

## **ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN SUMMARY**

Project Title: Mzuzu – Nkhata Bay Road Rehabilitation Project

Project Number: P-MW-DB0-012-02

Country: Malawi

Department: OITC

Division: OITC2

### **1. PROJECT DESCRIPTION AND OBJECTIVES**

#### **Project Background**

The total coverage of the public road network in Malawi is approximately 15,451km, of which 28% is paved and the rest of the network is unpaved. The condition of the roads remain largely in good to fair condition, with 93% of the paved road network in good to fair condition, 65% of the unpaved road network is in fair to good condition. The Mzuzu-Nkhata Bay road is part of the Mtwara Development Corridor (MDC). The MDC is a major and important trade route connecting Tanzania, Malawi, Mozambique and Zambia. The project road is also an important trunk road linking the northern Malawi to the central and southern parts of the country.

#### **Project Description and Objectives**

The proposed project will involve rehabilitation of the road between the towns of Mzuzu and Nkhatabay. The works shall include rehabilitation and widening of the carriageway from 4.2m to 6.7m with 1.5m sealed shoulders, recycle base to sub-base and provide 150mm sub-base and 40mm asphalt concrete surfacing.

The overarching project development objective is to support economic growth and poverty reduction. Malawi's trade competitiveness in export markets relies on efficient international trade corridors. The specific objectives of the project are: (i) to reduce vehicle operating costs; (ii) to reduce travel time between the towns of Mzuzu and Nkhatabay; and (iii) to generally boost the social-economic welfare of the communities in the road catchment area by providing them access to social economic centers (markets, schools, and health centers).

The project components are as follows: (i) civil works (rehabilitation of the Mzuzu-Nkhatabay road); (ii) consultancy services (design review, preparation of bidding documents, and supervision; road safety audit; and financial audits); (iii) capacity building (road sector needs assessment study; skills training and acquirement of management systems in procurement project management and road asset management). The major environmental and social sub-components include the following: ; (i) implementation of the Environmental and Social Management Plan (ESMP), (ii) Compensation of Project Affected Persons (iii) Sensitization of communities and road users on HIV/AIDs.

#### **Project Categorization**

Due to constraints in the project area terrain and to minimise the environmental impacts on slopes and embankments, the proposed designs follow the existing alignment with minor improvements suggested in some curves. Because of the scope and nature of works that would be undertaken the multitude of positive impacts that could ensue with this

development and the limited negative impacts that could be generated and which could be easily mitigated through a series of appropriate mitigation measures and their follow up, places this project in the environmental category 2.

## **2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **Policy Framework**

The National Environmental Policy 2004 promotes sustainable social and economic development through the sound management of the environment and natural resources. The policy recognizes the trade-offs between economic development and environmental degradation and calls for the use of EIA and environmental monitoring as tools for minimizing impact of development on environment. The road construction project will integrate the principles of the environmental policy into the project so that rehabilitation is done in an environmentally responsible manner. Other policies of relevance to the project include the National Land Policy of 2003; National Forestry Policy, 1997; National Water Policy, 2004; National Decentralization Policy, 1998; the National Fisheries and Aquaculture Policy, 2001 and the Malawi Economic Growth and Development Strategy. These policies provide sectoral frameworks for the mainstreaming of thematic areas into the development process including in the Mzuzu – Nkhata Bay Road Project.

### **Legal Framework**

The ESIA was prepared with reference to the key legal instruments including the Constitution of the Republic of Malawi, 1995; Environment Management Act, 1996; Fisheries Conservation and Management Act of 1997; Land Act, 1969; Malawi Forestry Act, 1997; Monuments and Relics Act, 1990; and the National Local Government Act, 1998. The relevant conventions to which Malawi is a signatory are also discussed in the ESIA. These legal instruments outline compliance requirements that have to be observed during the various stages of implementation of the road project.

### **Administrative Framework**

The key environmental agencies that will be involved in monitoring include;

- The Environmental Affairs Department (EAD) - empowered by the Environmental Management Act (1997), EAD is mandated to coordinate and advise on all environmental issues, including EIA procedures and all environmental requirements. The EAD has recently appointed 24 inspectors. The inspectors will be deployed to monitor and strengthen compliance with ESIA and ESMP standards and specifications in all development projects including the Mzuzu – Nkhata Bay Project.
- Environmental and Social Management Unit of the Roads Authority (RA) - established under Act No. 3 of 2006, the RA ensures that national roads are constructed, maintained or rehabilitated at all times. The Environmental and Social Management Unit will monitor the ESMP implementation and prepare regular reports on compliance to the EAD.
- The National Roads Safety Council (NRSC) was established under Act No 22 of 1978. It is mandated to promote road safety on public roads.

Other administrative frameworks to be involved in monitoring include the Roads Fund Administration and the Ministry of Lands on compensation issues; and the District Environmental Committees on the ESMP.

### **3. DESCRIPTION OF THE PROJECT ENVIRONMENT**

#### **Physical Environment**

*Topography:* The topographical features in the zone of influence of the project road are very diverse as follows: Viphya Plateau and Hill zone area is located to the west and north of the Nkhata Bay district is the largest and highest with an altitude of 1,900 m above sea level; the Rift Valley Scarp extends from the Central of the district extending to the northern part. It largely occurs between the Lake Shore and the Viphya Plateau. The lake shore plain lies in the Rift Valley Floor at an elevation ranging from 450 m to 550 m above sea level. Marshes and wetlands predominantly occur along Liphasa and Lweya rivers which are located in the Central and South East of the district.

*Temperature:* Temperature is variable in the project district and influences rainfall. The average monthly temperatures range between 20°C and 28°C with the low temperatures being experienced in the months of June and July while high temperatures in the months of November and December annually. During cold season however, sometimes temperatures go as far as 10 °C on Viphya plateaus while during dry seasons, it is as high as 32 °C in lakeshore areas . Temperatures are however modified by lake breezes every day and night along lake shore areas. These parameters have been used in the design of the road project.

*Rainfall:* The annual rainfall ranges from 1200mm to over 2,000 mm per annum. Typically, the rainy season occurs between November and March; however, in previous years, the season has extended into May. The highest monthly rainfall, over 3800mm, is usually observed in the month of March while the lowest monthly average, less than 5mm is experienced in September every year.

*Humidity:* Rainfall is also influenced by wind speed and relative humidity in the air .The maximum and minimum humidity in the district is 85% and 54% respectively. This gives a mean relative humidity of 71% .The maximum wind speed ranges from 6 m/s to 11m/s in the district (Mkondezi Research Station, 2011). The district receives both convectional rainfall and topographic rainfall.

*Hydrology / Hydrogeology:* The Mzuzu-Nkhata Bay Zone has a rich and a highly divided network of the rivers. This is due to the type of terrain existing in this area which is lobbed and the drainage pattern is dendritic. Most rivers in Nkhata Bay and Mzimba originate from three main catchment areas, namely: Kaning'ina Forest Reserve, Viphya Highlands and Uzumara hills. The rivers near or crossing the M5 road mainly originate from Kaning'ina Hills in the forest Reserve and highlands around the Mzuzu City. The Limpasa, Pundu, Dambolitali, Chinguluwe and Kachenga rivers have wetlands and swamps. These rivers are potential impact receptors of adverse impacts from road construction activities and have been included in the detailed ESMP. The designs of drainage systems, culverts and bridges will ensure that the project road is protected from flooding.

*Geology and Soils:* The road traverses over the Malawi basement complex and is dominated by the rocks of the amphibolite facies, gneisses of the Pre-Mafingi group. There is also a stretch of sedimentary and volcanic rocks along the road corridor. The types found include

nepheline syenite, garnet – mica schist phyllonites. The soils in the area are classified by the Geological Map of Malawi, 1979, as latosols dominated by leached ferrallitic soils and ferrisols.

## **Biological Environment**

*Flora / Vegetation:* The vegetation of Mzuzu- Nkhata Bay zone is basically closed canopy woodlands dominated by *Brachystegia* species. These woodlands developed into thick forest popularly known as Miombo woodlands. ‘Miombo’ Woodlands comprise forestlands in the plateau, hills and escarpments that have medium to high rainfall. The Kaning’ina Forest Reserve hosts a lot of rare species of monocots, dicots and pteridophytes. Part of the zone is semi-evergreen forest (around Nkhata Bay Boma), while the other part is made of perennially wet grasslands of the swamps along the Limphasa valley. The main indigenous tree species are *Brachystegia* wood land, montane grass lands and *Pterocarpus angolensis*. In all, none of the vegetation groups are listed as rare, endemic or threatened from the conservation perspective; implementation of this road project will therefore have minimal impacts on vegetation communities.

*Fauna / Wildlife:* From the consultations during the ESIA, the main animal groups in the areas of the project comprise largely monkeys and common birds. No animal groups are reported to be rare, endemic, or vulnerable. The protected areas are the Forest Reserves.

## **Socio-Economic and Cultural Environment**

*Population:* Nkhata-Bay District has a total population of 202,388 which is less than 2% of the national population. These figures are based on the projections of 1998 Population and Housing Census using the growth rate of 2.7%. The average annual population growth rate is 2.7% as indicated. This is higher than the national average (2.0%). The population density in Nkhata-Bay District was 40 persons per square kilometer in 1998. This increased from 32 persons per square kilometer in 1987. There are more females than males living in the district with a male: female ratio of 1:1.05. The density is currently much higher than in 1998. The observed population density along the road is very low.

*Employment:* There is little data on labour from the district. However, main categories of services that employ labour include administration, clerical workers, sales workers, agriculture works, production worker and tenancy. Child labour occurs in the district. Statistics show that children are employed in fishing, domestic work, marketing and agriculture.

*Education:* Nkhata Bay’s Education sector strives to improve quality and relevance, access and equity, management and governance at both basic and secondary levels, to improve education sanitation facilities. There are 178 public primary schools and 8 privately owned. The district has a total of 37 secondary schools of which 9 are unregistered privately owned.

*Health:* The district has one district hospital which is located at the Boma owned by Ministry of Health. It has also one rural hospital at Chintheche owned by Ministry of Health. The district hospital offers curative, preventive and support services to all peripheral health facilities. It also serves as referral hospital for whole district. The rural hospital also provide curative, preventive and support services and it also serve as referral centre for health centres and health posts for minor cases covering a population of about 85, 000 people. In addition to

hospitals the district also has 15 health centres. Out of 15 health centres, 2 are owned by CHAM and the rest by Ministry of Health These centres provide preventive, curative and maternity services. There are also 8 dispensaries and three private clinics; two (one of which BLM) located at the Boma and one is at Chintheche Turn Off.

There are 55 health posts in the district. Out of the 55 health posts, 20 have permanent shelter and the rest do not have permanent structures. Health posts provide community level services like immunisation, treatment of minor ailments, nutrition services, growth monitoring services, case finding and contact tracing, information, education and communication (IEC) activities and water, hygiene and sanitation services.

The Mzuzu city on the other hand hosts two major referral hospitals of St Johns and Mzuzu central. Most serious cases of patients in Nkhata Bay District are referred to these two hospitals.

HIV/AIDS: Mzuzu and Nkhata Bay District councils have HIV/AIDs prevalence rates of 10 and 12 % respectively. The number of HIV positive cases is increasing every year. The district response is helping to keep the numbers down but the number of new infections is high. The district response is multi-faceted and includes the establishment of a functional district aids coordination committee and office, formation and training of community based organizations and involvement of NGOs among other approaches. During road construction it is important that the contractor develops a comprehensive HIV/AIDs workplace policy that includes training and sensitization, condom distribution and treatment support activities.

In addition to technical messages and services offered by the Ministry of Health, Banja La Mtsogolo and other health service providers, the councils have special programmes through which services like awareness creation, HTC and STIs diagnosis and treatment are offered.

Gender: Most of the decision making power for most of the Malawi rural communities lies with men. Women have lesser powers on many issues including development. Participation of women in development is therefore heavily affected. Few development programmes target women and other vulnerable groups.

Energy: Nkhata-Bay has various sources of energy for household and industry uses. Most households use paraffin, firewood, and/or charcoal. Paraffin is supplied by BP Oilcom and Enjena Company at the Boma. Most households use firewood for cooking. Most people prefer to use charcoal when cooking meals. Even some households with electricity prefer using charcoal when cooking. Charcoal, however, is one of the major causes of deforestation.

Agriculture: Agriculture plays an important role for sustainable livelihood in the district. Only 11% of the total land area is available for agricultural production, most of which is used for subsistence agriculture. Women undertake most of the farming activities in the district, except for the western and northern areas of the district. Commercial agriculture is mainly done by the estate sub-sector.

Cassava, the staple food for the majority of people in the district, has the highest yield, followed by maize, rice, sweet potatoes, groundnuts, leafy vegetables and millet. The main cash crops in the district are tea, rubber, sugarcane and legumes. Maize, cassava and rice are sometimes used as cash crops. For the estate sub-sector, macadamia nuts, tea and coffee are

major crops. Fruits produced in the district such as bananas, mangoes, and citrus as well as some vegetables such as onions, Chinese cabbage, mustard and legumes also grown for cash.

*Tourism:* Nkhata Bay is one of the country's major and popular tourist destinations found in the Northern region of Malawi. The district receives international visitors from countries like United Kingdom, USA, New Zealand, Australia, South Africa and from neighboring countries of Tanzania and Mozambique. The district has 23 operating lodges with a total of 235 rooms. 19 operating rest houses with a total of 312 rooms and 14 restaurants with an average capacity of 9.

The main areas of high tourism potential includes; Lake Malawi beaches at Chikale, Chintheche, Kande, Mwaya and Liuzi areas; Forest reserves at Kandoli; historical site (martyrs grave) at Kakumbi, Old Bandawe Mission (Makuzi and Thipula); scenic areas like Vizara rubber and timber plantations. The district also has 2 diving schools and 3 safari companies. The sector offers direct employment to more than 403 people.

*Industry and Commerce:* The manufacturing economy is mostly hosted by the Mzuzu City. Where a lot of products are manufactured or marketed. Mzuzu has the biggest industrial base in the Northern Region. Some of the major companies that provide different services, market or goods include, Southern Bottlers, Auction Floors, Chibuku Products, Northern Region Water Board, ESCOM, MTL, and others. Mzuzu City also provides a large market for manufactured goods from other cities like Lilongwe and Blantyre. These products whether manufactured within the City or procured from elsewhere, have to be transported to and from the city.

*Cultural Environment:* Nkhata-Bay District has two major tribes that include Tonga and Tumbuka. The Tonga tribe accounts for approximately 64% of the population while the Tumbukas account for 33%. Other tribes, such as the Nyanjas from Likoma Island, the Chewas, and Ngonis, account for 3%. Culturally, the Tongas are both patrilineal and matrilineal, while the Tumbukas are mostly patrilineal.

#### **4. ANALYSIS OF ALTERNATIVES**

The design engineer provided three design options for analysis and the No-project situation these include;

Option 1: widen carriageway width from 4.2m to 6.7m with 1.5m shoulders, recycle base to sub-base, provide 200mm crushed stone base and DBST surfacing (19mm plus 9mm)

Option 2: widen carriageway width from 4.2m to 6.7m with 1.5m shoulders, recycle base to sub-base, provide 150mm crushed stone base and DBST surfacing (19mm plus 9mm)

Option 3: widen carriageway width from 4.2m to 6.7m with 1.5m shoulders, recycle base to sub-base, provide 150mm crushed stone base and 40mm asphalt concrete surfacing.

Option 4: No Project / Do nothing option.

#### **Economic Analysis for selection of options**

Preliminary economic evaluation was carried out based on the cost benefit analysis methodology using HDM-4 model. In addition to traffic, other HDM-4 inputs that include unit costs for the proposed interventions, physical characteristics of the road, and vehicle operating costs. The main project Alternatives include the zero option or "do nothing option", the construction of a dual carriage way within the Mzuzu City and 3 other technical options

which would improve road quality and widening. Based on a 15 year design period, cost benefit analysis indicated that, option 3 is the optimal design, with an ERR of 16.1% for the base-case scenario.

### **Selection of surfacing Option**

Topographic considerations: The Mzuzu – Nkhata Bay road starts from an altitude of 618.908m above sea level in Mzuzu to 258.267m above sea level in Nkhata Bay, a drop of 361m over a 46 km stretch. The road design has vertical slopes of up to 12 percent. Considering the traction effects of heavy vehicles on steep slopes, the most appropriate surfacing is Asphalt concrete. The application of surfacing layer is critical on steep slopes as it is difficult to control the operation. Asphalt Concrete is easier to control than Double Bitumen Surface Treatment (DBST) as DBST is prone to either stripping or bleeding.

## **5. POTENTIAL IMPACTS AND MITIGATION MEASURES**

### **Potential Impacts**

The positive impacts on the physical and socio-economic environment would concern: employment benefits for the local communities during construction and maintenance of the road; reduced transport cost for the production of agricultural products; improved mobility to farms, social infrastructure (schools, markets, health centers, water points, etc.); increase in agricultural activities and better market prices for their produce. The women, who constitute a major work force in the agricultural activities, would be the major beneficiaries. In sum, this project will contribute to the reduction of poverty and improvement in the quality of life and living standards of the population in the project zone.

The benefits of rehabilitation include (i) improved road safety and hence reduction of road accidents due to road widening, improved visibility and provision of 1.5 meters shoulders; (ii) reduced travel time and transport fares for passengers using buses and minibuses; (iii) improved access to social services like school and hospitals; (iv) improved travel quality with respect to comfort and convenience; (v) enhanced storm water control due to lined drains and discharging of excess water and runoff into natural drainage channels; and (vi) provision of easier access to other economic centers in the Northern, central and southern regions of Malawi.

The negative environmental impacts include erosion on the steeper sections of the road, dust, noise, loss of vegetation, water pollution and depletion, and loss of property. Mitigation measures proposed include stabilization of road sides to reduce erosion; provision of lined drains to channel water away from the pavement; construction of check dams in steep slope side drains to reduce velocity of run-off water and minimize soil erosion; use of water to control dust, use of well-maintained construction equipment, grassing of embankments to protect the streams from sedimentation, and afforestation programmes with the local communities. There are two major gullies at Rwana Atonga (Km 10.4) and Mtambilika village that pose a risk to the project road. The gullies will be rehabilitated with support of the communities. Quarries and borrow sites exploited during construction will be rehabilitated.

According to the Abbreviated Resettlement Action Plan (ARAP), prepared by the Roads Authority, about 56 households will be affected of which 36 will need to be resettled. The households to be resettled will be compensated for their structures and given land where they will rebuild their new dwelling units. The type of assets affected include: residential and

business structures, crops, and trees. In addition, utility services (water, telephones, electric poles, etc) and station shelters will require to be relocated.

### **Enhancement Measures**

The Contractor's site compound shall include adequate living and sanitation facilities for the workers, including an approved plan for solid and liquid waste disposal. The Contractor shall also have an approved Environment, Health and Safety Plan for storage of equipment, petroleum products, etc., so as to minimize risk of spillage, leakage and fire outbreak, as well as safety and emergency response procedures. The Contractor shall construct bitumen and oil interceptor traps to ensure that these substances do not seep into the groundwater. At the end of the contract period, the Contractor shall reinstate the site compound in a clean and rehabilitated condition to the satisfaction of the Supervising Engineer (SE) and the Environmental/Social specialist at the Roads Authority, and the community.

Disposal of excavated materials, removed debris and demolished structural materials shall be transported to dumping locations approved by the SE, and authorization for dumping shall be secured from the landowners, the Community and/or relevant government authorities.

The Contractor shall take all necessary measures to limit pollution from dust and any wind blown materials during the works. Measures include: (i) utilize water spraying during operation; (ii) trucks leaving the site are properly covered to prevent discharge of dust, rocks, sand, etc.; (iii) crushers and other equipment conform to relevant dust emission control standards; and (iv) stored materials and heaps should preferably be located away from communities and farmlands. The Contractor shall adopt the best practicable means of minimizing noise during construction. All machineries and equipment shall be properly maintained to minimize noise pollution.

Wherever practicable, mature trees shall be retained. During construction, the Contractor shall take all necessary measures to minimize potential impacts of construction activities on flora and fauna along the roads through the provision of appropriate barriers and/or vertical signs.

The project has, as much as possible taken into account measures to reduce the impact of climate change on the road, as well as ways to contribute to mitigation of climate change. Some of the measures integrated in the project design include: (i) Flood design return period: To adapt the road to climate change, a conservative return period of 30 years for culvert design have been provided, instead of the usual 5-15 years as specified in the existing design standards. Further, adequate drainage will be provided, particularly in low laying areas to ensure longevity of the road. All exposed cuts will be grassed to reduce denudation and drainage ditches along cuttings and outfall drains at embankments shall be lined. (ii) Reforestation: In terms of climate change mitigation, a program to plant trees shall be initiated. Trees will be planted in the proximity of the road. Tree planting is expected to contribute to climate change mitigation by storing carbon dioxide, one of the major greenhouse gases (GHG).

The project caters for gender sensitivity. The Contractor shall take all necessary precautions to ensure health and safety conditions at the construction sites. In the Environmental Health Safety Plan, mitigation measures shall include: reduction of workers and public health and safety risks at construction sites, but not limited to location of plant equipment away from

sensitive locations (hospitals, schools, etc.); equipment operation procedures; safety barriers, warning signs; first aid and medical kits use and procedures; safety training for the workers; information campaigns on health practices and communicable diseases. The Contractor shall also ensure HIV/AIDS awareness in collaboration with the National HIV/AIDS Coordination Agency.

## **6. MONITORING PROGRAM**

It is planned that the environmental and social impacts and their designed mitigation measures shall be monitored during implementation of the construction/rehabilitation works and operation phase. The roles and responsibilities for monitoring the environmental and social impacts and mitigation measures are as follows;

The Contractor will be responsible for ESMP implementation while the District Councils, the Ministry of Lands and the Roads Fund Administration will implement the ARAP. The Environmental and Social Management Unit of the Roads Authority will monitor the implementation of the ESMP and ARAP. The Environmental Affairs Department (EAD) of the Ministry of Environment and Climate Change and Environment will undertake compliance monitoring and periodic inspection of the construction site. The EAD has recently recruited 24 inspectors to follow up ESMP implementation in construction projects nationally.

The monitoring of the impacts will focus on the following points: rehabilitation of quarry sites and borrow pits; number of men and women who are employed; number and amount of compensation paid to the project affected persons (PAP) and the date of payment ; number of students, persons, drivers and women who have undergone sensitization on the HIV/AIDS, environmental protection and personal hygiene and sanitation; the number of accidents that occurred during the construction; etc.

The implementation of the ESMP will be one of loan covenants in the agreement signed between the borrower and the Bank. All the mitigation measures specified in this plan shall be included in the bid documents for the successful enterprise to implement. Campaigns on HIV/AIDS, environmental protection and personal hygiene and sanitation shall also be undertaken. For this purpose, services of experienced NGOs in the fields would be sought. The malaria and the HIV/AIDS campaigns would be undertaken in the framework of the Ministry of Health relevant programs.

## **7. COMPLIMENTARY INITIATIVES**

Complimentary initiatives integrated in the project to support project beneficiaries and enhance livelihoods include (i) support to community forest management initiatives with provision of tree seedlings to compensate for trees that will be felled and to mitigate climate change effects; (ii) provision of bus-stops and sanitation facilities at key trading centres along the project road as follows - Kavudzi Trading (where a temporary shed is to be replaced with a permanent market shed with pit latrines), Mpamba Trading Centre (one market shed and pit latrines are to be provided), Mkhwiya (Curio temporary shed is to be replaced with a permanent shed with pit latrines) and Nkhata Bay Boma (Car park with sanitation facilities are to be provided); (iii) the road shoulders will serve as lanes for cyclists and pedestrians thereby improve road and pedestrian safety and (iv) a HIV/Aids sensitization and awareness programme.

## **8. PUBLIC CONSULTATION**

Extensive consultations were conducted with all stakeholders in the project impact area in order to solicit their views on the proposed road rehabilitation project. Public consultations were conducted from 15th June to 3rd July 3, 2012 and over 250 individuals and representatives of organizations were consulted. Various other stakeholders were also consulted during the preparation of the Environmental and Social Impact Assessment.

The consultations yielded a general agreement on the need for the rehabilitation of the road that was considered long overdue by most stakeholders. The negative and positive impacts were discussed with the local authorities, village leaders, the local community and independent organizations operating in the zone of influence of the project. The approach used comprised interviews, group discussions and observations during project site visits. Key concerns raised by local communities included the need for ensuring compensation for loss of property and land, ensuring employment of local communities in the project and improvement of road design to ensure road safety at certain location along the road.

## **9. COST ESTIMATES**

The cost of mitigation for environmental, health and safety aspects is MWK 59.6 million (USD 212,347). An Abbreviated Resettlement Plan has been developed to mitigate loss of property. The cost estimate for compensation is in the sum of MWK250,000,000.00.

## **10. IMPLEMENTATION SCHEDULE AND REPORTING**

The implementation of the environmental and social measures shall last throughout the project cycle. The main responsibility of monitoring the progress of the project implementation shall lie with the Environmental and Social Management Unit of the Roads Authority. The ESMU shall be responsible for designing project monitoring systems and record keeping. It will prepare progress reports, including quarterly reports, which will need to be submitted to the Bank. The environmentalist will be responsible for the preparation of reports on the effectiveness of the implementation of the environmental and social mitigation measures and any improvement that would be required.

## **11. REFERENCES AND CONTACTS**

Environmental and Social Impact Assessment Study Report for the Proposed Rehabilitation of Mzuzu – Nkhata Bay Road by Roads Authority, August 2012.  
Preliminary and Detailed Engineering Design by EMC Jatula Consulting Engineers.

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