod of Livingstonia Development (SOLDEV)
Humphrey	Jere	Ward Councillor
Ian	Msowoya	Chinyolo ADC Member
Ida	Mughogho	Department of Trade
Innocent	Simakweli	Rumphi District Council
Jackson	Silumbu	Area Development Committee Member
Jestina	Nyasulu	Village Development Committee (VDC) Chairman
Johan	Chingawale	District Water Development Office (DWDO)
John	Ndakaora	ADC Member
Josiah	Mbewe	Village Development Committee (VDC) Secretary
Kelvin	Mphonda	Roads Department -Ministry of Transport and Public Works
Kelvin	Tenso	Capital Radio
Kelvin	Chawinga	Senior Chief (Hewe)
Kemelson	Nhuluwe	Area Development Committee Member

Name	Surname	Company
Kenneth	Silumbu	Area Development Committee Member
Kings	Mdhuli	Agriculture, Irrigation and Water Development
Kingsley	Phiri	Malawi Telecoms Ltd
Kondwani	Harawa	Ward Councillor
Kondwani	Chilanga	Village headman Chamanganga
Lameck	Magawa	Mmbelwa District Council
Lameck	Nyasulu	Village Headman Chibotera
Lawrence	Siliya	Water Development & Sanitation Department
Lenney	Kaunda	Village Development Committee (VDC) Chairman
Leonard	Masauli	Department of Information
Leonard	Mtonya	Road Traffic and Safety Services
Levie	Mzembe	Area Development Committee Member
Lifred	Banda	District Forestry Office
Lilian	Chirambo	Ward Councillor
Limbani	Msiska	Area Development Committee Member
Lizzie	Mhango	Social Welfare
Louis	Thindwa	Village Headman Mtomboloka
Lucy	Muyafula Kabaghe	Mmbelwa District Council
Lusizi	Nhlane	District Commissioner -Rumphi District Council
Lusungu	Mkandawire	Rumphi District Council
Lydon	Mkandawire	District Labour Office
Lywell	Mhango	GVH Manombo
Mabvuto	Mupwayi	Synod of Livingstonia Development (SOLDEV)
Mackenzie	Chiyala	Malawi Telecommunications Limited (MTL)
Mahara	Longwe	National Aids Commission (NAC)
Makoza	Nyasulu	Village Development Committee (VDC) Chairman
Malioni	Nyasulu	GVH Kamphoni
Mateyo	Msiska	Village headman Mziyala
Mazile	Chibambo	Ward Councillor
Mazoe	Gondwe	Ward Councillor
Mc Holdings	Nyirenda	Rumphi District Council
Menard	Mwafulirwa	Ministry of Gender
Mighty	Kayoyo	Education
Mlota	Mnthali	Area Development Committee Treasurer
Moses	Chirongo	Rumphi District Forestry Office
Moses	Lupwayi	Rumphi District Forestry Office
Mphatso-A	Mithi	Rumphi Water Board
Mr	Nkhonyesa	Village headman Katakwa
Musandide	Missinjo	Rumphi District Council
Oscar	Msiska	Village Headman Kamphoni
Patricia	Masupayi	Department of Forestry
Patson	Nyasulu	Group Village Headman Kazuwa
Peter	Muyanga	Ward Councillor
Peter	Sakala	Malawi Housing Corporation (MHC)

Name	Surname	Company
Precious	Ndhlovu	Mkombezi
Regina	Gama	Area Development Committee Member
Rex	Kanjedza	Simbanet Malawi Ltd
Robert	Mhange	Kamphoni
Robert	Mteza	Malawi Defense Force
Roosevelt	Kamwetewa	Agriculture
Russell	Mhone	Labour Office Mmbelwa District Council
Samson	Mzembe	Group Villageheadman Kamzomole
Selina	Nyasulu	Mtomboloka
Sleve	Masoo	Mmbelwa District Council
Solomon	Chirambo	Ministry of Local Government and Rural Development
Solver	Kalinde	Mmbelwa District Council
Sport	Nyasulu	Group Village headman (GVH) Sangaliwe
Statch	Kondowe	Ward Councillor
Stephen	Kalua	Village Development Committee (VDC) Chair
Steven	Mtawa	Zonal Forestry Office North
Suzgo	Gondwe	Development Action for Marginalised Rural Areas (DAMRA)
Sydney	Kamtukule	Department of Water Resources
Tawola	Msiska	Village Development Committee (VDC)
Tenwell	Lwesya	Rumphi District Agriculture Office
Thelesiwe	Hara	Department of Youlth
Thom	Mzumara	ESCOM
Timothy	Banda	Irrigation Department (Agriculture)
Timothy	Mhango	Area Development Committee (ADC) Member
Tobias	Mwakilanamwila	Rumphi District Hospital
Tobious	Mwilwa	Area Development Committee Member
Tom	Hachu	Area Development Committee Member
Vanani	Nyirenda	Zodiak Broadcasting Station (ZBS)
Victor	Tezera	Electricity Supply Commission of Malawi (ESCOM)
Vinjero	Luhanga	Ward Councillor
Visuzgo	Harawa	Village Headman Julira
Vitumbiko	Nyirongo	Rumphi District Council
Wainright	Chihana	Roads Authority
Wakefer	Mukumbwa	Rumphi District Agriculture Office
Wakisa	Kalima	Minister of Agriculture
Wigly	Mwamsango	Nationa Registration Bureau
William	Ngambi	Ministry of Mines and Environmental Affair (Forestry Department)
WJ	Gondwe	Themba La Mathemba Chief Chikulamayembe
Yaz	Nyirenda	District Agricultural Development Officer (DADO)
Yusuf	Kazembe	Mmbelwa District Council

Appendix c: Comment and Response Report (CRR)

Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP)
for the Kacheche to Chiweta Section of the M1 Road, Malawi

COMMENT AND RESPONSE REPORT

RECORD OF STAKEHOLDER COMMENTS RAISED DURING SCOPING PHASE ENGAGEMENT

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
1. NEED AND DESIRABILITY OF PROJECT						
We place on record that we appreciate the coming of the project.	Themba la Mathemba Chikulamayembe	Paramount Chief	18 August	Rumphi District Council (DC)	Noted with thanks.	n/a
People were told a new development was coming when the Road Reserve Boundary (RRB) was marked. Now we are telling the people that the new project is coming.	Mwankhunikira	Senior Chief	18 August	Rumphi DC	Noted.	n/a
What was the reason for choosing this section of the road?	Mr. Herbert Mweuka	Rumphi District Executive Steering Committee (DESC) Synod of Livingstonia Development (SOLDEV) Rumphi office	19 August 2016	Rumphi DESC	Mr. Chihana: This project forms part of the bigger North Corridor project, which links Malawi with Tanzania. It includes: Kia turnoff to Mzimba, turnoff Mzimba – Kacheche – Chiweta – Karonga – Songwe. Chiweta to Karonga is excluded from the project.	Section 2.1

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Why can the road not include the road to Rumphi district because the section from Bwengu to Rumphi is small?	Mr. Limbani Msiska	Chinyolo Area Development Committee (ADC)	20 August 2016	Chinyolo ADC	Mr. Chihana: Funding is only for the M1 road and does not include secondary roads. Bwengu to Nyika via Rumphi is a different project.	n/a
2. PROJECT RELATED ISSUES						
Should you wish to present a Project Brief to the EAD, you should do so only when stakeholders have commented on the terms of reference of proposed specialist studies to be undertaken during the Environmental Impact Assessment for the road project	Ms Tawonga Mbale Luka	Environmental Affairs Department	8 July 2016	EAD	Comment noted.	n/a
How much money is earmarked for the project? We know it is World Bank (WB) funded. What are the time frames for the project?	Mr. Harvey Chihana	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chihana: Budget: The budget is currently not available for the construction, the Malawi Roads Authority (RA) has only been funded for initial studies including the ESIA and design teams. After these studies, the final budget will be arrived at. Timeframes Surveys and designs will be finished in March 2019. Contractor selection will be done in 9-12 months after March 2019.	Section 1.1 Section 2.4
	Themba la Mathemba Chikula Mayembe	Paramount Chief	18 August 2016	Rumphi DC		

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					Only after March next year will we know the exact timeframes.	
Management at excavated areas is important. Borrow pits cause a lot of destruction to the environment. Usually hillside forests are impacted. Once construction is completed, those areas are abandoned. What will the terms of reference (ToR) for the contractor be? E.g. There was a contractor who was assigned to rehabilitate a road from Rumphi BOMA to Chipokabawoli Bridge. He was taking rocks from the mountain forests without permit and without following EMP. The rocks taken from the mountain slopes have destabilised them, which is dangerous. Payment is required to cut a tree in some areas, which is also not adhered to.	Mr. Gift Nyirenda	Rumphi DEC District Forestry Officer	18 August	Rumphi DEC	Mr. Chihana: The guidance from this team (SRK) will make provision for re-instatement. The contractor has to negotiate with the owner of the place for a borrow-pit. We encourage that the contractor gets the district assembly to witness the agreement to mitigate the impact. The laws of Malawi require rehabilitation but this does not mean that the areas will be restored to its original state after rehabilitation. The main and only feasible rehabilitation is sloping and backfilling with topsoil. We will make sure the borrow pits are draining.	Section 9.4
Previous borrowing has taken place in people's gardens and there has been damage. How are you going to mitigate this?	Mr. Kemerson Ngulube	Chinyolo ADC	20 August 2016	Chinyolo ADC		
Borrow pits need to be rehabilitated, and adequate funds should be made available for rehabilitation. For example, mosquitoes come if these areas not rehabilitated to standard.	Mr. Kinas Mdhuli	Mzimba DESC Agriculture, irrigation and water development	17 August 2016	Mzimba DESC	Borrow pits are the key component at a road project.	

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Borrow pits are left open and are not rehabilitated after construction activities. Why is this so? Who will rehabilitate them?	Mr. Makoza Nyasulu	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	<p>Roads are made from soil, soil has to come from another place. We use specific soil: we use gravels wherever there is road construction.</p> <p>The challenge is to find a place where we dig to reinstate. We need to fill the hole, to fill the hole we have to dig another hole. We at least try to reinstate. We trim the side slope, bring back the topsoil so the natural vegetation can come back and that the hole can drain out.</p> <p>There will always be borrow pits. It is a concern to the community and the environment as a whole.</p> <p>Sometimes local communities would humbly ask us to keep a borrow pit. It is an advantage to have water for cattle. We ask the Department of Environment Affairs (DoE) for permission to do this. Usually we receive money and give the contractor the money for compensation when the contractor finds a place where he can put the borrow</p>	

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					pit. We have to agree to an appropriate place. District assembly has to witness and agree to this process.	
There is a borrow pit at Chombe as a result of a previous road project which still has not been rehabilitated. Shall we bring in a new project when the old one is not addressed?	Mr. Frank Mkandawire	Rumphi DC	18 August 2016	Rumphi DC	Mr. Chihana: We encouraged contractors to negotiate a borrow pit at Chombe. We did not know there was an issue at Chombe. The RA will investigate this.	RA to address
What about the borrow pits – where will they be located as they negatively impact on the environment.	Mr. Lusizi Nhlane	District Commissioner , Rumphi	18 August 2016	Rumphi DC	Mr. Chihana: An EMP will be developed to prevent and manage any negative impacts of borrow pits. Their location will only be known once the final design of the road is available.	Section 2.7 Section 9.4
Is track labour considered as part of the design? I would like to see the design and discuss it with the engineer. The whole design of road must be shared with stakeholders – information such as quality of tar, thickness of road. We want to see whether design specifications are met.	Mr. Kinas Mdhluli	Mzimba DESC Agriculture, irrigation and water development	17 August 2016	Mzimba DESC	Mr. Theu: The RA should discuss this with Mr Kinas and the council once the information becomes available.	Section 2
Is there a period that has to elapse to replace the road signs when they are damaged?	Mr. Arrow Nyirenda	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chihana: There is a year required for maintenance at the end of the construction period. Broken	Section 9.7 Section 9.13 Section 10

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					road signs are repaired during this time.	
Will the road expansion go through Chiweta to Chitimba or will it stop in the escarpment?	Mr. Timothy Mhango	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chiumia: The road will be widened from Kacheche to Chiweta. Other consultants will be involved on the other section from Lilongwe to the border.	Section 1
Contractors tend to leave without properly finishing the project. How will you ensure that the work is completed before the contractors leave?	Mr. Roosevelt Kamweteke	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: There is a 5% retention of payment as security to ensure the project is completed satisfactorily.	Section 9,10
During implementation of the project many issues can arise: management planning, money will it be implemented as you say and will recommendations be followed?	Mr. Henry Zimba	Mzimba DEC Judiciary	17 August 2016	Mzimba DEC	Mr. Chihana: The WB does monitor the project implementation to ensure that it is done in accordance to plans and specifications.	Section 9,10
3. COMPANY POLICY AND RELATED ISSUES						
Why has the RA not previously contacted us regarding previous projects? What has caused you to consult to ADC now? Why was the The Phwezi to Usumala road done without a baseline survey? Does this project have higher priority than others?	Mr. Tobias Musilwa	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chihana: This project is different from others in that it is funded by the WB and is larger than many other projects undertaken by the RA. The RA realises that the current project can have major impacts on the natural and social environment.	n/a

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
We see that the RA is willing to give some of its roles to local people. As we have seen in its explanation about road reserves and other things. When is the RA decentralising?	Mr. Khunya Elja	Rumphi DC	18 August 2016	Rumphi DC	Mr. Chihana: RA is part of the ministry and cannot decide on its own when to decentralise.	n/a
4. ESIA RELATED ISSUES AND INFORMATION						
4.1 Other projects						
The Njakwa-Livingstone road upgrade will commence very soon. It will be tarred. The construction period will be 2 – 3 years.	Mr. Kelvin Mphonda	Director of Ministry of Transport	15 August 2016	Ministry of Transport and Public Works	Noted.	n/a
Are you involved with the dam project at Fufu? How are the 2 projects related? The Fufu Dam project and this one? The RA is encouraged to investigate the matter. I am upset that a new bridge was built and now it might be demolished. It is a waste of resources.	Mr. Charles Gondwe	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chihana: The RA has only known of the dam project through the press and not officially. The RA will investigate. Mr. Chihana will meet with the Ministry of Energy and also speak to Mr. Kalowekamo.	RA to address
	Mr. Lewis Thindusa	Mwalweni II ADC	19 August	Mwalweni II ADC		
	Mr. Andrew Chima	Rumphi DEC	18 August 2016	Rumphi DEC		
	Ms Chrissy Chiumia Mr Alfred Topeka	Department of Antiquities	15 August 2016	Department of Antiquities		
	Mr. Kelvin Mphonda	Director of Ministry of Transport	15 August 2016	Ministry of Transport and Public Works		
	Mr. Yaz Nyirenda	DESC Agriculture	19 August 2016	DESC		
	Mr. Lusizi Nhlane	District Commissioner, Rumphi	18 August 2016	Rumphi DC		
The Millennium Challenge is another project.	Mr. Allan Chitete	Rumphi DC	18 August 2016	Rumphi DC	Noted.	n/a

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Four years down the line, a road in this area has not been completed. Funds were earmarked for that project and the road is not finished. The committee needs to get feedback regarding delays.	Mr. Hendrix Mphaw kamo	Mzimba DEC Malawi carer	17 August 2016	Mzimba DEC	Noted.	
4.2 Stakeholder engagement						
The road project should involve the communities and they should feel part of the development.	Mr Francis Nyirenda	Mzuzu Meterogical Office, Mzuzu	25 August, 2016	Mzuzu Meterogical Office	Noted.	Section 5
4.3 Fieldworkers						
Sometimes we are not informed about the length of time required for research assistants, and assistants are underpaid. The social welfare of research assistants should be considered.	Mr. Tobias Mwilwa	Chinyolo ADC	20 August 2016	Chinyolo ADC	Ms. Bron: A contract will be drawn up with survey assistants, specifying employment conditions. Conditions will be aligned with local labour laws.	Table 1.3 of the RAP.
5. INFRASTRUCTURE AND SERVICES						
5.1 Electricity						
The development will cause power interruption to surrounding communities when power lines are moved away for the road.	Mr Thom Mzumara	ESCOM, Mzuzu	25th August, 2016	ESCOM, P.O Box 56Mzuzu	Noted.	n/a
The development will mainly affect low voltage lines at Bwengu and Mchenga coal mine because these lines are close to the road. ESCOM is hoping that there will be	Mr Thom Mzumara	ESCOM, Mzuzu	25th August, 2016	ESCOM, P.O Box 56Mzuzu	Noted. Compensation to affected community members will be addressed in the RAP.	Sections 5-7 of the RAP

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compensatory plan in place to deal with this issue						
How are you going to deal with electricity poles that are located close to the road?	Ms. Selina Nyasulu	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: The electricity poles and other services will not be impacted negatively. The poles will be taken into consideration in the design of the road upgrade.	n/a
5.2 Boreholes						
Boreholes close to the road should be taken into account.	Mr. Goodnews Gumbo	Mzimba DESC Parks and Wildlife Officer	17 August 2016	Mzimba DESC	Noted.	n/a
There is a borehole at Mkombezi. If it is taken away without replacement it will be a loss to the district.	Mr. Gift Nyirenda	Rumphi DEC District Forestry Officer	18 August 2016	Rumphi DEC	Mr. Chihana: The borehole will be replaced if it is affected.	Section 9.4
There is a borehole at Mkombezi. But I am defeated by the comment by Mr. Chihana that it is within the RRB.		Rumphi DC	18 August 2016	Rumphi DC		
5.3 Traffic flow						
The movements of goods and services will slow down during construction as the Kacheche- Chiweta road is narrow and detours are difficult. A clear plan to address this is required.	Mr George Nxumayo	Parks and Wildlife Office, Mzuzu	25 August, 2016	Parks and Wildlife Office, Mzuzu	Noted. This will be addressed in the construction management plan as part of the ESIA/ESMP.	
Travelling will be far more efficient on the new road	Mr Mabvuto Lupwayi	Synod of Livingstonia	25th August, 2016	Synod of Livingstonia	Noted.	Section 9.7

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
		Development (SOLDEV)		Development (SOLDEV P.O. Box 27 Ekwendeni.		
The widening of the road will improve efficiency of travel	Mr Steven Mtaw a	Zonal Forestry	223rd August, 2016	Zonal Forestry Office North, Mzuzu	Noted.	Section 8.7
How will diversions not affect business? How will you deal with blockages and water flow?	Mr. Wakisa Kalima	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: Wherever a diversion becomes a limitation, other road construction techniques will be used. The government will find a way to undertake construction: either by leaving one lane open at a time, or closing the road at short intervals. We entire length of the road will not be closed off. Blockages will be cleared, and water will be channelled into natural water-flow channels. This will be taken into consideration as part of the design of the road upgrade.	Section 9.4
The road is meandering at the escarpment area. How will you build the road, will you make use of diversions?	Mr. Abraham Mhlanga	DEC Rumphi Agricultural Office	18 August 2016	DEC Rumphi		
I am grateful for the road upgrade. The road has a lot of corners and curves. Are you going to put bumps to control speeding and will you expand and reduce the curves? Are sharp bends going to be straightened?	Mr. VH Mziyala	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: RA is aware that improvement may lead to speeding and accidents. The area at Kawekez bridge will be straightened and should reduce accidents. A safety	Section 9.4

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					auditor will check the design to ensure road safety. Low lying areas where water flows on the road, will be raised.	
I am concerned with the Phw ezi trading centre as the road is busy. Trucks from Karonga side park on the left block the visibility at the road. Cars travel between Karonga and Mzuzu. The road needs to be re-aligned.	Mr Mshanga	Rumphi DEC Agricultural Office	18 August 2016	Rumphi DEC	Mr. Chihana: Re-alignment of that section of the road is a challenge. United Kingdom (UK) master students get the road in exams to design and they usually answer that it is impossible. Some even propose a tunnel. In some cases we will not be able to realign because of the challenges. But some shoulders will be 2 meters to allow for space for trucks. Phw ezi will be one of them.	RA to address
At the Bwengu T-junction the road should be re-designed. The road is very narrow and there are small shops around. I don't know if they will be resettled.	Mr. Mbewa	Rumphi DEC Agricultural Office	18 August 2016	Rumphi DEC	Mr. Chihana: This project will address junctions and improve them where possible. A Relocation Action Plan (RAP) is being undertaken as part of EISA process and will guide resettlement and identification of those to be resettled.	Section 9.4
Rumble surfaces along the M1 road should be of reasonable height as at times they make the driving experience horrible.	Mr Dumisani Mbekeyani	Mzuzu City Council	24 August 2016	Mzuzu City Council, Mzuzu	Noted. This will be addressed in the Construction	Section 9.4 Section 9.7

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					Management Plan as part of the ESIA/ESMP.	
Road signs should be put on all necessary places, should be reflective and should not be prone to vandalism (preferably concrete). Single lane bridges should be avoided if there are to be any new bridges.	Mr Robert Mteza	Malaw i defence Force	26th August, 2016	Malaw i Defence Force	Noted.	Section 9.4
5.4 Cables/pipes						
Underground telecommunication cables and internet cables have just been laid. Internet cables are located very close to the road.	Mr. Vitumbiko Nyirongo	Rumphi DEC RDC	18 August 2016	Rumphi DEC	Mr. Chihana: We will follow the existing road and there will be no interference with cables except where bridges are crossed. We are working together with Simbanet in this regard. We know where the cables are, and have given permission for cables to be buried in that area.	n/a
There are PVC water pipes alongside part of the road. The regional office might have maps to show where the pipes are located. It runs from Zumba Village to Mukakalayaw i Village and diverts to the east from the road.	Mr. Goodnews Gumbo	Mzimba DSC Parks and Wildlife Officer	17 August 2016	Mzimba DSC	Noted.	n/a
If the road will involve deep excavation it is very likely that our infrastructure in terms of fibre optic cables will be tampered with. In this case MTL has to be consulted where deep excavation will be undertaken.	Mr Mackenzie Chiyala	Malaw i Telecommunication s Limited (MTL)	25th August, 2016	Malaw i Telecommunications Limited (MTL) , Mzuzu	Noted.	RA to address Section 9.4

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Most of the MTL infrastructures are planted 30m away from the road reserve, so no serious problems should arise during construction.	Mr Mackenzie Chiyala	Malawi Telecommunication s Limited (MTL)	25th August, 2016	Malawi Telecommunications Limited (MTL, Mzuzu	Noted.	n/a
Most of the information concerning MTL infrastructure is available to the NRA as consultation occurred before the infrastructure was buried.	Mr Mackenzie Chiyala	Malawi Telecommunication s Limited (MTL)	25th August, 2016	Malawi Telecommunications Limited (MTL, Mzuzu	Noted.	n/a
The project may affect the Luzi Water scheme and expose their irrigation pipes during construction and excavation activities.	Mr Francis Mtambo	Region Water Office, Private Bag 68 Mzuzu	25th August, 2016	Region Water Office, Private Bag 68 Mzuzu	Noted. This will be addressed in the ESIA/ESMP.	Section 9.4
5.5 Management of the road/Road usage						
Maybe the same scenario will happen: the subcontractor does substandard work, the lowest bidder will get the job.	Mr. Abraham Mhlanga	Rumph DEC Agriculture Office	17 August 2016	Rumphi DEC	Mr Chihana: We are rehabilitating the road because we need to widen it to international standards. We will therefore have to maintain higher specifications. We don't know who the contractor will be but we will implement WB standards. It is very likely that it will be an international contractor of high repute.	Section 2
One of the major impacts is poor management of the road reserve. There is much encroachment into the road reserve by activities which cause destruction of roads – rice paddies, trees are cut, and agricultural	Mr. Gift Nyirenda	DEC Rumphi District Forestry Officer	18 August 2016	DEC Rumphi	Mr. Chihana: Management of encroachment is difficult and can be met with aggression, e.g. RA representatives have been threatened with a gun	Section 9.4

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activities. What management measure will be put in place to mitigate this?					when they tried to deliver a letter enforcing the law. This has to be addressed more efficiently.	
Fuel trucks from Dar es Salaam to Blantyre pass through this road. There are plans to construct a dry port at Mbeya in Tanzania to improve turnaround time that is very slow. Tankers that ferry fuel in the Beira Corridor now have to be escorted, and trucks have been burnt. The alternative to the Beira Corridor is to maximally use the Northern Corridor from Dar es Salaam that will use block-trains (40 wagons) to load fuel (1.2million litres). Once the dry port is built, the number of trucks and frequency will increase due to the reduced distance. The current turnaround between Blantyre and Dar Es Salaam is 8 days, twice a month between the two and there are 90+ additional trucks expected on the road. Currently there are 420 road tankers. The expanded road will lead to increase in truck traffic which raises concerns regarding road wear and tear, accidents, and safety. Tanker drivers will spend more money in transit, but there is concern about increase of siphoned fuel from trucks, which may cause local, legitimate businesses to suffer.	Mr. Emmanuel Kamangira (Senior specialist for Fuels and Transport)	Malawi Energy Regulatory Authority (MERA)	16 August 2016	Malawi Energy Regulatory Authority	The increase in traffic load will be taken into consideration as part of the design of the road upgrade.	Section 9.4
For +400 litres you need one bulk storage of fuel on site, and a license from the Malawi Energy Authority (MERA) will be required. It will have to be inspected, certified and approved – see the relevant Act.	Mr. Emmanuel Kamangira (Senior specialist for Fuels and Transport)	Malawi Energy Regulatory Authority (MERA)	16 August 2016	Malawi Energy Regulatory Authority Meeting	Noted.	Section 9 Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Consider resting places for tankers in the road design. This will also stop them from selling fuel illegally.	Mr. Emmanuel Kamangira (Senior specialist for Fuels and Transport)	MERA	16 August 2016	Malawi Energy Regulatory Authority Meeting	Noted.	
Road accidents and the standard of the road are a concern. In the event that it would be substandard e.g. many potholes causing accidents. Will the constructor be required to fix it?	Mr. Cuthberth Phirir (Magistrate)	Rumphi DESC Judiciary	19 August 2016	Rumphi DESC	Mr Chihana: The M1 road is regional in our designs and we have instructed the designers to use SABC standards. We have employed a supervising consultant to ensure standards are implemented. My hope is the standards are high. We release a % of the contractors' money after a year of the road having been constructed. We use the % to fix the road where required. The bottom-line is we have used SABC standards and employed a supervising consultant.	Section 9.4
Bus stages along the M1 road should be well established. This will help to minimize road accidents as buses, taxis, and cars stop anywhere for passengers.	Mr Dumisani Mbekeyani	Mzuzu City Council	24 August 2016	Mzuzu City Council,	Noted.	Section 9.4
Distance signposts adequately to warn road users of approaching trading centres and other busy places.	Mr Dumisani Mbekeyani	Mzuzu City Council	24 August 2016	Mzuzu City Council, P.O Box 1,	Noted. This will be addressed in the ESIA/ESMP.	Section 9.4
Rumble strips must be placed on all slopes.	Mr Charles Lungu	Malawi Defence Force	25 August, 2016	Malawi Defence Force	Noted.	Section 9.4

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Road signs visibility should be improved.	Mr Emmanuel Masongola	Feed The Children International Rumphi	25 August, 2016	Feed The Children International Rumphi	Noted.	Section 9.4
The road bends must be reduced as much as possible	Mr Mabvuto Lupwayi	Synod of Livingstonia Development (SOLDEV)	25 August, 2016	Synod of Livingstonia Development (SOLDEV)	Noted.	Section 9.4
Bends in the road must be reduced as much as possible as they contribute to most of the accidents on the road.	Mr Steven Mtaw a	Zonal Forestry	23 August, 2016	Zonal Forestry Office North, P.O. Box 223 Mzuzu	Noted.	Section 9.4
The road is very important to MTL as it will improve mobility to access their infrastructure. It will also minimize the risk when transporting equipment from Tanzania to Malawi as at the moment the road is not in good shape.	Mr Mackenzie Chiyala	Malawi Telecommunications Limited (MTL)	25 August, 2016	Malawi Telecommunications Limited (MTL)	Noted.	n/a
Road markings should be reflective, preferably painted with Thermo-plastic paint.	Mr Leonard Mtonya	Road Traffic and Safety Services	22 August, 2016	Road Traffic and Safety Services	Noted.	Section 9.4
The road must be of a "forgiving highway"; guard rails must be installed on all the bends. Humps, notified by rumble surfaces must be made available to show users the need to reduce speed.	Mr Leonard Mtonya	Road Traffic and Safety Services P O Box 115 Mzuzu	22 August, 2016	Road Traffic and Safety Services P O Box 115 Mzuzu	Noted.	Section 9.4
Detours must be placed away from social facilities like schools to avoid frequent crossing which may cause accidents	Mr Leonard Mtonya	Road Traffic and Safety Services	22 August, 2016	Road Traffic and Safety Services	Noted.	Section 9.4

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The tarmac should be of good quality to withstand all weather conditions. Previously the tar melted during hot weather.	Mr Francis Nyirenda	Mzuzu Meteorological Office	25 August, 2016	Mzuzu Meteorological Office	Noted.	Section 9.4
The project should consider inclusion of speed limit signpost, pedestrian crossing points and shoulders for cyclist movement. It should also address sharp bends along Chiweta area. Provision of well-established bus stops along the road is also important.	Mr Enerst Luhanga	Northern Region Education Division, Mzuzu	25th August, 2016	Northern Region Education Division, Mzuzu	Noted.	Section 9.4
5.6 Landslides						
At Boliwoli there is heaving and reinforcement has been placed. Please ensure that this is maintained.	Village Headman Hachu	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: The Geotech designer will take this into consideration.	RA to address Section 9.4
We have seen rocks in the road from rock falls. What have you done in this case? Previous anchors are not working efficiently.	Mr. Andrew Chima	Rumphi DEC	18 August 2016	Rumphi DEC	Mr Chihana: The designer is required to make recommendations to prevent rock falls and appropriated maintenance thereof. There is however no 100% guarantee that there will be no rock falls.	RA to address
Some road areas traverse the hillsides. How much will be cut into hillsides? It will obviously have a serious impact. It is heavily affected in the raining season.	Mr. Allan Chitete	Rumphi DC	18 August 2016	Rumphi DC	Mr Chihana: The design consultant is on the ground. He has not decided whether we should extend by one side only or both sides. That decision will come be dependent on economics. To cut is cheaper than to build. But cutting does	RA to address Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					give rise to concern regarding the stability of slopes.	
6. ENVIRONMENT						
6.1 Air Quality						
It is very common to see communities being affected by dust pollution. They say they will wet the road, but it does not happen on the ground. Those living closer to the road should not be exposed to too much dust.	Mr. Hendrix Mphw akamo	Rumphi DEC Malaw i carer	17 August 2016	Rumphi DEC	Noted. This will be taken into consideration in the ESIA.	Section 9.4
There should be dust abetment exercise every morning on the detours that will pass through residential areas in order to minimize dust	Mr Dumisani Mbekeyani	Mzuzu City Council	24 August 2016	Mzuzu City Council	Noted. This will be taken into consideration in the ESIA.	
6.2 Water						
How is the RA going to deal with property already in the RRB impacted by water? · Mkombezi area is affected by water flow from the hill, water damages houses down stream · Mzokoto and other areas are affected by water from the hill during the rainy season and houses have previously been damaged as a result · Phwezi area is also affected by water from the hill side	Mr. Harvey Chihana	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr Chihana: The culvert was put at the lowest point, but has somehow silted and some water overflows into it. The theory is that other upstream land use issues contribute to the problem. Nevertheless, a culvert will be put in and the road raised.	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Mzokoto area is becoming a problem area. A stream/river has been blocked due to it having been diverted.	Mr. Abraham Mhlanga	Rumphi DEC	18 August 2016	Rumphi DEC		
At Mzokoto people told us an interesting story about the diversion of the waterway. Tap into knowledge of local people about how water was flowing into the river. The issue of how water can be diverted without causing problems should be decided in consultation with local people.	Mr. Gift Nyirenda	Rumphi DEC District Forestry officer	18 August 2016	Rumphi DEC		
You are professionals, we are villages and that you know. I would like to emphasize drainage is a very serious issue when roads are constructed. You have the know how, we don't. Have there have been fatalities due to flooding as a result of poor drainage.	Themba la Mathemba Chikula-Mayembe	Chief Paramount	18 August	Rumphi DC		
Have you considered raising the road as it has gone lower? The new road may also be affected by run-off if not raised.	Senior Chief Mwankhunikira	Rumphi DC	18 August 2016	Rumphi DC	Mr. Chihana: The RA will maintain levels except in places where there are draining challenges. Otherwise the money is for rehabilitation only and not for reconstruction.	Section 9.4
South Rukuru River: Will you use oils etc. during construction which could have negative impacts on the water.	Mr. Edward Mkandawa	Rumphi DEC	18 August 2016	Rumphi DEC	Mr. Chiumia: Trucks are a common source of pollution due to leakage. Most pollution comes from campsites, where things are stored and leak. I am sure the construction	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					<p>team will discuss the placement of camps with the district council.</p> <p>Best practice is to ensure there are no spillages /leakages. Other management practices are to have banding areas.</p> <p>Other problems include volatile compounds such as bitumen, which can be harmful to villagers and workers. A good management practice in this case is to wear respirators.</p> <p>Camps and temporary storage areas should not be close to villages. We will include spill prevention plans in the EMP. Environmental officers will be on site to ensure the EMP is followed.</p>	
The ESIA should address how the construction and project will impact on our water sources in terms of water quality and siltation. These are major concerns in the country. Especially the river; it is still a good river.	Mr. Sydney Kamtukule	Department of Water Resources	16 August 2016	Regional Water Office Surface Water division	Noted.	Section 8.3.3
As the road is an expansion, we are hopeful that it will not have major impacts on water sources. Impacted areas need to be fixed. When it rains there is a lot of run-off.	Mr. Sydney Kamtukule	Department of Water Resources	16 August 2016	Regional Water Office Surface Water division	Noted.	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
We have an Act dealing with temporary dams required during construction. You require a water permit when damming water. The permit application need to be submitted to the Ministry: The contractor should show the areas where they will be damming and then get a temporary license (because it is construction). We are supposed to inspect – but low funding makes it hard to inspect. The National Water Resources Authority must be established to issue licences (previously the Water Resources Board), since the Water resources Act has been passed.	Mr. Sydney Kamtukule	Department of Water Resources	16 August 2016	Regional Water Office Surface Water division	Noted.	Section 9.4 Section 3
Don't just dam and stop all water from flowing. At least 10% should still flow downstream.	Mr. Sydney Kamtukule	Department of Water Resources	16 August 2016	Regional Water Office Surface Water division	Noted.	Section 9.4
Roads bring a lot of goods to new areas. But when they open up the road we don't know the side effects. Will water be a problem? What do you promise in this regard?	Mr. Edward Moyo	Rumphi DEC District Forestry Office	17 August 2016	Rumphi DEC	Mr. Theu: This forms part of the water management study. We cannot promise that issues raised and management measures addressed in the studies will be implemented.	Section 8.3.3 Section 9.4
Consider that culvert discharge to Rukuru River rather than just stopping in people's gardens.	Mr. Harvey Chihana/ Mr. Arrow Nyirena	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr Chihana: The RA is mandated to drain runoff to the natural water ways.	Section 9.4
Catchments – water could flow along the roads. It has been discovered that culverts cannot handle water due to forests being cut	Mr. Wakefer Mukumbwa	Rumphi DEC	18 August 2016	Rumphi DEC	Mr. Chihana: Where culverts are not adequate they will be improved upon. Where the	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
causing excess runoff. Will it be addressed in EMP?					road is low , we are going to increase the height. Draining problems will be addressed accordingly.	
The drains that have been constructed in the past been left and allowed to flow uncontrolled and cause damage to crops. How are you going to improve on this? Are you going to construct the main water course?	Mr. Roosevelt Kamw eteka	Mw alw eni II ADC	19 August 2016	Mw alw eni II ADC	Mr. Chihana: The design of the drain takes consideration of natural drainage. There would be a big challenge to construct to the river.	Section 9.4
The drainage system has to be considered. Will farms be considered?	Mr. Annox Mbeba	Rumphi DEC	18 August 2016	Rumphi DEC	Mr. Chihana: Specialists need to guide us. The quick answer is: Wherever there is a negative impact, compensation will be discussed. We are mindful and don't usually don't build a drain for a drain. Usually we discharge in a natural area.	Section 9.4
Mechanism to control mudslides at Chiw eta area must be considered	Mr. Enerst Luhanga	Northern Region Education Division,	25 August, 2016	Northern Region Education Division,	This will be addressed in the ESIA/ESMP.	Section 9.4
Mudflows caused blocks in culverts in the Chiw eta – Mlow e road. How are you going to address this?	Mr. Boyson Ngw ira	Mw alw eni II ADC	19 August 2016	Mw alw eni II ADC	Mr. Chihana: The culverts on the Chiw eta – Mlow e road will be inspected and upgraded as required. This will however be a separate project.	Section 9.4
There is a need to include contours in the mountainous areas to minimize the pressure of water flowing from higher lying areas	Mr Francis Nyirenda	Mzuzu Meterogical Office, P. O Box 135 Mzuzu	25 August, 2016	Mzuzu Meterogical Office, Mzuzu	Noted.	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
The project should ensure that soil removed during construction should not be dumped close to water sources.	Mr Francis Mtambo	Region Water Office, Private Bag 68 Mzuzu	25 August, 2016	Region Water Office, Mzuzu	This will be addressed in the ESIA/ESMP.	Section 9.4
The biggest expectation is that the road will provide easy mobility to the Water Office to reach the rural communities in the area.	Mr Francis Mtambo	Region Water Office, Private Bag 68 Mzuzu	25 August, 2016	Region Water Office, Mzuzu	Noted.	n/a
6.3 Biodiversity						
Some of the trees that will be destroyed have nests, so the birds habitat will be disturbed	Mr George Nxumayo	Parks and Wild life Office, Mzuzu	25 August, 2016	Parks and Wild life Office, P.O Box Mzuzu	Noted.	Section 9.4
Biodiversity should not be a major concern, because this is brownfields project, following an existing alignment.	Mr. Kelvin Mphonda	Director of Ministry of Transport	15 August 2016	Ministry of Transport and Public Works	Noted.	Section 9.4
For biodiversity: get the forest department/natural forestry representative to do an inventory of all trees.	Mr. Rex Kanjedza	Simbanet	15 August 2016	SIMBANET	Noted.	Section 9.4
6.4 Environmental management						
EMPs usually indicate who the responsible coordinator for mitigation measures and associated costs is, but during implementation this is not adhered to.	Mr Frank Mkandawire – Director of Planning and Development	Rumphi DC	18 August 2016	Rumphi DC	Mr. Chihana: The Director of Planning and Development (DPD) should provide details of coordination entities and their contractors.	Section 9.4 RA to address
We have environmental screening forms available for a roads project we did in accordance to WB standards.	Mr. Cleverson Nyando	Mzimba DESC M'Mbelwa DC	17 August 2016	Mzimba DESC	Noted.	n/a

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Input, output, outcome indicators need to be considered. Look at the statistics in health centres and monitor these. The District level need to communicate with contractors regarding the indicators that are applied. Measures to address negative outcomes need to be put in place. Monitoring of indicators and agreements are not happening and standards are not met, because of the lack of monitoring.	Mr. Kinas Mdhuli	Mzimba DESC Agriculture, irrigation and water development	17 August 2016	Mzimba DESC	Noted.	
When the project is finished, we start complaining, the mistake is that there is a completion certificate but no evaluation of what has been done. Be clear in your report that an Environmental Control Officer (ECO) is required as well as a health and safety officer - this should be checked. That is what is killing our country. For us to be Malawians they have to look after our environment. I blame the consultant who is supposed to implement, not the contractor. A penalty must apply if people do not adhere to measures – Even government officials need to have been budgeted for e.g. they come every 3 months after finishing the road to assess with communities whether completion is satisfactory. The completion certificate has to have a clause where the environmental department shows how impacts have been mitigated. We need to be serious regarding this during the implementation of the EMP.	Mr. Cleverson Nyando	Mzimba DSC M'Mbelwa DC	17 August 2016	Mzimba DSC	Mr. Chiumia: Government has to ensure that monitoring is happening. Environmental officers have to be on board. With WB funded projects: strict monitoring will be required and followed up.	Section 9

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
Adequate drainage and well curved/sloped road surface for drainage should be considered in the project.	Mr Leonard Mtonya	Road Traffic and Safety Services	22 August, 2016	Road Traffic and Safety Services Mzuzu	This will be addressed in the ESIA/ESMP.	Section 9.4
There is a need to compact the soil along the road near Chiweta as vehicles sink into the ground in some areas.	Mr Francis Nyirenda	Mzuzu Meteorological Office Mzuzu	25 August, 2016	Mzuzu Meteorological Office, Mzuzu	This will be addressed in the ESIA/ESMP.	Section 9.4
The road should be raised above the natural ground level in order to control the water runoff during heavy rains.	Mr Francis Nyirenda	Mzuzu Meteorological Office, Mzuzu	25 August, 2016	Mzuzu Meteorological Office, Mzuzu	This will be addressed in the ESIA/ESMP.	Section 9.4
There should be a provision of flat inlets and outlets where the road is raised above the natural ground level.	Mr Enerst Luhanga	Northern Region Education Division, Mzuzu	25 August, 2016	Northern Region Education Division, Mzuzu	Noted.	Section 9.4
Grass should be planted on either side of the road.	Mr Enerst Luhanga	Northern Region Education Division, Mzuzu	25 August, 2016	Northern Region Education Division, Mzuzu	Noted.	Section 9.4
6.5 Trees						
The project will have an impact on the scenic beauty of the places once the trees are destroyed. Replanting of trees should be considered.	Mr George Nxumayo	Parks and Wild life Office, P.O Box Mzuzu	25th August, 2016	Parks and Wild life Office, Mzuzu	This will be addressed in the ESIA/ESMP.	Section 9.4
We destroy so many trees where a road is placed. How will this project assist you to get those trees back? The project must assist us in maintaining trees and assist displaced families.	Mr. Edward Moyo	Mzimba DEC District Forestry Office	17 August 2016	Mzimba DEC	Mr. Theu: Noted – will consider it in the ESIA	Section 9.4
The District Forestry Office has to be informed should trees need to be felled. The assessment is done through lands offices. It is mandatory that government does the	Ms. Lucy Muyafula Kabaghe	Mzimba DESC Mzimba DC	17 August 2016	Mzimba DESC	Noted: The RAP will serve as a guideline but the lands will do the final valuing.	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
evaluation. The district office does the evaluation of properties/houses. Gardens and trees are done on a local level.						
If there will be a need to cut down natural trees, we need to be informed. We are more concerned about the natural trees, not fruit trees. If the trees are in RRP, forestry must know about it, especially if it is in a forestry reserve. The department needs to see the trees, and compensation need to be identified. Compensation does not have to be monetary, but should be suitable to the situation. E.g. off-set could be considered.	Ms. Patricia Masupayi	Department of Forestry	16 August 2016	Regional Forestry Office	Noted.	Section 9.4
Different villages have village forestry areas, and forestry committees. But our forestry areas are outside the road.	Mr. Cleverson Nyando	Mzimba DESC Mmbelwa DC	17 August 2016	Mzimba DESC	Noted.	Section 9.4
What plans are there to protect natural resources including cutting of trees. Damage to trees might in turn cause water flow to damage the road.	Mr. Kenneth Silumbu	Chinyolo ADC Secretary	20 August 2016	Chinyolo ADC	Mr. Chiumia: Issues of the protection of natural resources will be addressed in the ESIA and ESMP.	Section 9.4
Government started greenbelts and we have planted some trees within Road Reserve Boundary (RRB). Are you going to compensate?	Mr. Limbani Misika	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chiumia: The manner in which this will be dealt with will be discussed in the RAP.	Section 7 of the RAP
There do not seem to be forest reserves in the area that will be impacted by construction works, but this will have to be confirmed. Grass of special value should not be in this area.	Ms. Patricia Masupayi	Department of Forestry	16 August 2016	Regional Forestry Office	Noted.	Section 9.4

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Kacheche road has lost trees and nothing has been done about the trees that were lost.	Edward Moyo	Mzimba DEC District Forestry office	17 August 2016	Mzimba DEC	Noted.	Section 9.4
From Kamphoni towards Chiweta we are concerned about cutting the trees and we would like to be compensated for our gardens. Water from the escarpment has in the past damaged crops. There is also the Boliwoli Forest Reserve.	Village Headman Mambo	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Noted.	Section 7 of the RAP
There is an important Wildlife Corridor linking Nyika National Park and Uzumara forested areas that passes through Boliwoli Forest 1 and 2 crossing the M1 road moving south East to Uzumara. Care needs to be taken during implementation not to disturb animal habitats and movements.	Moses Tchongo (Forestry)	DEC	19 August 2016	Rumphi DEC	Noted.	Section 9.4
The briefing indicated that the road will be widened and this will surely result in many trees being cut down. Besides compensations, there should be a clear outline of mitigation measures for damage to trees.	Mr Steven Mtaw a	Zonal Forestry Office North, Mzuzu	223rd August, 2016	Zonal Forestry Office North, P.O. Box 223 Mzuzu	Noted.	Section 9.4
Along Chiweta road there are trees that are hanging close to the road, these should be removed as they are likely to fall and broke the road in times of heavy wind or rains.	Mr Francis Nyirenda	Mzuzu Meterogical Office, Mzuzu	25th August, 2016	Mzuzu Meterogical Office, P. O Box 135 Mzuzu	Noted.	Section 9.4
The project should consider replanting the trees that are close to water sources.	Mr Francis Mtambo	Region Water Office, Mzuzu	25th August, 2016	Region Water Office, Private Bag 68 Mzuzu	Noted.	Section 9.4

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7. SOCIO – ECONOMIC ISSUES						
Downstream impacts will affect small scale farmers and irrigation. People grow tomatoes in the area and sell it elsewhere.	All attendees agree	Mzimba DESC	17 August 2016	Mzimba DESC	Noted.	Section 9.4
There are a lot of tomatoes and vegetables along this road that need to be considered.	Mr. Henry Zimba	Mzimba DESC Judiciary	17 August 2016	Mzimba DESC	Noted.	Section 9.4
People need to know who to contact in the event of queries once the project has been completed?	Mr. Chrispine Chakhumbira	Mzimba DESC M'Mbelwa DC	17 August 2016	Mzimba DESC	Noted.	Section 9.4
Along the Kacheche-Chiweta (Karonga – Chitipa road) there were camps that have been demolished after project completion. Consider not demolishing the camp structures to use for social services or schools, clinics etc. Qwezima as a camp for example – it is now a trading centre.	Ms. Wigly Mkoamsango	Mzimba DESC National Registration Bureau	17 August 2016	Mzimba DESC	Noted.	Section 9.4
Most of the major construction projects: inclusions of staff houses, offices etc. included in tender coordinates and costing, are handed over to the government after construction.	Mr. Goodnews Gumbo	Rumphi DEC Parks and Wildlife Officer	17 August 2016	Rumphi DEC	Noted.	Section 9.4
Why are the road reserves not protected whereby people are allowed to construct in the reserve? Eg: The clinic at Bwengu. Can't you take action when you see people in the road reserve?	Joe Mohuka	Rumphi DESC Youth Network	19 August	Rumphi DESC	Mr Chihana: I will say something that pains me to say but it is a fact of life. Ignorance is not defence. For someone to say you should protect your reserve – the reserve belongs to the road, whether it is protected or not. We are putting	Section 9.4

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					<p>beacons for your benefit, but the road reserve has always been there. We put jingles on radio to sensitize people.</p> <p>We have road inspector's standards that are distributed. What we don't have is capacity. I will give you a letter to deliver to Bwengu. What will you do if there is a person threatening you with a gun when you arrive to deliver the letter?</p> <p>The road will be like the Zomba-Blantyre road. The road reserve for M roads is 60 metres total. We will only widen by 2 metres – it will not consume that 60 meters.</p> <p>Mr. Chiumia:</p> <p>We cannot say who will be compensated now.</p>	
7.1 Employment and recruitment						
How can we ensure that money is best used? Cash provides opportunities. How will the money be used?	Mr. Clement Ndlovu	Mzimba DEC Mzimba Radio	17 August 2016	Mzimba DEC	<p>Mr. Theu:</p> <p>The World Bank does monitor to ensure that implementation is done in accordance to plans and specification</p>	Section 9.4

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Will equal opportunities for genders be provided in the project?	Mr. Steve Masoo	Mzimba DESC Community Development	17 August 2016	Mzimba DESC	Mr. Chihana: The gender component is there but it is not possible to have 50/50 because of the current skills and nature of the work to be done.	Section 9.4
Normally in Malawi you don't see women working on site. I would be happy to see women consulting. Most women go into prostitution because they need money, if they earn money they will not do it.	Ms. Chimwemwe Kumwenda	Trade	17 August 2016	District Executive Council (DEC)		Section 9.4
I would like 50/50 male-female representation in the project.	Mr. Byron Mwalwanda	Chinyolo ADC	20 August 2016	Chinyolo ADC		Section 9.4
What employment measures will be given to the contractor? We find they come with their workers instead of using people in surrounding communities.	Mr. Alfred Butato	Rumphi DC	18 August 2016	Rumphi DC	Mr. Chihana: Contractors will be engaged for the project and it will be up to the contractor to assess where to get labour. But as government we have noted that where local labour is available it should be used. Government has put together incentives to foreign contractors to use local labour and local contractors. Government has a law that requires the contractor should spend 10% on local contractors. Machine based work is usually done by the main contractor. Manual labour by Malawians, e.g. grass planting, digging. When contractors see their workers	Section 9.4
Are you going to employ local people on the project?	Mr. Harvey Chihaus	Chinyolo ADC	20 August 2016	Chinyolo ADC		Section 9.4
Where will you source casual labour from?	Mr. Edwin Mwase	Mwalweni II ADC ADC Chairman	19 August 2016	Mwalweni II ADC		Section 9.4

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					are cheaper, they will use their own.	
Contractors under pay workers and as a result theft becomes a problem. We have been told that the spirits are not happy and that is why there are rock falls.	Ms. Jestina Nyasulu	Mwalweni II ADC	19 August 2016	Mwalweni II ADC	Mr. Chihana: In the contract with the contractor, the Malawi labour laws are included.	Section 9 and Section 9.4
7.2 Community development/Corporate Social Responsibility						
Are developments related to water, schools and hospitals included in the projects?	Mr. Harvey Chihau	Chinyolo ADC	20 August 2016	Chinyolo ADC	Mr. Chihana: The project does not have a CSR component, being a WB project. Unfortunately this is a loan from WB and the loan is specifically for the road project only. The contractor might leave behind some infrastructure, but this is not a requirement. The contractor may do CSR independently outside the loan agreement. The communities may engage with the contractor to discuss options.	Section 9.4
Will there be inclusion of Corporate Social Responsibilities (CSR) such as schools or hospitals?	Mr. Wakisa Kalima	Mwalweni II ADC	19 August 2016	Mwalweni II ADC		Section 9.4
It is a good idea to use existing infrastructure of the contractors to use for community development. But will the contractor be required for CSI – will they be flexible to provide portable water and build on buildings		Rumphi DC	18 August 2016	Rumphi DC		Section 9.4
We can help the contractor to identify campsites. These camps in other districts like Nkhosha are being used as police units, classes etc.)		Rumphi DC	18 August 2016	Rumphi DC	Noted.	Section 9.4
This is a welcome project, we are thankful. It will bring development. However, we have seen in the past projects have been	Cuthbert Phiri (Magistrate)	Rumphi DESC Judiciary	19 August	Rumphi DESC	Mr Chihana:	Section 9

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introduced but do not get implemented. We are talking to people about compensation. Will this add value to people along the road? Boreholes and schools so that at least that can feel the welcome of the project.					<p>The team that has come here, we are not politicians. I work the way you work. You receive orders, issues with regards to government paying contractors etc.... I have been told the project will exist. The assurance I have is that it is a WB funded project. I have been able to procure design consultations and the technical part of has commenced.</p> <p>It is very hard to incorporate other projects into the road industry. I hope the contractors will think of CSI when they are appointed, it is difficult to put in other components.</p>	
There are interventions by organization in communities within TA Mwanikhunira and Mwanlowe to reduce open-pit toilets. People are encouraged to construct latrines. With this development, there is likelihood that people may not reconstruct latrines when resettled. Families may be relocated far away from a safe water supply. The project should make sure that Sanitation and Hygiene is a priority in the RAP.	Mr Emmanuel Masongola	Feed The Children International Rumphi	25 August, 2016	Feed The Children International Rumphi	This will be addressed in the RAP.	Section 7 of the RAP

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7.3 Resettlement						
People were told a few years ago that RBB markers on road reserves meant that it was public land. Now we are going to remind the people about the function of the RBB and that now the government wants to rehabilitate the road. We are also going to mention about the impacts of the project. We will go back to our people and explain about the boundaries.	Themba la Mathemba Chikulamayembe	Paramount Chief	18 August	Rumphi DC	Noted with thanks.	Section 9.4
When the road was constructed, the road boundaries were not in place.	Mr. Wakefer Mukumbwa	Rumphi DEC Agricultural office	18 August 2016	Rumphi DEC	Mr. Chihana: The demarcations show the boundaries of the road reserve. The road reserve was there before the boundaries. Now we are indicating its boundaries physically.	n/a
Resettlement as a result of the dam will also require a RAP. Will the people be registered twice? People should be compensated the same.	Mr. Wakefer Mukumbwa	Rumphi DEC Agricultural office	18 August 2016	Rumphi DEC	Noted.	Section 13 of the RAP
People are removing trees for charcoal because people say they are moving out anyway.	Mr. Harry Mkandawire	Rumphi DEC Director of Planning and Development	18 August 2016	Rumphi DEC	Noted.	n/a
Trading centres' relocation will upset the family structures and business. Monitoring should be done, and results and information should be shared. We never have that information. What has the impact of resettlement been?	Mr. Cleverson Nyando	Mzimba DESC M'Mbelwa DC	17 August 2016	Mzimba DESC	Noted.	Section 7 of the RAP

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Chapter 16 (04) of the Land Acquisition Act is triggered. The inclusion of the North Regional Commissioner of Lands is key in the resettlement process. The SRK RAP will be indicative of the costs and Project Affected People (PAP) involved, but a detailed assessment by government will follow. SRK should focus on the principles, and work with the regional commissioner to produce the schedule for compensation. Until now only improvements were assessed because land was regarded as having no value, but in the latest law land has value.	Mr. Davie Chilongwe	Ministry of Housing, Lands, and Urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	
Make sure all legal provisions are addressed in accordance with the National Land Policy, subsection 16, which deals with open and appropriate compensation.	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	Section 2 of the RAP
The Department of Land produces the evaluation report. The report is submitted to the Grant Ministry and then funds are requested from the OPC (Office of the president and Cabinet).	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	n/a
The WB requests that an ESIA and RAP are approved. The RAP is to be approved by the Department of Lands. The Department of Lands wants to see the Terms of Reference and wants to be involved up front. A Resettlement Policy Framework has to be developed. The RAP will be approved on district level.	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	The RAP developed for this round is a Resettlement Policy Framework, and includes Actions to be taken for the

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
						development of the RAP.
The issue with land that is not owned is addressed in the current bill. The current bill rectified unused land, i.e. public land for communities (village land) will be illegible to receive money and money will be used for the village.	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	Refer to sections 7 and 8 of the LRP
Use VDC (Village Development Committees) in the RAP process. Get a list of these committees and see which VDC's apply.	Mr. Rex Kanjedza	Simbanet	15 August 2016	Simbanet	Noted.	See sections 10 and 11 of the RAP
Resettlement will be required. Trading centres and villages are a concern. Encroachment is a serious issue. To manage encroachment is a challenge in the first place. Resettlement has a negative impact on projects, it can delay a project and compensation adds cost to a project.	Mr. Kelvin Mphonda	Ministry of Transport and Public Works	15 August 2016	Ministry of Transport and Public Works	Noted.	See sections 10,11 and 13 of the RAP
Relocations along Rukuru river: The people along this stretch must be resettled as it is a disaster prone area	Mr Leonard Mtonya	Road Traffic and Safety Services Mzuzu	22 August, 2016	Road Traffic and Safety Services Mzuzu	Noted.	The RAP considers the people within the RRB
7.4 Compensation						
Compensation will be calculated at open market value, which is close to the WB standard, as opposed to fair value, which is "just enough to wipe your tears". This in accordance with the new land policy, which requires that land size is assessed for	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	See sections 2 and 7 of the RAP

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determining compensation; it is market driven.						
A valuer will assess the potential value of the land and houses. Agreement between local law and world bank requirements will have to be reached.	Mr. Davie Chilongwe	Ministry of Housing, Lands, and urban Development	15 August 2016	Ministry of Housing, Lands, and urban Development	Noted.	See sections 2 and 7 of the RAP
We have village forestry along the road Boliwoli 1 & 2 along Chiweta. What compensation will you put in place for the loss of trees? They are within the road reserve to manage the road itself, because of the rock falls. There is an agreement between communities and the Department Forestry in this regard.	Mr. Moses Chirongo	Rumphi DESC Forestry Office	19 August 2016	Rumphi DESC	Ms. Bron: This will be taken into account in the RAP.	See sections 6 and 7 of the RAP
It is a good project, the road has been narrow. The widening will be best for traffic. The use of the land by the people will be impacted. What happened previously: land was valued, it took time for people to be compensated, people planted their crops in time for the rain. Then the project started and the crops had to be destroyed and they did not get money soon. People were not compensated for planting.	Mr. Hendrix Mphaw kamo	Mzimba DEC Malawi carer	17 August 2016	Mzimba DEC	Ms. Bron: This will be taken into account in the RAP.	See section 7 of the RAP
With regards to financial compensation, we trained PAP on financial literacy and budgeting ourselves.	Mr. Steve Masoo	Mzimba DESC Community Development	17 August 2016	Mzimba DESC	Noted.	See section 8 of the RAP
A total of 2200 PAP were impacted by Simbanet's overhead cables. A RAP was developed, implemented, and compensation executed. It is expected that grievances will be addressed in 2 weeks' time. Trees were	Mr. Rex Kanjedza	Simbanet	15 August 2016	Simbanet	Noted.	See sections 2 and 7 of the RAP

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impacted because it triggered gazette notice 23 of 2010. Rates for trees were calculated as per the Forestry Act. The Land Act also had to be considered. Fruit trees (mango's and oranges) are not in gazette notice and your calculations will have to be made independently.						
The Simbanet RAP was submitted to the Ministry of Lands. They deal with issues of compensation. When compiling the inventory of PAP for this project, the danger is that people will get paid twice or thrice. To avoid this, PAP of the Simbanet project have to be compared against PAP for this project. Simbanet did not consider the wayleave for compensation – the financial implications would have been alarming.	Mr. Rex Kanjedza	Simbanet	15 August 2016	Simbanet	Noted.	See section 13 of the RAP
It was difficult to identify owners of trees and gardens during the Simbanet project.	Mr. Rex Kanjedza	Simbanet	15 August 2016	Simbanet Representation	Noted.	Noted
Issues of compensation arose after the cables were installed. The project closed 3 rd of June 2018 and all payments were made by then.	Mr. Rex Kanjedza	Simbanet	15 August 2018	Simbanet	Noted.	Noted
Because the project was implemented in a gazetted road reserve, people did not expect compensation. Between Simbanet, government and the WB agreement had to be reached on issues regarding compensation.	Mr. Rex Kanjedza	Simbanet	15 August 2018	Mr. Rex Kanjedza	Noted.	Noted. See section 13 of the RAP.
Why is the RA not going to compensate people in the RRB who have been there for	Ms. Getrude Mhango	Chinyolo ADC	20 August 2018	Chinyolo ADC	Mr. Chihana:	Refer to the RAP.

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generations? This is mainly for the Bwaja to the Livingstonia road.					Unfortunately the laws of Malawi say no compensations to encroachers. The community must raise the issue with their member of parliament. The road in question is wholly funded by the Malawi government, while the Kacheche-Chiweta road project is funded by the World Bank. Different rules apply in that the Malawi government does not compensate encroachers. Compensation will be conducted following the WB rules. Compensation is not only money but can include replacement of the house for example. When other road projects are done in the future, if funded by Malawi Government, the projects will not compensate people who have encroached in the roads reserve. We expect very few compensations because the project is only an expansion. We will also consider damage due to drained water.	
Will you compensate people within the RRB?	Mr. Edwin Mwase	Mwalweni II ADC ADC Chairman	19 August 2018	Mwalweni II ADC		
What can be said to those businesses who may be impacted?	Mr. Allan Chitete	Rumphi DC	18 August 2018	Rumphi DC		
What will be your take on those who had structures before the road reserve was instated? Local indigenous people must benefit from this project.	Mr. Abraham Mhlanga	Rumphi DEC Agriculture Office	17 August 2018	Rumphi DEC		
How are you going to manage the displacement of people? In the past people were just given money. People tend to go anywhere they feel. The trees suffer.	Mr. Gift Nyirenda	DEC member, District Forestry Officer.	18 August 2018	Rumphi DEC		

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Trees and forests – where they have been disturbed, there has been some compensation. In most cases, compensation is honoured. I implore you to put in good practice in the ESMP. In terms of the compensation of trees, the District does a lot of work with communities regarding forestry management. Communities as such are not considered, only individuals are.	Mr. Gift Nyirenda	Rumphi DEC District Forestry Officer	18 August 2018	Rumphi DEC	Noted.	See section 7 of the RAP.
Culverts are sometimes directed to people's houses. How will compensations be undertaken in these cases? Consider compensation to where water is discharged to. Please discharge into the river.	Mr. Tackson Silumbu	Chinyolo ADC	20 August 2018	Chinyolo ADC	Mr. Chihana: Affected communities and water that has not flowed in the natural water way will be compensated.	This will have to be assessed when the final design is available. The current assumption is that culverts will not be directed at people's houses
I am very happy with this development but I would like to emphasize that compensation to the affected people is very important.	Mr. Tom Hachu	Mwalweni II ADC	19 August 2018	Mwalweni II ADC	Mr. Chiumia: All compensation will be dealt with in the RAP.	Refer to the RAP section 7 and 8 for compensation information
How quick will affected people be compensated? Will it be during or after the project? We ask you to compensate people prior to commencement of the project.	Mr. Herbert Mweuka	Rumphi DESC SOLDEV – Rumphi office	19 August 2018	Rumphi DESC	Mr. Chiumia: Land Acquisition Act: Compensation has to be paid before the works. This advice is in line with the Act. A condition of the WB is that before you employ a	See section 12 and 13 of the RAP

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					<p>contractor, they will access land acquisition aspects. This has to be finalised before going into another phase of the project, which implies compensation has to be paid first. WB wants to confirm that the project has been received by its people. Compensation is very complex. As the project progresses more issues may arise, for example vibration during construction impacting elsewhere. Not a lot of compensation is expected as the road is being rehabilitated and upgraded and this is not a construction of a new road.</p> <p>Ms. Bron:</p> <p>Financial compensation is regarded as a last option by the WB.</p>	
<p>List of costs of the trees are available in the Forestry (amendment) Rules 2010</p> <p>Government Notice no 23, Chapter 63:01 (Dated 3 Dec 2010 – No 3A). Monetary compensation should not be regarded as the only option for compensation for the loss of trees.</p>	Ms. Patricia Masupayi	Department of Forestry Regional Forestry Office	16 August 2018	Department of Forestry	Noted.	See section 7 of the RAP

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Government and the WB each have their own compensation. People know who got what, for example at the Liwonde-Majonge road, compensation is undertaken by government but WB standards will be applied: How are you going to address the difference between local and WB standards. If government compensates at the same rate as other projects, it will not be a problem. If a different rate is applied it will be a problem. The Malawi government and the WB need to discuss this matter.	Mr. Harris Kumwenda	Ministry of Local Government and Rural Development	15 August 2018	Ministry of Local Government and Rural Development	Noted. Ms. Bron: This will be addressed in the RAP.	See sections 2, 7 and 13 of the RAP
If you allow people to stay in the 60 metres RRB for longer than 3 years they must be compensated. People have the mentality that the land is theirs. It is easy to move a house, but what about the social services – ECKOM, for example, it is an additional cost to project and delays the contractor. The services need to be provided to people when construction is happening. Detail regarding which areas and points will be affected need to be provided.	Mr. Harris Kumwenda Mr. Solomon Chirambo	Ministry of Local Government and Rural Development	15 August 2018	Ministry of Local Government and Rural Development	Noted.	See sections 7 and 13 of the RAP
Reasonable compensation should be provided for communities affected during construction.	Mr Dumisani Mbekeyani	Mzuzu City Council	24 August 2018	Mzuzu City Council,	This will be addressed in the RAP.	See section 7 of the RAP
There is fear of conflict during resettlement and compensation due to dissatisfaction with and misappropriation of compensation funds.	Mr Mabvuto Lupwayi	Synod of Livingstonia Development (SOLDEV)	25th August, 2018	Synod of Livingstonia Development (SOLDEV), Ekwendeni.	Noted.	Noted.

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7.5 Social Fabric/Health and Safety						
The project should have a clear plan of how spread of HIV/AIDS will be address. This is important as employees sometimes take advantage of the communities.	Mr Francis Mtambo	Region Water Office, Private Bag 68 Mzuzu	25th August, 2018	Region Water Office, Private Bag 68 Mzuzu	Noted.	Section 9.4
HIV is a song we are singing as leaders.	Mr. Mw ankhunikira	Senior Chief	18 August	Rhumpi DC	Noted.	Section 9.4
The community has a picture in their mind of what happens when a road is being constructed based on past experience, including social impacts like pregnancies, HIV/ and other Socially Transmitted Diseases (STD). Some people gain because of the projects and others become poor as a result of the project.	Mr. Arrow Nyirenda	Chinyolo ADC	20 August 2018	Chinyolo ADC	Noted (Mention was made by the meeting that this was an obvious matter and therefore it was not further discussed).	Section 9.4
The employees have money. They come from elsewhere, you never know their status. They find girlfriends. Spreading of HIV/Aids/ Social Transmitted Infections (STI)'s rise. When the project is completed we sit with the complaints as a result of the projects. Sometime marriages fail. Men from SA leave pregnant woman behind. They don't accept that belly and the women want to commit suicide.	Mr. Hendrix Mphw akamo	Mzimba DEC Malawi carer	17 August 2018 /	Mzimba DEC	Noted. Ms. Bron: This will be considered in the SIA.	Section 9.4
During construction projects we have problems with our wives because our wives are attracted to the rich contractors. It is not	Village Headman Kataghala	Mwalweni II ADC	19 August 2018	Mwalweni II ADC	Mr. Chiumia:	Section 9.4

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only girls that engage in sexual acts, but also wives. The younger husbands sometimes end up beating their wives.					Noted, civic education to be included as a mitigation measure.	
Use the DAC to sensitise people about HIV/Aids. Use the Health Department for other health issues. Go to health care centres; schools can be targeted to talk about Aids and sensitize people before the project. Also sensitize them about the water issues.	Ms. Lucy Muyafula Kabaghe	Mzimba DESC MMbelwa DC	17 August 2018	Mzimba DESC	Noted.	Section 9.4
As a result of prostitution, women have children without fathers. These Mothers leave for their homes and leave the kids behind.	Mr. Goodnews Zgambo	Mzimba DEC Parks and Wildlife Officer	17 August 2018	Mzimba DEC	Noted.	Section 9.4
How are people going to be protected from dangerous infrastructure such as fuels tanks? What are the safety guarantees? HIV will impact people – what plans do you have to protect people in the area?	Mr. Christone Mlenga	Chinyolo ADC	20 August 2018	Chinyolo ADC	Ms. Bron: A Community Health and Safety Plan will be developed as part of the ESIA. We will highlight key aspects that the plan should consist of. The plan will have to be developed prior to starting the project so the plan can be adhered to during project implementation. Mr. Chiumia: The plan will also consider consultation methods and existing structures that deal with HIV.	Section 9.4
Civic education should be conducted before and during the project.	Mr. Wakisa Kalima	Mwalweni II ADC	19 August 2018	Mwalweni II ADC	Mr. Chiumia: Noted. It will be considered in the social study.	Section 9.4

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Information regarding child labour should be provided to people during civic education. Often parents disagree amongst themselves regarding this as they need money.						
We place on record that we appreciate the coming of the project. We will mention some impacts to people as a result of the project. Prostitution can never be fully eliminated but we will tell our people that whoever wants to be involved in this weakness can do so, but the contractors aim to build the road.	Paramount Chief Chikulamayembe	Mzimba DEC	18 August 2018	Rumphi DC	Noted.	Section 9.4
Mainst HIV/Aids education is required. An awareness programme should be included in the budget. We have a district HIV/Aids coordinator office: 1. District Aids Coordinating Committee includes all the partners in the district 2. Sector Implementation Plans (SIPS) coordinating team 3. VACC – Village of Aids Coordinating Committees 4. Community Based Organisations (CBO's) – a list can be provided We want the resources; HIV/Aids should be channelled to the HIV/Aids Committees. SRK can go to the CPO directly or work through the coordinating committee. The HIV statistics are available at the DESC.	Mr. Lusizi Nhlane	Rumphi DESC Chair	19 August 2018	Rumphi DESC	Noted.	Section 9.4
Chinese contractors are coming in, and new tribes are formed because of intermarriages.	Mr. Steve Masoo	Mzimba DESC Community Development	17 August 2018	Mzimba DESC	Noted.	Section 9.4

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I am happy about the project but there are concerns. When previous projects were done our people contracted HIV. The contractors even engaged in sexual activity with minors.	Mw alw eni II ADC Group Village Head Mw achiw iska	ADC member	19 August 2018	Mw alw eni II ADC	Noted.	Section 9.4
We are honoured and excited that you came to us. Usually we only hear about these projects when STIs/pregnancies/unprotected sex incidents increase in the area. In this case it will help us prepare to work with partners on the ground.	Mr. Mahara Longwe	National Aid Commission (NAC) Partnership and liaison officer	16 August 2018	NAC	Noted.	
Usually development projects bring money into the area. Villagers don't have money and they will see sexual activities as a means to make money. Young contract workers will come in and their blood is hot. The National Aids Committee (NAC) has an office in Mzuzu for quick interventions. This is the correct entry point for preventative measures.	Mr. Mahara Longwe	NAC Partnership and liaison officer	16 August 2018	NAC	Noted.	Section 9.4
Next steps: We can do a quick survey of the HIV/Aids situation on the ground – share the info in the SIA. We can give input into the baseline/management measures. Well stocked hospitals and products will result in adequate identification and treatment of HIV. Gender based violence also need to be addressed as part of the study.	Mr. Mahara Longwe	NAC Partnership and liaison officer	16 August 2018	NAC	Noted.	Section 9.4
NAC does not work on the ground, but work with structures that are there: communities, health workers, local councils in Mzimba and Rumphi as well as the Church of Central African Presbyterian (CCA Church).	Mr. Mahara Longwe	NAC Partnership and liaison officer	16 August 2018	NAC	Noted.	Section 9.4

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People have options to go to Rhumpi or Eukweni for health issues. In addition, Ekwendeni hospital also have an Aids organisation where people can obtain assistance.	Mr. Mahara Longwe	NAC Partnership and liaison officer	16 August 2018	NAC	Noted.	Section 9.4
We may have national data for HIV and AIDS and district specific data may be available.	Mr. Mahara Longwe	NAC Partnership and liaison officer	16 August 2018	NAC	Noted. (Contact details of Mzuzu's regional NAC manager were given).	Section 9.4
A white person was involved in the Njakwa Chitimba road project and used to have sex with our girls. He took videos and showed them to the public and bragged about it. How are you going to make sure this does not happen? This person has since been deported.	Mr. Roosevelt Kamweteke	Mwalweni II ADC	19 August 2018	Mwalweni II ADC	Ms. Bron: Potential issues such as these will be dealt with in the social impact assessment. Has there been any intervention regarding the affected girls? Mr. Chihana: If you see anyone breaking the laws, it must be dealt with in accordance with the laws of Malawi. There should be no fear or favour regardless the nationality. The DPD says that the case should be followed up so that the government can investigate as the government has a record of all contractor personnel.	
Will contractors bring in employees to site or do they make use of local people? If individual contractors move alone, there may be a problem. When someone is working	Mr. Kingsley Phiri	Mzimba DEC Malawi Telecoms	17 August 2018	Mzimba DEC	Noted. Ms. Bron: The SIA will address this.	Section 9.4

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somew here he should be allow ed to bring family with. Employees should be encouraged to bring their w ives and paid additional money to bring them to site.						
The issue of unfaithfulness does not depend on the wife being present on site. Unfaithfulness rests in the heart and the mind of the person. The provision of camps need to be re-assessed as this company policy contributes to prostitution.	Mr. Goodnew s Gambo	Mzimba DEC Parks and Wildlife Officer	17 August 2018	Mzimba DEC	Noted.	Section 9.4
The presence of construction companies during road construction projects contribute to the spread of HIV/Aids. Prostitution is on the rise and these areas become hotspots for the spread of HIV/Aids.	Ms. Vanani Nyirenda	Mzimba DEC Zodiak Broadcasting Station (ZBS)	17 August 2018	Mzimba DEC	Ms. Bron This will be considered as part of the SIA and management and monitoring plan.	Section 9.4
Middle-upper management are looked after, but it is the low er ranks w here prostitution then happens.	Mr. Goodnew s Gambo	Mzimba DEC Parks and Wildlife Officer	17 August 2018	Mzimba DEC	Noted.	Section 9.4
Safety is important and employees have to be provided with Personal Protective Wear (PPW).	Mr. Hendrix Mphaw kamo	Mzimba DEC Malaw i carer	17 August 2018	Mzimba DEC	Noted.	Section 9.4 Section 9.13
People normally only wear safety gear w hen the minister is coming. This should not happened and safety gear should be worn at all times.	Mr. Kingsley Phiri	Mzimba DEC Malaw i Telecoms	17 August 2018	Mzimba DEC	Noted.	Section 9.4 Section 9.13
The communities should be informed of project commencement dates well in advance as well as cut off dates for project activities.	Mr. Edw ard Moyo	Mzimba DEC District Forestry office	17 August 2018	Mzimba DEC	Noted.	Appendix B Section 9.4
How will you deal w ith children w ho w ill want to w ork instead of going to school?	Group Village Head (GVH). Mw achiw iska	Mw alw eni II ADC Group Village Head	19 August 2018	Mw alw eni II ADC	Mr. Chiumia:	Section 9.4

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I am concerned that construction activities will cause blockages in the road.					There will be sensitisations prior to and during the construction period to ensure that the children do not bunk school. Mr. Chihana The construction will take place in a manner that will leave one lane open. Where total closure may be required, this will be done for short periods only.	
Will children spend time at the road construction site?	Mr. Harrison Lungu	Rumphi DESC	19 August	Rumphi DESC	Chair Mr. Lusisi Nhlane: Children do spend time in the construction area. The District Education Committee, and teachers need to step in. We have a shortage of teachers in schools. Unattended children will go to the machines. The Road Traffic Department has a Road Safety Department to help with sensitization.	Section 9.4
How will you ensure that the road barriers are not stolen in the future?	Mr. Group Village Head Mwachiswa	Mwachiswa II ADC	19 August 2018	Mwachiswa II ADC	Mr. Chihana:	Section 9.4

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How will you ensure that road signs are not vandalised. This has happened before and there are schools close to the road.	Mr. Group Village Head Kamphoni	Mwalweni II ADC	19 August 2018	Mwalweni II ADC	The RA requests that community should take ownership and assist. New designs include welding and guards to reduce vandalising but it still happens.	
The RA is not present at the police station when people have been arrested after stealing infrastructure. People have been caught stealing but there have been no conviction because the RA is not present to give evidence. People are therefore released on bail. I suspect that sometimes the project people steal and then install again so that they can make more money.	Mr. Arrow Nyirenda	Chinyolo ADC	20 August 2018	Chinyolo ADC	Mr. Chihana: The RA was not aware that vandals have previously been caught. Maybe communication between police and RA was poor. The RA will investigate the matter.	Section 9.4
The mind-set in Malawi is bent on developing him/herself. We have to fight that mind-set. For example, the stealing mind-set should stop. We must guard against each other, and ensure that this does not negatively affected development in this area. Adhere to the laws for employing people correctly and do not use shortcuts.	Magistrate Cuthbert Phiri	Rumphi DESC Judiciary	19 August 2018	Rumphi DESC	Noted.	Section 9.4
Sometimes bosses from within the company build their houses with project stock and give family members privileges they are not entitled to.	Mr. Herbert Mweuka	Rumphi DESC SOLDEV Rumphi Office	19 August 2018	Rumphi DESC	Noted.	Section 9.4
People use project cement to make tombstones. Petrol is stolen.	Mr. Yaz Nyirenda	Rumphi DESC Agriculture	19 August 2018	Rumphi DESC	Noted.	Section 9.4
We noticed that the pilferage is connected to senior people in construction teams and people outside to get access to markets.	Lusizii Njlane – Rumphi District Commissioner	Rumphi DESC Agriculture	19 August 2018	Rumphi DESC	Noted.	Section 9.4

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Communities are the conduit for this. They caught a person with a bag of cement and arrested him. The owner at the construction company pleaded with police to release the thief, and it happened. You wonder... it's complicated.						
People steal when they get little money. The construction company has to pay their employees fairly.	Mr. Peter Sakala	Rumphi DESC M.H.C	19 August 2018	Rumphi DESC	Noted.	Section 9.4
Is it possible to fence off the schools close to the road?	Mr. Tenwell Lwesya	DEC, Education office	18 August	Rumphi, DEC	Mr. Chihana: It is a requirement of the bank that we do a road safety audit. The auditor will recommend what to do in this regard.	Section 9 Section 10
Traffic management will be the responsibility of the contractor, as well as environmental management and we provide them with the conditions. Good alternative routes need to be provided in cases where the road is closed.	Mr. Kelvin Mphonda	Ministry of Transport and Public Works Director of Ministry of Transport	15 August 2018	Ministry of Transport and Public Works	Noted.	Section 9.4
The road has been in use for a while. Unless we improve on trade (trucks), nothing will really change. Just widening, there will not change much. The social fabric has settled. During construction there will be issues, but temporary – unless the trucks increase. Increase in trucks will have a negative impact.	Mr. Cleverson Nyando	Mzimba DESC Mmbelwa DC	17 August 2018	Mzimba DESC	Noted.	Section 9.4

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
People will congregate around the construction camp for informal trading as it has happened in the past.	Mr. Kinas Mdhuli	Mzimba DESC Agriculture, irrigation and water development	17 August 2018	Mzimba DESC	Noted.	Section 9.4
There is fear of promiscuity during construction of the road.	Mr Mabvuto Lupwayi	Synod of Livingstonia Development (SOLDEV)	25 August, 2018	Synod of Livingstonia Development (SOLDEV)	Noted.	Section 9.4
The development may pose a threat to security/safety in surrounding areas	Mr Mabvuto Lupwayi	Synod of Livingstonia Development (SOLDEV)	25 August, 2018	Synod of Livingstonia Development (SOLDEV)	Noted.	Section 9.4
The road signs to be used should not be prone to vandalism and must be reflective.	Mr Leonard Mtonya	Road Traffic and Safety Services	22 August, 2018	Road Traffic and Safety Services Mzuzu	Noted.	Section 9.4
Where there are bridges the barricades or the bars should be made of cement as metal material is stolen by people.	Mr Francis Nyirenda	Mzuzu Meteorological OfficeMzuzu	25 August, 2018	Mzuzu Meteorological Office, Mzuzu	Noted.	Section 9.4
The project should include provision of pedestrian bridges at schools for the safety of the children and the elderly	Mr Enerst Luhanga	Northern Region Education Division, Mzuzu	25 August, 2018	Northern Region Education Division, Mzuzu	Noted.	Section 9.4
7.6 Cultural Issues						
There are graves located within the RRB at Mzokoto, Phwezi and Kayira. Are you going to deal with this in a culturally appropriate manner?	Mr. Harvey Chihana	Chinyolo ADC	20 August 2018	Chinyolo ADC	Mr. Chihana: The final design has not been done yet. If it is noted that the said graves will be impacted, the RA in consultation with the local communities will	Section 9.4 Section 9.11

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
					decide on appropriate cultural procedures.	
Spirits reside in the Chiweta mountains. Rituals and prayers should be conducted to appease these spirits, otherwise there will be rock falls and other disasters.	Mwalweni II ADC	ADC member	19 August 2018	Mwalweni II ADC	Mr. Chihana: The RA in consultation with the local communities will decide what is appropriate regarding this matter.	Section 9.4 Annexure B
Rumphi & Karonga have Rift Valley early age sites and dinosaur beds. When they originally constructed a road, no ESIA was done unfortunately to take these issues into account. There may also be iron age and stone age sites within the river.	Ms. Chrissy Chiumia Mr. Alfred Topeka	Department of Antiquities	15 August 2018	Department of Antiquities	Noted.	Section 9.4 Section 9.11
Graveyards are located in close proximity to the road.	Ms. Chrissy Chiumia Mr. Alfred Topeka	Department of Antiquities	15 August 2018	Department of Antiquities	Noted.	Section 9.4 Section 9.11
It is important to know the location of borrow pits, spoil sites and diversions and assess them for their cultural value.	Ms Chrissy Chiumia Mr Alfred Topeka	Department of Antiquities	15 August 2018	Department of Antiquities	Noted.	Section 2 Section 9.4
The presence of graves must be investigated.	Mr. Cleverson Nyando	Mzimba District Environmental Sub Committee, MMBelwa DC	17 August 2018	Mzimba District Environmental Sub Committee	Noted.	Section 9.4 Section 9.13
8. GENERAL						
The project is a welcome development for this country. It will facilitate movement of ESCOM equipment from the port into Malawi with minimized risk especially on Chiweta	Mr Thom Mzumara	ESCOM, P.O Box 56Mzuzu	25th August, 2018	ESCOM, Mzuzu	Noted.	n/a

COMMENTS, ISSUES, SUGGESTIONS RAISED BY STAKEHOLDERS	STAKEHOLDER NAME	ORGANISATION / VILLAGE	DATE	SOURCE	RESPONSE BY ESIA & MRA PROJECT TEAM	REFERENCE IN ESIA/RAP REPORT
road where the road has sharp bends and is narrow .						
There is a place near Phw ezi, Mphompha and Uzamara where apples, beans, maize and irish potatoes are grow n. This project has the potential of developing economic opportunities in this area if better access is provided to the short 8km dirt access road that leads to this area.	Mr. Allan Chitete	Rumphi DC	18 August 2018	Rumphi DC	Noted.	Section 9.4
The RA should seriously consider concerns of drainage raised by local people. Eg: At some point people and animals are carried away by water diversions.	Mr. Allan Chitete	Rumphi DC	18 August 2018	Rumphi DC	Noted.	Section 9.4
Is there a possibility of destroying vegetation? If so, maybe we can come up with groups to establish nurseries and undertake reforestation in the area.	Mr. Allan Chitete	Rumphi DC	18 August 2018	Rumphi DC	Noted.	Section 9.4

Appendix d: Attendance registers

The Department of Antiquities Meeting on 15 August 2018			
Name	Surname	Company	Town/Village
Chrissy	Chiumia	Department of Antiquities	Lilongwe
Alfred	Topeka	Department of Antiquities	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Ministry of Housing, Lands Urban Development Meeting on 15 August 2018			
Name	Surname	Company	Town/Village
Davie	Chilonga	Ministry of Housing, Lands Urban Development	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Ministry of Local Government Meeting on 15 August 2018			
Name	Surname	Company	Town/Village
Solomon	Chirambo	Ministry of Local Government and Rural Development	Lilongwe 3
Harris	Kumwenda	Ministry of Local Government and Rural Development	Lilongwe 3
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Ministry of Transport Meeting on 15 August 2018			
Name	Surname	Company	Town/Village
Kelvin	Mphonda	Roads Department -Ministry of Transport and Public Works	Lilongwe 3
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Simbanet Meeting on 15 August 2018			
Name	Surname	Company	Town/Village
Rex	Kanjedza	Simbanet Malawi Ltd	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Drop-off BID Meeting on 16 August 2018			
Name	Surname	Company	Town/Village
Gibson	Nyirenda	Department of Mines	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Forestry Regional Office Meeting on 16 August 2018			
Name	Surname	Company	Town/Village
Patricia	Masupayi	Department of Forestry	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Malawi Energy Regulatory Authority Meeting on 16 August 2018			
Name	Surname	Company	Town/Village
Emmanuel	Kamangira	Malawi Energy Regulatory Authority	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the NAC Meeting on 16 August 2018			
Name	Surname	Company	Town/Village
Mahara	Longwe	National Aids Commission (NAC)	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the Regional Water Office Meeting on 16 August 2018			
Name	Surname	Company	Town/Village
Sydney	Kamtukule	Department of Water Resources	Lilongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the District Executive Committee Meeting on 17 August 2018			
Name	Surname	Company	Town/Village
Chrispine	Chakhumbira	MEC (Mmbelwa District Council)	Mzimba
Goodness	Gumbo	Wildelife Department	Mzimba
Lawrence	Siliya	Water Development & Sanitation Department	Mzimba
Cleaverson	Nyando	M'mbelwa District Council	Mzimba
Solver	Kalinde	Mmbelwa District Council	Mzimba
Lameck	Magawa	Mmbelwa District Council	Mzimba
Yusuf	Kazembe	Mmbelwa District Council	Mzimba
Hendrix	Mphangamo	Malawi Carer	Mzimba
Henry	Zimba	Judiciary	Mzimba
Clement	Ndlovu	Mzimba Radio	Mzimba
Vanani	Nyirenda	Zodiak Broadcasting Station (ZBS)	Mzimba
Leonard	Masauli	Department of Information	Mzimba
Haward	Msewa	Meteorological Department (MET)	Mzimba
Francis	Chidandale	Tourism Department	Mzimba
Kingsley	Phiri	Malawi Telecoms Ltd	Mzimba
Kelvin	Tenso	Capital Radio	Mzimba
Edward	Moyo	District Forest Office	Mzimba
Chimwemwe	Kumwenda	Department of Trade-One Village One Product (OVOP)	Mzimba
Wigly	Mwamsango	Nationa Registration Bureau	Mzimba
Chawezi	Chumia	Plant Vehicle Hire Organization (PVHO)	Mzimba
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Mzimba District Environmental Sub-Committee Meeting on 17 August 2018			
Name	Surname	Company	Town/Village
Cleverson	Nyando	Mmbelwa District Council	Mzimba
Sleve	Masoo	Mmbelwa District Council	Mzimba
Mighty	Kayoyo	Education	Mzimba
Lameck	Magawa	Mmbelwa District Council	Mzimba
Russell	Mhone	Labour Office Mmbelwa District Council	Mzimba
Goodnews	Gumbo	Wildelife Department	Mzimba
Alefa	Chigulu	Environment	Mzimba
Lifred	Banda	District Forestry Office	Mzimba
Haward	Msewa	Meteorological Department	Mzimba
Lawrence	Siliya	Water Dev & Santitation	Mzimba
Lucy	Muyafula Kabaghe	Mmbelwa District Council	Mzimba
Kings	Mdhluli	Agriculture, Irrigation and Water Development	Mzimba
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the District Executive Committee Meeting on 18 August 2018			
Name	Surname	Company	Town/Village
Vitumbiko	Nyirongo	Rumphi District Council	Rumphi
Annox	Mbeba	Land Resource and Conservation (LRCO)	Rumphi
Edward	Mkandawa	District Fisheries Office	Rumphi
Abraham	Mhlanga	Rumphi District Agriculture Office	Rumphi
Wakefer	Mukumbwa	Rumphi District Agriculture Office	Rumphi
Allan	Chitete	Rumphi District Agriculture Office	Rumphi
Andrew	Chima	Rumphi District Agriculture Office	Rumphi
Tenwell	Lwesya	Rumphi District Agriculture Office	Rumphi
Gift	Nyirenda	District Forestry Office	Rumphi

Frank	Mkandawire	Director of Planning and Development (DPD)	Rumphi
Johan	Chingawale	District Water Development Office (DWDO)	Rumphi
Anita	Bron	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the District Executive Committee Meeting on 18 August 2018			
Name	Surname	Company	Town/Village
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Rumphi District Council Meeting on 18 August 2018			
Name	Surname	Company	Town/Village
Harry	Mnyenyembe	Ward Councillor	Rumphi
Alfred	Butao	Ward Councillor	Rumphi
Lilian	Chirambo	Ward Councillor	Rumphi
Elisah	Khunga	Ward Councillor	Rumphi
Aggrey	Nyirenda	Ward Councillor	Chitimba
Fedwin	Nyirenda	Ward Councillor	Livingstonia
Mazile	Chibambo	Ward Councillor	Henga Phoka
Allan	Chitete	Ward Councillor	Rumphi
Peter	Muyanga	Ward Councillor	Rumphi
Mazoe	Gondwe	Ward Councillor	Rumphi
Vinjero	Luhanga	Ward Councillor	Rumphi
Kondwani	Harawa	Ward Councillor	Rumphi
Humphrey	Jere	Ward Councillor	Rumphi
Mc Holdings	Nyirenda	Rumphi District Council	Rumphi
Frank	Mkandawire	Rumphi District Council	Rumphi
Musandide	Missinjo	Rumphi District Council	Rumphi
Kelvin	Chawinga	Senior Chief (Hewe)	Rumphi
Ian	Msowoya	Chinyolo ADC Member	Rumphi
WJ	Gondwe	Themba La Mathemba Chief Chikulamayembe	Rumphi
Foster	Mhango	Traditional Authority MwahengaMhuju	Rumphi
Lusizi	Nhlane	District Commissioner -Rumphi District Council	Rumphi
WJ.	Gondwe	Themba la Mathemba Chief Chikulamayembe	Rumphi
Statch	Kondowe	Ward Councillor	Rumphi
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg

Kacheche Project: Attendance Register for the District Environmental Sub-Committee Meeting on 19 August 2018			
Name	Surname	Company	Town/Village
Peter	Sakala	Malawi Housing Corporation (MHC)	Rumphi
George	Mlowoka	Youth Network and Councillng (Yoneco)	Rumphi
Mphatso-A	Mithi	Rumphi Water Board	Rumphi
Yaz	Nyirenda	District Agricultural Development Officer (DADO)	Rumphi
Thelesiwe	Hara	Department of Youlth	Rumphi
Ida	Mughogho	Department of Trade	Rumphi
Cuthberth	Phiri	Judiciary	Rumphi
Edward	Khonje	Rumphi District Council	Rumphi
Annettie	Chitsonga	Community Development Office	Rumphi
Harrison	Lungu	Office of President and Cabinet (OPC)	Rumphi
Timothy	Banda	Irrigation Department (Agriculture)	Rumphi
Herbert	Mweuka	Synod of Livingstonia Development (SOLDEV)	Ekwendeni
Lydon	Mkandawire	District Labour Office	Rumphi
Suzgo	Gondwe	Development Action for Marginalised Rural Areas (DAMRA)	Rumphi
Francis	Puleni	Rumphi District Council	Rumphi
Austen	Chibkiana	Rumphi Prison	Rumphi
Victor	Tezera	Electricity Supply Commission of Malawi (ESCOM)	Rumphi
Lizzie	Mhango	Social Welfare	Rumphi
Innocent	Simakweli	Rumphi District Council	Rumphi
Charles	Mpezeni	Rumphi Police	Rumphi

Moses	Chirongo	Rumphi District Forestry Office	Rumphi
Moses	Lupwayi	Rumphi District Forestry Office	Rumphi
Frank	Mkandawire	Director of Planning and Development	Rumphi
Tobias	Mwakilanamwila	Rumphi District Hospital	Rumphi
Lusungu	Mkandawire	Rumphi District Council	Rumphi
Aubrain	Kumwenda	Rumphi District Council	Rumphi

Kacheche Project: Attendance Register for the District Environmental Sub-Committee Meeting on 19 August 2018			
Name	Surname	Company	Town/Village
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Mwalweni ADC Meeting on 19 August 2018			
Name	Surname	Company	Town/Village
Sport	Nyasulu	Group Village headman (GVH) Sangaliwe	Chiweta Center
Mr	Nkhonyesa	Village headman Katakwa	Chiweta Center
Lameck	Nyasulu	Village Headman Chibotera	Chiweta Center
Oscar	Msiska	Village Headman Kamphoni	Chiweta Center
Stephen	Kalua	Village Development Committee (VDC) Chair	Jumbo
Timothy	Mhango	Area Development Committee (ADC) Member	Chipoka
Boster	Mhango	Area Development Committee Member	Chiweta Center
Lywell	Mhango	GVH Manombo	Chiweta Center
Malioni	Nyasulu	GVH Kamphoni	Chiweta Center
John	Ndakaora	ADC Member	Chiweta Center
Josiah	Mbewe	Village Development Committee (VDC) Secretary	Chitimba
Makoza	Nyasulu	Village Development Committee (VDC) Chairman	Chitimba
Jestina	Nyasulu	Village Development Committee (VDC) Chairman	Chitimba
Lenney	Kaunda	Village Development Committee (VDC) Chairman	Thekero
Robert	Mhange	Kamphoni	Chiweta
Patson	Nyasulu	Group Village Headman Kazuwa	Chitimba
Visuzgo	Harawa	Village Headman Julira	Chitimba
Selina	Nyasulu	Mtomboloka	Luwuchi
Wakisa	Kalima	Minister of Agriculture	Rumphi
Aggrey	Nyirenda	Rumphi District Council	Chitimba
William	Ngambi	Ministry of Mines and Environmental Affair (Forestry Department)	Rumphi
Edwin	Mwase	Chimphamba	Chitimba
Roosevelt	Kamwetewa	Agriculture	Chitimba
Menard	Mwafurirwa	Ministry of Gender	Chitimba
Ernest	Msiska	Area Development Committee Member	Chitimba
Tawola	Msiska	Village Development Committee (VDC)	Chitimba
Boyson	Ngwira	Group Village Headman Bombo	Chitimba
Francis	Zuma	Village Development Committee Chairperson	Chitimba
Mlota	Mnthali	Area Development Committee Treasurer	Chitimba
Fryness	Nyienda	Village Development Committee Chairman	Chitimba
Georgina	Thindwa	Village Development Committee Chairman	Chitimba
Levie	Mzembe	Area Development Committee Member	Chitimba
Tom	Hachu	Area Development Committee Member	Chiweta Center
Ezeckiel	Mkandawire	Group Village Headman	Chitimba
Samson	Mzembe	Group Villageheadman Kamzomole	Chiweta Center
Alex	Mhango	Village headman Matchonga	Chiweta
Kondwani	Chilanga	Village headman Chamanganga	Chiweta
Mateyo	Msiska	Village headman Mziyala	Chiweta
Louis	Thindwa	Village Headman Mtomboloka	Chiweta
Fanny	Ngwira	Group Village Headman Bombo	Chiweta
Aaron	Luwe	Ministry of Gender	Chitimba
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the ADC Chinyolo Meeting on 20 August 2018			
Name	Surname	Company	Town/Village
Jackson	Silumbu	Area Development Committee Member	Mzokoto
Christon	Mlenga	Area Development Committee Member	Mzokoto
Charity	Nyirenda	Area Development Committee Member	Mzokoto
Bywell	Mwalwenda	Area Development Committee Member	Chinyolo
Florence	Sapwe	Area Development Committee Member	Chinyolo
Charles	Gondwe	Area Development Committee Member	Mzokoto

Kacheche Project: Attendance Register for the ADC Chinyolo Meeting on 20 August 2018			
Name	Surname	Company	Town/Village
Ethel	Chipeta	Area Development Committee Member	Mzokoto
Tobious	Mwilwa	Area Development Committee Member	Rumphi
Arrow	Nyirenda	Malondanimaso	Chinyolo
Flyton	Chiwenda-Mwale	Area Development Committee Member	
Catherine	Singh	Mzokoto	Mzokoto
Kemelson	Nhuluwe	Area Development Committee Member	Mzokoto
Regina	Gama	Area Development Committee Member	Mzokoto
Getrude	Mhango	Kakoloha Village Development Committee	Mzokoto
Precious	Ndhlovu	Mkombezi	Mzokoto
Kenneth	Silumbu	Area Development Committee Member	Chinyolo
Harvey	Chihana	Area Development Committee Member	Mzokoto
Limbani	Msiska	Area Development Committee Member	Mzokoto
Austin	Mhomgo	Area Development Committee Member	Mzokoto
Wainright	Chihana	Roads Authority	Hlongwe
Anita	Bron	SRK Consulting	Johannesburg
Grant	Theu	SRK Consulting	Johannesburg
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Road Traffic and Safety Services Meeting on 22 August 2018			
Name	Surname	Company	Town/Village
Leonard	Mtonya	Road Traffic and Safety Services	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Zonal Forestry Office North Meeting on 23 August 2018			
Name	Surname	Company	Town/Village
Steven	Mtawa	Zonal Forestry Office North	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Mzuzu City Council Meeting on 24 August 2018			
Name	Surname	Company	Town/Village
Dumisani	Mbekeyani	Mzuzu City Council	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the ESCOM Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Thom	Mzumara	ESCOM	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Feed the Children International Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Emmanuel	Masongola	Feed The Children International	Rumphi
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Malawi Defense Force Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Charles	Lungu	Malawi Defense Force	Mzuzu
Robert	Mteza	Malawi Defense Force	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Malawi Telecommunications Limited Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Mackenzie	Chiyala	Malawi Telecommunications Limited (MTL)	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Mzuzu Meterogical Office Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Francis	Nyirenda	Mzuzu Meterogical Office	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Northern Region Education Division Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Enerst	Luhanga	Northern Region Education Division	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Parks and Wildlife Office Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
George	Nxumayo	Parks and Wild life Office	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Region Water Office Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Francis	Mtambo	Region Water Office	Mzuzu
Chris	Chiumia	Vineyard Consulting Services	Blantyre

Kacheche Project: Attendance Register for the Synod of Livingstonia Development (SOLDEV) Meeting on 25 August 2018			
Name	Surname	Company	Town/Village
Mabvuto	Mupwayi	Synod of Livingstonia Development (SOLDEV)	Ekwendeni
Chris	Chiumia	Vineyard Consulting Services	Blantyre

