ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED LOT 3 ANNUITY ROAD PROJECT FOR RHAMU-MANDERA (75 KM) ROAD LOCATED IN MANDERA COUNTY, KENYA

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JUNE 2017

SUBMISSION OF DOCUMENTATION

I, Prof. Jacob K. Kibwage on behalf of Africa Waste and Environment Management Centre (AWEMAC) submit this Environmental and Social Impact Assessment Study Report for the **Proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road (75km) located in Mandera County, Kenya.** To the best of my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project as per project information provided by proponent.

Signed at **NAIROBI** on this **__8th_____**of **June 2017**

Signature and stamp:

Designation: **Lead Environmental Consultant and Team Leader, NEMA Firm Reg No. 0527**

SUBMISSION OF DOCUMENTATION

I,……,on behalf of Kenya National Highways Authority (KeNHA) **(Proponent)** and HCG Infra Ltd. **(Main Contractor)** submit this Environmental and Social Impact Study Report for the **Proposed Lot 3 Annuity Road Project for Rhamu-Mandera (75km) Road Located in Mandera County, Kenya**. To the best of my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project.

Signed at **NAIROBI** on this……day of **June 2017**

Signature and stamp: ……..

Designation: ……..

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ACRONYMS

A-RAP	Abbreviated Resettlement Action Plan
ASAL	Arid and Semi-arid Lands
AWEMAC	Africa Waste and Environment Management Center
CBOs	Community Based Organizations
CCTVs	Closed Circuit Televisions
CEDAW	Convention on the Elimination of all forms of Discrimination against Women
CPP	Consultation and Public Participation
CRC	Convention on the Rights of the Child
CSOs	Civil Society Organizations
CSR	Corporate Social Responsibility
DHP	Designated Health Practitioner
DRSRS	Department of Resource Surveys and Remote Sensing
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EMP	Environmental Monitoring Plan
EPFI	Equator Principles Financial Institutions
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
GDP	Gross Domestic Product
GHG	Greenhouse gases
GOK	Government of Kenya
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IFC	International Finance Corporation
ILO	International Labor Organization
IPM	Integrated Pest Management
KBS	Kenya Bureau of Standards
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
KURA	Kenya Urban Roads Authority
MEAs	Multi-Lateral Environmental Agreements
NBSAP	National Biodiversity Strategy and Action Plan
NCCRS	National Climate Change Response Strategy
NEAP	National Environment Action Plan
NEC	National Environmental Council
NET	National Environmental Tribunal
NEMA	National Environment Management Authority
NFD	Northern Frontier District
NGEC	National Gender Equality Commission
NGOs	Non-Governmental Organizations
NPEP	National Poverty Eradication Plan
NPGD	National Policy on Gender and Development
OSHA	Occupational Safety and Health Act
PAPs	Project Affected Persons
PEC	Poverty Eradication Commission
PPE	Personal Protective Equipment

PPP	Public Private Partnership
PRSP	Poverty Reduction Strategy Paper
PVC	Polyvinylchloride
SDGs	Sustainable Development Goals
SERC	Standards and Enforcement Review Committee
STDS	Sexually Transmitted Diseases
SWM	Solid Waste Management
ToR	Terms of Reference
TSS	Total Suspended Solids
TDS	Total Dissolved Solids
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on the Environment and Development
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commission for the Refugees
YP	Youth Polytechnic
VMGs	Vulnerable and Marginalized Groups
VOC	Volatile Organic Compounds
WB	World Bank
WHO	World Health Organization
WIBA	Work Injury Benefit Act
WRA	Water Resources Authority

UNITS

CO	Carbon Monoxide
dB(A)	Decibel Amperes
KES	Kenya Shillings
Km	Kilometres
km/h	Kilometer per hour
km^2	Square Kilometer
m3	Cubic metre
mm	Millimetres

GLOSSARY OF TERMS

"Abbreviated Resettlement Plan (A-RAP)" According to the World Bank OP 4.12, Paragraph25:"Where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower";

"Air quality" means the concentration prescribed under or pursuant to the Environment Management and Coordination Act 1999 of a pollutant in the atmosphere at the point of measurement;

"Analysis" means the testing or examination of any matter, substance or process for the purpose of determining its composition or qualities or its effect (whether physical, chemical or biological) on any segment of the environment**;**

"Biological diversity" means the variability among living organisms from all sources including, terrestrial ecosystems, aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, among species and of ecosystems;

"Biological diversity" means the variability among living organisms from all sources including, terrestrial ecosystems, aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, among species and of ecosystems;

"Ecosystem" means a dynamic complex of plant, animal, micro-organism communities and their non-living environment interacting as a functional unit;

"Effluent" means gaseous waste, water or liquid or other fluid of domestic, agricultural, trade or industrial origin treated or untreated and discharged directly or indirectly into the aquatic environment;

"Environment" includes the physical factors of the surroundings of human beings including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment;

Environmental and Social Assessment (Assessment) is a process that determines the potential environmental and social risks and impacts (including labour, health, and safety) of a proposed Project in its area of influence

Environmental and Social Impact Assessment (ESIA) is a comprehensive document of a Project's potential environmental and social risks and impacts.

Environmental and Social Management Plan (ESMP) summarizes the commitments to address and mitigate risks and impacts identified as part of the Assessment, through avoidance, minimization, and compensation/offset. This may range from a brief description of routine mitigation measures to a series of more comprehensive management plans (e.g. water management plan, waste management plan, resettlement action plan, indigenous peoples plan, emergency preparedness and response plan, decommissioning plan). The level of detail and complexity of the ESMP and the priority of the identified measures and actions will be commensurate with the Project's potential risks and impacts.

Environmental and Social Management System (ESMS) is the overarching environmental, social, health and safety management system which may be applicable at a corporate or Project level. The system is designed to identify, assess and manage risks and impacts in respect to the Project on an ongoing basis. The

system consists of manuals and related source documents, including policies, management programs and plans, procedures, requirements, performance indicators, responsibilities, training and periodic audits and inspections with respect to environmental or social issues, including Stakeholder Engagement and grievance mechanisms.

"Environmental management" includes the protection, conservation and sustainable use of the various elements or components of the environment;

"Environmental monitoring" means the continuous or periodic determination of actual and potential effects of any activity or phenomenon on the environment whether short-term or long term;

"Natural resources" include resources of the air, land, water, animals and plants including their aesthetic qualities;

"Noise" means any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment;

"Ozone layer" means the layer of the atmospheric zone above the planetary boundary layer as defined in the Vienna Convention for the Protection of the Ozone Layer, 1985;

"Pollutant" includes any substance whether liquid, solid or gaseous which—

a may directly or indirectly alter the quality of any element of the receiving environment;
b is hazardous or potentially hazardous to human health or the environment; and includes objectionable odours, radio-activity, noise, temperature change or physical, chemical or biological change to any segment or element of the environment;

"Pollution" means any direct or indirect alteration of the physical, thermal, chemical, biological, or radio-active properties of any part of the environment by discharging, emitting, or depositing wastes so as to affect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous to public health, safety or welfare, or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause contravention of any condition, limitation, or restriction which is subject to a licence under the EMCA 1999;

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EXECUTIVE SUMMARY

Over the last fifty years, since independence, the average rate of paved road development in Kenya stands at a paltry 242km per year.

Traditionally the Government has funded infrastructure through annual budgetary allocations derived from tax and duty collections supplemented by project specific donor support. This has not been enough to meet the funding requirements. The Government has taken upon itself, the primary role of identifying alternative funding mechanisms in application elsewhere in the developed and developing countries. One of the funding models is the private public partnership model (PPP). Under this, the Annuity model has been adjudged to be most suitable for the roads under consideration.

The Annuity Financing Model, a PPP approach, will see a fast tracked pace in road infrastructure development, tying in to the National Government's Vision 2030 development strategy that that has identified road infrastructure as one of its key enablers.

The proposed road project by Kenya National Highways Authority (KeNHA) is a part of the LOT 3 - annuity road project in Kenya under the Public Private Partnership (PPP) which entails construction of a 75 km class B road from Rhamu town to Mandera town. Upon completion, the Rhamu - Mandera road will lead to opening up of the North-Eastern part of Kenya. The project will give Mandera town a facelift and access to other towns, improve trade and business in the region with the linkages between Mandera County and the neighbouring Countries like Somalia and Ethiopia, and among other benefits.

The proposed road project navigates from West (Kenyan Horn) to the East, parallel to the Kenya-Ethiopian border. The road reserve for the proposed project is 40 meters. Most of the area traversed by the road is on a trust land vested on the County governments.

Scope and Objective of the Environmental and Social Impact Assessment (ESIA)

The purpose and terms of reference developed for this study was to assess the impacts that may result during the construction, operational and decommissioning phase of the proposed Rhamu- Mandera road project.

Specifically, the terms of reference (as guided by the Kenya Environmental Impact Assessment and Audit Regulations of 2003 and EMCA, 1999) developed for this study shall cover:

i. The description of the proposed road project.
ii. A brief but in-depth description of the national and local environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
iii. The project objectives.
iv. The employed technology, procedures, and processes for the implementation of the project.
v. The materials to be used in the construction and implementation of the project.
vi. The products, by-products and waste to be generated by the project.
vii. A description of the potentially affected environment.
viii. The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
ix. Recommendation of a specific and environmentally sound and affordable waste management system.
x. Analysis of alternatives for the: project site, design and technologies.

xi. An Environmental and Social Management Plan (ESMP) proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
xii. A monitoring plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.
xiii. Proposed measures for the prevention of health hazards and the ensuring of security in the working environment for the employees, local community and for the management in case of emergencies.
xiv. Identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
xv. Economic and social analysis of the project.
xvi. Such other matters as may be directed by the National Environment Management Authority.

The Study Methodology

This study was guided by the EMCA 1999, the Equator Principles and the International Finance Corporation/World Bank Group Performance Standards, particularly Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts; Performance Standard 2: Labor and Working Conditions; Performance Standard 3: Resource Efficiency and Pollution Prevention; Performance Standard 4: Community Health, Safety, and Security; Performance Standard 5: Land Acquisition and Involuntary Resettlement, Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; Performance Standard 7: Indigenous Peoples and Performance Standard 8: Cultural Heritage. The World Bank Guidelines for Roads and highways, the General Environmental, Health, and Safety (EHS) Guidelines and Cultural Heritage Guidelines were applied in the process for identification of social and environmental impacts including the formulation of the mitigation measures for negative impacts as outlined in the Environmental and Social Management Plan.

On the basis of the magnitude of the proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road (75km) located in Mandera County, the ecological and biophysical aspects of the road and its associated facilities, an Environmental and Social Assessment (ESIA) study report was undertaken to determine the impacts of the project. Field visits were undertaken in the period between April and May 2017. The general steps followed in environmental and social impact assessment were as follows:

- Environmental screening, in which the project was identified as among those requiring Environmental Impact Assessment under schedule 2 of EMCA, 1999.
- Environmental scoping that identified the key issues to be addressed in the ESIA study.
- Desktop studies to gather any relevant secondary data and information on the impacts of roads projects on the environment and possible mitigation measures by making use similar reports for other infrastructural projects that have been undertaken along the proposed project corridor.
- Public participation by conducting interviews, discussions and public meetings with key stakeholders including members of the community affected by the project to obtain their views on the impacts of the project and possible mitigation measures. This is as per the Kenyan Constitution, EMCA, 1999, Equator Principles and the World Bank Performance standards.
- Physical inspection of the routes of the proposed road.
- ESIA study report preparation, publication and submission.

- Integration of recommendations of the ESIA study into the design and implementation of the proposed way.

Positive Impacts of the proposed road Project

The proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road project will come along with numerous positive impacts as exhaustively discussed within the report. They include:

- Creation of employment opportunities for construction, maintenance and operation crew.
- Creation of faster means of transport for passengers and bulk cargo from the Rhamu to Mandera.
- Reduced cost of public transportation.
- Increased business opportunities for small and medium -scale traders such as hotel and shop owners, food vendors, etc especially during construction phase.
- Increased regional trade.
- Increased security.
- Reduced risk of accidents on the roads.
- Contribution of revenue to the county, national and regional governments.
- Emergence of new towns and markets.

Negative impacts and the respective mitigation measures of the proposed road project

The key negative impacts and proposed mitigation measures for the proposed project are summarized in Table 1 as follows:-

Table 1: Summary of Key Negative Environmental Impacts and the proposed Mitigation Measures

POSSIBLE IMPACTS	MITIGATION MEASURES
Acquisition of land and property for earth borrow pits, quarries , water , spoil pits and workmen's camp	• The acquisition should be done in conjunction with the local community. • Determination of agreeable rates for compensation to affected persons by key players being NEMA , Ministry of Roads and public Works, Ministry of Housing and all other relevant statutory institutions. • Cultivable lands will not be used as borrow pit sites for excavation of construction materials, unless other sites have been exhausted. • Siting of quarries far from communal settlements, providing adequate buffer zones and adopting best available and safest controlled blasting techniques. • Adopt the following key rehabilitation principles during decommissioning; 1. Rehabilitate the affected areas to a state equal to or better than the original, that supports plant growth. 2. Rehabilitate within terms agreed between the affected party (land owner) and the contractor. 3. Complying with terms and conditions provided in the NEMA EIA License of the project.
Contamination of soil by fuels, oil spills and lubricants	• Vehicle, machinery, and equipment maintenance and refueling will be carried out on paved surfaces so that spilled materials do not seep into the soil. • Fuel storage and refilling areas will be located at least 300 m from drainage structures and important water bodies (rivers etc). • Fuel storage and refueling areas, if located in agricultural land or areas supporting vegetation, will have topsoil stripped, stockpiled, and returned after completion of refueling/construction activities. • All spoils and wastes will be disposed of as per approved disposal plans in wastelands, and in consultation with the county environmental administrators and local communities. • Bituminous wastes will be disposed of at approved sites with impervious linings.
Air Pollution due to Dust Generation and Exhaust Emissions	• Sprinkling of water on dry and dusty surfaces regularly including the access murrum roads and diversions. • All precautions to be taken for reduction in dust emissions from batching and/or hot mix plants and crushers, etc. • Use of storm/waste water to sprinkle at the construction site so as to reduce excessive dust. • Adherence to personal protective clothing such as the use dust masks and respiratory masks by

	workers. • Enforce onsite speed limit regulations. • Ensure machines and vehicles are properly and regularly maintained. • Environmental Impact Assessments (EIA) to be done on all the camp sites and borrow pits to be established along the road corridor and address the dust effects. • Installing dust nets around batching plants.
Degradation of earth borrow pits and quarry areas	• All earth borrow pits and quarry areas will be refilled, re-vegetated and landscaped. In case if it is not done, then such areas will be cordoned with barbed wire fence, with warning signs or be harnessed to form water pans or earth dams for the local community and wildlife. • Sites to be decommissioned as water pans or earth dams should be authorized by the relevant legal administration, should be eco-friendly and safe for the community. • Haphazard borrowing and quarrying should be avoided at all means. • Prior investigation/environmental impact assessments on the environmental aspects and the drainage should be conducted according to the specifications of NEMA. • Borrow pits and quarries should be located far from the settlements. • Degraded and barren areas, riverbeds, and wastelands to be used for borrowing materials. • Use of productive lands will be prohibited. • Potential borrow sites to be selected through Community consultation, and sites subsequently developed into productive purposes. • In case of new borrow areas, all measures will be taken so that there will be no loss of productive soil, and all environmental considerations are to be met with.
Noise Pollution and Excessive Vibrations during construction	• Ensure that all vehicles and construction machinery are kept in good condition all the time to avoid excessive noise generation. • Ensure that all workers wear ear muffs and other personal protective gear/equipment when working in noisy sections. • Sensitize drivers of construction vehicles and machinery operators to switch off engines or machinery that are not being used. • Ensure machines are switched off when not in use. • Undertake loud noise and vibration level activities during off-peak hours during the day (i.e. between

	8.00 am and 5.00 pm). • Ensure the World Health Organization (WHO) bare minimum noise level is maintained for the eight working hours i.e. 85 dB.
Displacement and disruption of Businesses located along Rhamu Town road reserve	• The affected community members should be informed early enough. • The affected businesses will be compensated appropriately according to existing best practices on current market rates or mutually agreed rates. • Explore the alternative of by-passing the road outside the Rhamu CBD to avoid displacement, • The proponent will need to ensure that the final designs of the road will be realigned to ensure that displacements are minimized as much as possible. • Ensure that the Resettlement Action Plan is done appropriately and professionally as per the laid Equator Principles and the World Bank guidelines. • Provide support to squatters to establish small-scale businesses in other suitable locations of Rhamu town. • Educate squatters on the need to maintain free road reserve. • Provide comprehensive environmental health and safety education to squatters along the road in Rhamu town. • Promote other sources of livelihood among the local communities.
Soil compaction	• Construction vehicles, machinery, and equipment shall move or be stationed in designated areas only while operating on temporarily acquired land for traffic detours, storage, material handling, or any other construction-related or incidental activities, topsoil from agricultural land will be preserved. • The contractor shall ensure that the method of stockpiling materials, use of plants, or sitting of temporary buildings or structures do not adversely affect the stability of excavation or fills. • Any incidental damages like, soil trampling and damage to herbs, shrubs, and grasses will be kept to a minimum.

Excessive Water Abstraction and Consumption	• Install water conserving taps and toilets where possible e.g. in the base camps. • Construct water pans and for storage of harvested storm water in conjunction with the local community members. • Drilling of boreholes to supplement water obtained from other sources like River Daua. • Boreholes to be drilled to comply with all the project's associated performance standards. • It would be a noble arrangement to enhance community water supply by handing over the project's boreholes to the community after construction. • Install gutters on the roof of houses in workers camps to harvest rain water.
Increased Generation of Solid Waste	• Maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base. • Incorporating recyclable materials to reduce the volume and cost of new asphalt and concrete mixes. • Collecting road litter or illegally dumped waste and managing it according to the Waste Management Regulations 2006 and as provided in the Environmental Management and Monitoring Plan. • Provision of temporary waste handling facilities (litter bins) both during construction and operation phase. • Recycling of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses.
Increased Energy Consumption	• Promote the use of solar energy and energy efficient bulbs in workers base camps and for street lights in villages situated along the proposed road. • Switch off lights when not in use. • Install electricity meters to monitor the consumption of electricity in workers camps. • Ensure construction machineries and trucks are well maintained. • Use energy-efficient construction machineries and trucks during construction phase of the project.
Discharge of Wastewater, Sewage and Degradation of Water Quality	• Construction of a communal septic tank linked to an approved wetland system. • Explore the use of bio-digester in treatment of sewage in the workers camps. • Promote recycling of wastewater especially storm water for dust suppression. • Install meters in base camps to control and monitor consumption of water. • Ensure regular maintenance of the plumbing system and septic tanks to avoid leakage or spillage of wastewater.

Modification of hydrology of ASALs	• Phase construction of bridges along the seasonal rivers by avoiding complete blockage of river channels during construction of bridges and culverts, • Re-open all blocked river channels after construction of bridges. • Quarries and pits for extraction of road construction materials to be used as water harvesting sites i.e. community water pans. • Control excessive abstraction of water from rivers. • Surface runoff on the sides of the proposed road should be channeled in areas with gentle slopes to erosion of the road sides. • Construct over passes and bridges in areas occupied by all rivers (Including seasonal rivers).
Increased generation of storm water	• Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration. • Use of vegetated swales, filter strips, terracing, check dams, detention ponds or basins, infiltration trenches and infiltration basins. • Regular inspection and maintenance of permanent erosion and runoff control features. • Paving in dry weather to prevent runoff of asphalt or cement materials.
Increased Soil Erosion Risk	• Ensure surface runoff generated on impervious surface is not channeled directly to steep slopes. • Provide grassed water ways along the access roads. • Construct flow breaks on roadside drainage channels. • Promote harvesting of surface runoff for landscaping purposes. • Provide adequate protection against scour and erosion and give consideration to the onset of the rainy season with respect to construction schedules.
Loss of Vegetation Cover and Biodiversity	• Ensure camps, borrow pits, dams and support facilities siting avoids critical terrestrial habitat by optimally utilizing existing transport corridors. • Minimize clearing and disruption of riparian vegetation. • Minimize removal of indigenous plant species and replant indigenous plant species in disturbed areas, • Explore opportunities for habitat enhancement through placement of nesting boxes in rights of-way, bat boxes underneath bridges. • Restoring the vegetative cover through properly designed afforestation and reforestation practices, whose success can be appreciated through vigilant monitoring and evaluation after planting.

Increased Loss of Human Life and animal lives due to Road Accidents	• Construct pedestrian and animal crossing points in certain key areas like the near the villages along the route. • Provide an independent side road parallel to the tarmacked road to prevent its usage by animals being transported on foot by the locals. • Provide safety guardrail in some sections to prevent animals from accessing/crossing the tarmac road when being transported from Rhamu to Mandera on foot. • Create under passes for livestock and wild animals at strategic locations along the road. • Create sufficient and well managed parking areas for trucks. • Provide adequate signs for animals/livestock crossing. • Inclusion of road bumps along the road and more especially near the villages located along the road.
Increased Spread of STD, HIV and AIDS	• Develop a comprehensive STDS, HIV and AIDs control programme and implement it during construction phase. • Provision of STDs, HIV and AIDS prevention capacity building and measures to workers. • Creation of awareness of STDs, HIV/AIDS in workers' camps. • Provision of the necessary contraceptives like condoms to prevent new infections. • Creation of local tradition/cultural awareness to prevent irresponsible behaviors.
Possible Insecurity and terrorism During Construction Phase	• Thoroughly screen workers, suppliers and distributors during the construction period. • Ensure 24-hour surveillance by engaging the Administration Police services both during the day and at night. • Random patrols along the road corridor by police and administration. • Install CCTV cameras in strategic locations of the camps. • Accord the local people the first priority in employment. • Ensure close liaison with the local administration and police for intel and enhancement of security protocols.

Disturbance to Wildlife	• Minimize clearance and disruption of riparian vegetation. • Avoid critical terrestrial and aquatic habitats when siting roads and support facilities by utilizing existing transport corridors. • Design and construct wildlife migration routes to avoid or minimize habitat fragmentation. • Minimize removal of indigenous plant species, and replant indigenous plant species in disturbed areas. • Explore opportunities for habitat enhancement through reduced clearance to conserve or restore native species.
Social Disputes	• Ensure all stakeholders and the public are involved in the planning process. • Ensure proper identification and compensation of all Project Affected Persons (PAPs). • Obtain necessary permissions and approvals from the Mandera County Government. • Ensure EIAs are conducted for specific project activities such as sand harvesting, quarry/borrow pit development, borehole sinking, dam establishment etc.
Land Acquisition and Involuntary Resettlement of Affected Persons	• Ensure proper compensation of the project affected persons. • The Resettlement Action Plan should ensure all the project affected persons are properly identified and duly compensated according to best practices.
Occupational Safety and Health	• Development of a transportation management plan for road construction that includes measures to ensure work zone safety. • Establishment of work zones to separate workers on foot from traffic and equipment by routing of traffic to alternative roads. • Use protective barriers to shield workers from traffic vehicles, regulation of traffic flow by warning lights, design of the work space to eliminate or decrease blind spots, and ensure reduction of maximum vehicle speeds in work zones. • Training of workers in safety and health issues related to their activities. • Ensure safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space. • Barricade the area around which elevated work is taking place to prevent unauthorized access. • Hoisting and lifting equipment should be rated and properly maintained, and operators trained in

	their use. • Elevated platforms should be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings). • Use of the correct asphalt product for each specific application, and ensuring application at the correct temperature to reduce the fuming of bitumen during normal handling. • Maintenance of work vehicles and machinery to minimize air emissions. • Reduction of engine idling time in construction sites. • Use of extenders or other means to direct diesel exhaust away from the operator. • Ventilation of indoor areas where vehicles or engines are operated, or use of exhaust extractor hose attachments to divert exhaust outside. • Apply all provisions set out in the Occupational Safety and Health Act, 2007 and the Work Injury Benefit Act, 2007 during construction to safeguard employees and the local community.
Local Community Health and Safety	• Implement pedestrian safety management strategies such as provision of safe corridors/side roads along the road alignment and construction areas, including tunnels and bridges and safe crossings for pedestrians, cyclists and animals to use both during construction and operation phase of the project.. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian and animal access to the roadway except at designated crossing points. • Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas like ramble strips and road bumps near all villages and towns. • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities, animal crossings or cyclists. • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions. • Construction of roadside rest areas and trucks parking bay at strategic locations to minimize driver fatigue. • Installation of measures to reduce collisions between animals and vehicles (e.g. use of signs to alert drivers on road segments where animals frequently cross, underpasses and culverts for animals). • Prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders.

	• Inclusion of bus stops in every village and towns where the road passes.
Gender Discrimination	• Apply gender Kenya constitutional requirements throughout the project by involving women in the road construction phase. • Apply all guidelines under the National Gender and Equality Commission Act, 2011. • Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages. • Incorporate best practices in gender mainstreaming from project partners. • Ensure etiquette gender interactions prevail throughout the entire project cycle.

Resettlement Action Plan

A preliminary census of structures likely to be affected was conducted to ensure adherence to set guidelines and procedures in mitigating the adverse impacts that might occur during the project implementation. In addition, the People Affected Persons (PAPs) will be assisted to develop their social and economic potential. This will enable them to restore or improve their pre-project living standards and income. Resettlement Action Plan (RAP) primarily ensures that the affected people are not worse off than they were before the project came into existence and while consideration is given to all affected people, emphasis is put on women, vulnerable groups, the disabled and children who are usually the most affected in such situations. For this RAP to comply with international best practices for resettlement of the affected people, KeNHA shall bind itself to the World Bank principles (OP 4.12) and the local legislation on compulsory acquisition and resettlement.

An estimated **124** structures would be affected along the project corridor from Rhamu to Mandera town, if the road will pass though the Rhamu town. These structures were mainly found to be located in Rhamu town. The estimated cost for these structures is **19,450,000 KES.** In Mandera town there will be no structures to be affected, since there is already an ongoing road project that covers the area where physical structures are potentially affected. The proposed project road stretch therefore ends at the outskirts of Mandera town.

The approximated number of structures in Rhamu town and their estimates costs are as shown below.

Nature	**Number**	**Approx. Cost (Kshs)**	**Total (Kshs)**
Permanent Structures	3	800,000	2,400,000
Semi – Permanent Structures	33	250,000	8,250,000
Temporary Structures	88	100,000	8,800,000
Grand Total	**124**		**19,450,000**

Within the road corridor are public utilities such as electricity lines, communication infrastructure and solar street lighting among others within the 60m road reserve that might be affected especially in Rhamu town.

Based on the number of PAPS (which are less than 200), an abbreviated RAP report is recommended for the proposed Rhamu – Mandera road project in order to capture more comprehensive details on PAPs and their entitlements. This is as per the World Bank OP 4.12: Involuntary Resettlement.

It is important to note that the road will be designed and constructed along the existing alignment, re-alignments effected where necessary. Drawing from the Project Agreement (ref contract no. KeNHA/RD/PPP/2016 – Lot 3) between Kenya National Highways Authority (KeNHA) and HASS Consortium GVR Infra Ltd, herein after referred to as the Consortium, to undertake the road construction and maintenance works, the Consortium will get access to an encumbered road corridor as referenced under the clauses contained therein and stated hereunder:

"***Clause 4.1.5***

As a condition precedent, the Contracting Authority shall have delivered to the service provider the following

(a) vacant access to the site and rights of way necessary for the project networks as detailed in Annex I to Schedule A below.

" Clause 10.2.2

In consideration of this Agreement and the covenants and warranties on the part of the Service Provider herein contained but subject to Clause 4(Conditions precedent), the Contracting authority, in ccordance with the tems and conditions set forth herein, hereby grants to the Service Provider, commencing from the Appointed Date, leave and licence rights of all the land (along with any buildinds,constructions or immovable assets, if any, thereon) comprising the site which is described, delineated and shown in Shedule A (the Licensed Site) free of any encumbrances, to develop, operate and maintain the said Licensed site, together with all singular rights, liberties, privilages, easements and appurtenancis whatsoeverto the said Licenced Sites, hereditaments or premises or any part thereto or enjoyed therewith, for the duration of the Project Team and, for th purposes permitted under this Agreement, and for no other purpse whatsoever.

"Annex-I Schedule A item 2"

Observes that all land in the project area is trust land except few parcels in main commercial centers. Bulk of the area is livestock zone and the community live a nomadic way of life. A 60m reserve is available for the greatest length of the road, Rhamu and Mandera centers having restricted 25m and 21m reserves respectively.

Further note*: Updated and approved detailed geometric design output that has with it plans and profiles would ideally guide on the exact location of plots to be affected. Valuation of the same would be undertaken and verified by a registered valuer. There being no detailed engineering design output, establishment of the affected plots as presented above is only indicative.*

Summarily design options that will lead to minimal acquisition or none at all, will be explored along the project area extents.

Conclusions

The studies conducted on the proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road (75km) shows that the project will pioneer development in the Kenyan Horn and have significant impacts, both positive and negative, on the environment and socio-economic set up of the region through which the road will transverse.

Considering the positive socio-economic and environmental benefits which will accrue as a result of the proposed development and the ESIA study having found no major impacts to arise from the development, it is our recommendation that the project be allowed to proceed on the understanding that the proponent will adhere to the mitigation measures recommended herein and will further still implement the proposed Environmental and Social Management Plan (ESMP) to the letter. Kenya as a country has a big shortage of such road project developments especially in the Northern side of the country, hence the

construction of the proposed project goes a long way in solving part of the road transportation sector.

CHAPTER ONE: INTRODUCTION

1.1. Background Information

Over the last fifty years, the average rate of paved road development in Kenya stands at a paltry 242km per year. This is attributable to historical Infrastructure funding gaps, the roads sub-sector presently operating with an average annual budget deficit of US$ 44Million (approximately KShs 40 billion).

The Government of the Republic of Kenya through the Ministry of Transport and Infrastructure represented by the Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and the Kenya Urban Roads Authority (KURA) being state corporations established under the Kenya Roads Act, 2007 has identified the need to upgrade to paved standards approximately 10,000 km of roads. These roads are intended to support the primary growth sectors of Commerce, Tourism, Agriculture and Rural Production, and Extractive Industries.

Traditionally the Government has funded infrastructure through annual budgetary allocations derived from tax and duty collections supplemented by project specific donor support. This has not been enough to meet the funding requirements. The Government has taken upon itself, the primary role of identifying alternative funding mechanisms in application elsewhere in the developed and developing countries. One of the funding models is the private public partnership model (PPP). Under this, the Annuity model has been adjudged to be most suitable for the roads under consideration. The target Annuity output of road for the financial year 2016/17 is approximately 5000km. The major works include upgrading to paved standards of gravel and earth roads and rehabilitation/reconstruction of existing paved roads including bridges, culverts, road intersections, drains, etc. and the maintenance thereof. The approach under this programme will be based on the Finance-Design-Build-Maintain and Transfer Contract Framework.

The Annuity Financing Model, a PPP, will see a fast tracked pace in road infrastructure development, tying in to the National Government's Vision 2030 development strategy that that has identified road infrastructure as one of its key enablers.

1.2. Project Description and Rationale for the Environmental and Social Impact Assessment

The proposed road project by Kenya National Highways Authority (KeNHA) is part of the LOT 3-annuity road project in Kenya under the Public Private Partnership (PPP) which entails construction of a 75 km Class B road from Rhamu town to Mandera town**.** Upon completion, the Rhamu-Mandera road will lead to opening up of the North-Eastern part of Kenya. The project will give Mandera town a facelift and access to other towns, improve trade and business in the region with the linkages between Mandera County and the neighbouring Countries like Somalia and

Ethiopia, and among other benefits that come with upgrading or improvement of road infrastructure.

The proposed road project navigates from West (Kenyan Horn) to the East, parallel to the Kenya-Ethiopian border. The road reserve for the proposed project is 40 meters. Most of the area traversed by the road is on a trust land vested on the County governments.

The Kenya Government policy on such projects, programmes or activities requires that an Environmental and Social Impact Assessment (ESIA) be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of such projects, programmes or activities. Therefore, in compliance with the law and to avoid unnecessary conflicts that may retard development in the country, the proponent undertook this Environmental Impact Assessment and incorporated environmental concerns as required.

Due to the scale of the project and to ensure optimum care is taken to minimize disruption of the proposed project site environs, a comprehensive full ESIA Study was opted for where an Environmental and Social Management Plan (ESMP) will be developed to advice the proponent on environmental issues and to assist National Environment Management Authority (NEMA) in advising the proponent in line with the provisions of Environmental Management and Coordination Act (EMCA), 1999.

This study was guided by the Environment Management and Coordination Act, 1999 and the (amendment Act 2015), the Equator Principles and the World Bank Performance Standards, among other applicable Kenyan legislation and Multilateral Environmental Agreements as discussed in the subsequent chapters of Policy, Legal and Institutional Framework.

1.3. Scope and Objectives of the ESIA

Government policy on road projects requires that an Environmental and Social Impact Assessment (ESIA) be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the natural and social environment are taken into consideration during the detailed design, construction, operation and decommissioning stages. Environmental and Social concerns now need to be part of the planning and development process, and in compliance with the law to avoid adverse environmental and social impacts and therefore unnecessary conflicts that may hinder sustainable development in the country.

The data collection exercise was based on field based surveys that were undertaken in the period between April and May 2017. Most of the data was collected using various approaches such as questionnaires, standard interview schedules, key stakeholders consultations, public meetings, use of checklists, observations and photography, site visits, focused group discussions and desktop environmental studies. Field surveys were undertaken in the manner specified in Environment Management and Coordination Act (EMCA), 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003. The scope of ESIA was guided by the following terms of reference:

i. The description of the proposed road project.
ii. A brief but in-depth description of the national and local environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
iii. The project objectives.
iv. The employed technology, procedures, and processes for the implementation of the project.
v. The materials to be used in the construction and implementation of the project.
vi. The products, by-products and waste to be generated by the project.
vii. A description of the potentially affected environment.
viii. The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
ix. Recommendation of a specific and environmentally sound and affordable waste management system.
x. Analysis of alternatives for the: project site, design and technologies.
xi. An Environmental and Social Management Plan (ESMP) proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
xii. A monitoring plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.
xiii. Proposed measures for the prevention of health hazards and ensuring security of employees while at work, the local community and for the management in case of emergencies.
xiv. Identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
xv. Economic and social analysis of the project.
xvi. Such other matters as may be directed by the National Environment Management Authority, Equator Principles and IFC performance standards.

1.4. Data Collection Procedures and Methods

The data collection was carried out through questionnaires/standard interview schedules, key informant interviews, focused group discussions, use of checklists, observations and photography, site visits, desktop environmental studies and scientific tests, where necessary in the manner specified in the Environmental (Impact Assessment and Audit) Regulations, 2003.

The ESIA Study was also carried out in compliance with the Government of Kenya's Environment Management and Coordination Act of 1999 and amendment Act of 2015, the Environmental (Impact Assessment and Audit) Regulations 2003, World Banks' Environmental and Social Performance Standards and Equator Principles among other relevant laws, regulations and guidelines standards.

The general steps followed during the assessment were as follows:

- Environmental screening, in which the project was identified as among those requiring Environmental Impact Assessment under schedule 2 of EMCA, 1999,
- Environmental scoping that provided the key environmental issues,

- Desktop studies,
- Physical inspection of the project location and the surrounding areas,
- ESIA Public participation via the use of questionnaires/ interviews/ meetings / focused group discussion,
- Data analysis,
- Report preparation.

1.4.1 Environmental Screening

This step was conducted through legal review and desktop studies to assess whether there will be a need for an environmental and social impact assessment, and what level of assessment is necessary. This has been done using a screening checklist in reference to requirements of the EMCA, 1999, and specifically the second schedule. Given the scale and the impact level of the proposed project, a full Environmental and Social Impact Assessment study was opted for, to ensure comprehensiveness and completeness of the assessment. Issues considered included the physical location, sensitive issues and nature of anticipated impacts.

Under the **Equator Principles** (**Principle 1: Review and Categorisation),** this project falls under **Category B** – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.

1.4.2 Environmental Scoping

The scoping process, through an ESIA scoping checklist, helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects. It also included discussions with key stakeholders, managers and design engineers as well as interviews with local communities.

1.4.3 Desktop Study

This included document review on the nature of the proposed activities, project documents, designs, policy and legislative framework as well as the environmental setting of the area among others. Key documents reviewed included the following:-

- The Final Report of the Preliminary and Detailed Engineering Design of Wajir- Mandera Road (B9), (2010) prepared by GIBB Africa Ltd was commissioned by the Government of Kenya (GOK), through the Ministry of Roads and Public Works (MORPW) on 2nd February 2007,
- Kenya National and County Laws,
- IFC Performance Standards and guidelines,
- Equator Principles,
- Applicable MEAs,
- Previous ESIA reports (if any) for the project.

1.4.4 Site Assessment

Field visits were made for physical inspections of the areas along the project site and the environmental status of the surrounding areas to determine the anticipated

impacts. The field visits were conducted from April-May, 2017. These visits were meant for primary data collection from the proposed road corridor.

1.4.5 Public Participation

To ensure adequate public participation in the ESIA process, questionnaires were administered to the local communities, leaders, and the information gathered was subsequently synthesized and incorporated into this ESIA Study Report. To ensure a full public participation as per **Principle 5 (Stakeholder Engagement) of the Equator Principles**, public/ consultative stakeholder meetings and focused group discussions were convened. The public participation exercise culminated in two public meetings, one in Rhamu town on the 3rd May, 2017 which was held at the sub-County offices while the other was held in Mandera town on the 4th May, 2017at the Red Sea hotel. The consultant incorporated the raised concerns and views of all stakeholders and the affected people in this ESIA Study Report from the public participation exercise.

1.4.6 Data Analysis, Reporting and Documentation

Data was quantitatively and qualitatively analysed. The Environmental Social Impact Assessment Study Report was compiled from the findings in accordance with the guidelines by, NEMA, Equator Principles, World Bank Performance Standards and other applicable Multilateral Environmental Agreements for such works and prepared and submitted by the proponent for consideration and approval. The Consultant ensured constant briefing of the client during the exercise. Description plans and sketches showing various activities forms part of the Appendices in this study report.

1.5. ESIA Organization and Structure

Based on the existing information, the ESIA study was carried out to full completion within a period of 30 days and processing estimated to take another 45 days from the date of undertaking. The Consultant (Lead Expert) coordinated the day-to-day functions and any related institutional support matters. Otherwise, all formal communications will be directed to NEMA through the proponent.

1.6. Responsibilities and Undertaking

The Consultant (Lead Expert) undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material as agreed with the proponent to ensure timelines are met as outlined in this NEMA approved TOR. On the site of the proposed project, the proponent provided some contact persons to provide information required for this study. The proponent provided a feasibility report and a map / preliminary designs showing the proposed road route and anticipated by-products, future development plans, operation permits and conditions, and site history. The output from the consultants includes the following:-

- An Environmental and Social Impact Assessment Study report comprising of an executive summary, study approach, baseline conditions, anticipated impacts and proposed mitigation measures.
- An Environmental and Social Management Plan, which also forms part of the recommendations of the study.

CHAPTER TWO: PROJECT DESCRIPTION

2.1 Introduction

The government of Kenya (GOK) through its road agency, Kenya National Highways Authority (KeNHA) has embarked on a pivotal infrastructure project to improve the 75km Rhamu-Mandera road to bitumen standard. The project is located in Mandera County and it is under the LOT 3 annuity project which also includes the improvement of the 68km Modogashe-Habasweini-Samatar road. The Rhamu-Mandera road is a 75km section of the 540km B9 road that runs from Modogashe town through Habasweini, Lagh Boghol, Leheley, Wajir, Elwak, Rhamu to Mandera town in North-Eastern Kenya (Figure 1-1 and 1-2). The Rhamu-Mandera road starts at Rhamu and navigates from west to East along the border of Kenya and Ethiopia terminating at Mandera town on the Kenya-Ethiopia-Somalia border. The existing road surface is gravel surfaced and in a poor condition with no bridges for river crossings. Geometrics of the current existing road will need to be improved because the road terrain is pre-dominantly flat with gently rolling sections thereby presenting drainage challenges.

Figure 1-1: Map of Kenya Showing the Rhamu - Mandera road (Circled)

(Source: Preliminary and Detailed Engineering Design of Wajir- Mandera Road (B9) Report by GIBB)

Figure 1-2: Google Earth View of the proposed Rhamu-Mandera road (*Source: Google Earth)*

2.2 Strategic importance of Rhamu - Mandera Road

The Rhamu - Mandera road is the major international link with the Republic of Somalia. It is therefore vital that the road should meet minimum international standards and its importance from security perspective cannot be overemphasized. Construction of this road to an all-weather standard will open up Mandera County. Security is still an issue of concern in most parts of this County and a bitumen road would enable the Government security personnel to offer rapid response whenever peace is threatened, either from within or from across the Kenya/Somalia or Kenya/Ethiopia borders.

2.3 Project Objectives

The Project roads are expected to meet the following objectives and service needs:

- Improve the region's road network.
- Reduce travel time and cost along and across the roads.
- Enhance the operational efficiency of the road.
- Promote economic growth within the region.
- Improve safety, security and reliability for all road users.
- Attract diverted traffic that will foster regional growth.
- Provide employment opportunities to local inhabitants, both during construction and during operations.
- Generate revenue both to the National and County Government.
- Foster business operations in the Northern Kenya.

2.4 The Physical Location

The proposed project is located in Mandera County (Figure 2-1). Mandera is a County on the North-Eastern side of Kenya. The County borders Ethiopia to the North, Somalia to the North-East, and Wajir County to the South. Its capital and largest town is Mandera town.

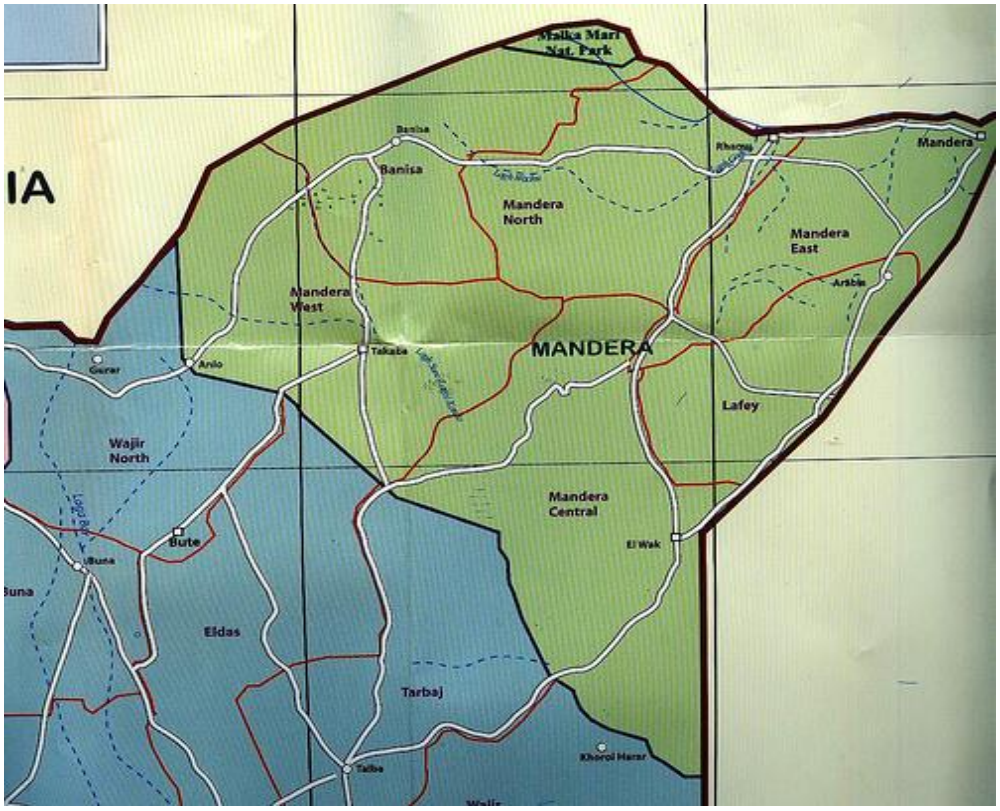


Figure 2-1: Mandera County Map (Source: Google)

The proposed Rhamu - Mandera road stretch will run along the border of Kenya and Ethiopia. The road will start at Rhamu town in Mandera County; Rhamu is a town located on the border of Kenya and Ethiopia. The road then stretches a distance of 75km to end at Mandera town, Mandera town boards both the Ethiopian and Somalia border. The coordinates of the starting point towns are presented in the table below.

TOWN	**COORDINATES**	
Rhamu	$03^{0}55.792'$ N	$041^{0}13.537'$ E
Mandera	$05^{0}55.150'$ N	$041^{0}47.875'$ E

The project area is characterized by low lying rocky hills located on the plains that rise gradually from 400 meters above sea level in the south at Elwak to 970 metres above sea level on the border with Ethiopia. The rest of topography is low lying, characterized by dense vegetation with thorny shrubs of savannah type. The road cuts a hilly terrain with steep gradient between Rhamu and Mandera. Mandera town is the highest point of the road at 400 meters above the sea level. The road terrain is properly cut out with a well-engineered alignment that is surfaced with a sand seal. The county is prone to

seasonal flooding during the rainy seasons which makes roads impassable. The main sources of water in the county are River Daua (Plate 2-1), shallow wells and water pans. The county is generally covered with young sedimentary rocks with loamy soils in the north bordering the Ethiopian highlands. The County has considerable deposits of Limestone and sand which are used in the local building industry.

Plate 2-1: A Section of River Daua *(Source: AWEMAC)*

2.5 Proposed Project Conceptual Design

2.5.1 Traffic Surveys and Analysis

The traffic class adopted was based on traffic studies provided in earlier design reports. Based on the poor state of the roads, relatively low economic activity and relative levels of insecurity occasioned by sporadic incursions by terror groups from neighbouring Somali, traffic had not changed significantly since the last survey. Traffic Class T3 was adopted for conceptual design.

2.5.2 General Proposed Project Design

The works to be executed under the Contract comprise the construction of approximately 75 km of single carriageway, two-lane 6.5m wide, bitumen surfaced road with 1.5m shoulders on each side from Rhamu - Mandera. The major items of Works to be executed under the Contract include the following:

- Setting out, referencing and taking cross sections;
- Site clearance and removal of top soil;
- Earthworks;
- Constructing drainage structures (box and pipe culverts including protection works);
- Construction of pavement comprising bitumen surfacing, cement stabilised base and improved material sub-base;
- Works necessary to effect the safe and convenient passage of traffic through the Works;
- Provision of road furniture e.g. signs, guardrails, marker posts, wire fencing, etc.;

- Operations ancillary to the main Works such as the construction of offices, laboratories and staff housing, accommodation works, diversion of services, the operations in quarries and borrow areas, the provision of water supply, the diversion of existing services.

The design of the road includes facilities such as lay-bays, bus bays and widening at market centers along the road. The typical road cross sections and the safety devices incorporated in the design are shown in the annexes.

2.5.3 Proposed Engineering Works

The following engineering works are proposed:

2.5.3.1 Design speed

A design speed for the section between Rhamu and Mandera is 100 km/hr was adopted. The design complies with the MORPW Design Manual's standard which specifies a design speed of 100-120 km/hr in level terrain.

2.5.3.2 Design for junctions

Where intersected by classified roads, junctions are designed according to the Design Manual Type B, with an island on the secondary road. A semi-trailer has been used as the design vehicle. For unclassified roads, the junctions are designed without the island on the secondary road. Other accesses are designed as simple junctions without the island and the compound curves.

2.5.3.3 Major Realignment

Realignment has been proposed at Rhamu for safety reasons in the town and to minimize resettlement of businesses in town center. Although some clan members were seriously opposed to the realignment, their concerns about bypassing the town have been addressed by proposing the provision of a bituminized loop through the town.

2.5.3.4 Minor realignments

Minor realignments have been effected in order to achieve the desired design speeds. In addition sections of the road are very straight and minor realignments have been effected to reduce the lengths of straights to less than 4 km and also to improve the road aesthetics. In general large radii 5,000-10,000 m have been used for these realignments.

2.5.3.5 Parking Bays

The project will provide parking bays for the existing market centers along the road.

2.5.3.6 Road Furniture

Edge marker posts will be provided at bridge approaches (where there are no guard rails), pipe culverts, sharp curves and at locations where sight distance requirements are not complied with, although these are very few on this road;

2.5.3.7 Road marking

Paint for road marking shall be internally reflectorized hot applied thermoplastic material (with Ballotini beads) in accordance with Clause 218 d (ii) of the Standard Specification. The Ministry of Public Works Materials Branch must approve this reflectorized paint inclusive of the Ballotini beads.

Warning signs will be provided and installed in accordance with the requirements of the Manual for Traffic Signs in Kenya, Part II;

2.5.3.8 Guardrails

Guardrail posts shall be made of concrete 210mm x 210mm x 1710mm set vertically at least 1.2m into the shoulder as directed by the Engineer. Beams for guardrails shall be "Armco Flex beam" or similar obtained from a manufacturer approved by the Engineer and tested to ensure compliance with AASHTO M180

Guardrails will be provided at bridge approaches, box culverts and high fills.

2.5.3.9 Permanent Road Signs

Permanent Road Signs shall be provided as directed by the Engineer and in compliance with the requirements of the "Manual for Traffic Signs in Kenya" Part II and Standard Specification clause 2004.

2.5.3.10 Junctions

A roundabout is the most viable junction at the start of the project. The main junctions incorporated in the project include:

- Km 280 B9/E2000 bypass through Ashabito
- Km 290 B9/D504 at Rhamu to Banissa and
- Km 315 B9/E846 at Rhamu to Malkamari.

The junctions will be either Type B or C depending on the class of the minor road.

2.5.3.11 Kerbs

a) Vertical Joints

Vertical joints between adjacent Kerbs shall not be greater than 5 mm in width and shall be filled with a mortar consisting of 1:3cement: sand by volume.

b) Transition between flush and raised kerbs

The transition between flush and raised kerbs (e.g. at bus bays) shall be termed as ramped kerbs. The transition between flush and raised kerbs shall occur within a length of 2.0 m.

c) Kilometer Marker Posts

Kilometer marker posts shall be provided as directed by the Engineer and in compliance with Standard Specification clause 2008.

d) Rumble Strips

Where directed by the Engineer, the Contractor shall provide, place, trim, shape and compact to line and level asphalt concrete rumble strips on the finished shoulders. This shall be done to the satisfaction of the Engineer

2.5.3.12 Temporary works

In addition to the permanent works described above, some temporary works will be undertaken to facilitate construction. These include:

- Diversion roads to allow passage of traffic to be maintained along the full length of the construction works;
- A work camp for accommodation, offices, services, stores, workshops and parking of vehicles;
- Production facilities such as concrete precast yard, timber and reinforced steel bending yards;
- Temporary stockpile areas to be set aside for delivered or double-handled materials such as aggregates and sand;
- Spoil areas for disposal of unsuitable or surplus materials.

2.5.4 Geometric Design

Horizontal and vertical design was guided by standards as contained in the MOR&PW Road Design Manuals (Part 1 &3) and Manual for Traffic Signs in Kenya (Part 1 & 2): construction specifications are in accordance with the MOR&PW Standard Specification for Road and Bridge Construction (1986).

Methodologies used in pavement design, earthworks, drainage and structures are in conformity with the latest international techniques to ensure economical use of available materials and a balance between capital and maintenance costs.

2.5.5 Materials Design

Pavement design carried out in accordance with MoW RDM Part III "Materials and Pavement Design for New Roads" 1987. Design considered pavement traffic loading expected during the design life, sub grade soil strength, and materials locally available for pavement construction including those for base, sub base and surfacing.

2.5.5.1 Gravel

Earlier design reports indicated numerous sources of gravel materials for road construction along the project road, many within 300m of the existing road.

The gravels selectively meet requirements for natural gravel sub-base and base, improvement with 2-4% of either lime or cement recommended.

2.5.5.2 Sand

Two river sand sources, one located 5km north of Rhamu and the other 5km north of Mandera were also found suitable. It is worth noting that separate EIAs for sand harvesting will be prepared for NEMA's approval. It goes without saying that sand

harvesting can present itself as a potential conflict source with the surrounding community should the harvesting endanger the water resource. Thus river bank protection and water conservation measures will be identified and implemented as construction project progresses, key among this being the monitoring of sand harvesting loads.

2.5.5.3 Water

It is expected that water pans and additional boreholes along the project road will be required during construction. Rhamu Town and Mandera Town could easily be served by identified by boreholes around Rhamu, Mandera and River Daua will also be a major water source. To forestall conflicts the project sponsors will see to it that project water needs will not compromise community water needs at existing water sources that the project might wish to utilize. As a requisite the project water requirements will be established prior to works commencement to ascertain the need for additional water points. Any additional boreholes will require separate EIAs to be approved by NEMA and water abstraction permits from WRMA.

2.5.5.4 Stone Sources

Between Elwak and Mandera the tonalities of Kubi Muchugureh meet the construction demand requirements for the Rhamu – Mandera road section.

2.6 Construction plant

The plant would have the following machineries for construction purposes.

- Cat D6 Bull Dozer or Equivalent with Dozer/Ripper attachment
- Cat 120H Motor Grader or Equivalent Complete with Scarifier
- Vibrating Roller (10 Tonnes)
- Hand Propelled Vibrating Roller 850 Kg
- Cat 950G Wheel Loader or Equivalent
- 10 Tonne Tipper Lorry
- 50 mm Delivery water pump and motor
- Concrete mixer 0.7m3/min.
- Concrete Vibrator (Poker Type)
- Tractor and Trailer

2.7 Quarries, Borrow Pits, Stockpiles and Spoil Areas

a. Provision of Land

The Contractor will make available any land for quarries, borrow pits, stockpiles and spoil areas, except for those areas in road reserves specifically approved by the resident engineer in collaboration with the local community. The contractor will be entirely responsible for locating suitable sources of materials complying with the Standard and Special Specifications and for the procurement, mining, haulage to site of these materials and all costs involved therein. Similarly the contractor will be responsible for the provision and costs involved in providing suitable areas for stockpiling materials and spoil dumps. Should there be suitable sites for spoil dumps or stockpiles within the road reserve

forming the site of the works the Contractor may utilize these subject to the approval of the Engineer. Important to note is that all borrow pit, workers 'camps, quarries and sand harvesting activity will require an EIA prior to their establishment.

b. Safety and Public Health Requirements

This is an integral part of the project especially during the construction phase. Warning and advisory notices, safety signage, drugs and condoms would be provided for throughout the project duration.

It has been observed that often, contractors overlook provision of appropriate and requisite number of warning, advisory and safety signage. It behooves the supervisory team to ensure that this is not the case on this project.

The contractor shall allow for qualified professionals to conduct awareness to the workers regarding the spread of HIV/Aids. Statutory trainings as provided in the Occupational Safety and Health Act, 2007 will also be conducted regularly to enhance workers 'safety skills.

c. Summary project activities

The major works to be executed under the Contract comprise mainly of but are not limited to the following:-

- Limited site clearance and top soil removal
- Earthworks
- Preparation of the sub-grade to receive the pavement layers as per the standard specifications.
- Provision of cement improved gravel for road sub-base of the specified thickness.
- Provision of cement stabilized gravel for road base of the specified thickness.
- Provision of a double surface dressing using 14/20 mm and 6/10 mm pre-coated class 4 chippings for both the carriageway and the shoulders. The shoulders shall be constructed with the same material and thickness as for sub-base, base and surfacing.
- Construction of culverts and other drainage works.
- Protection works using stone pitching and gabions as necessary.
- Relocation of services as necessary.
- Installation of kerb stones where instructed
- Provision of road furniture, including road marking and traffic signs.
- Landscaping including top soiling and grassing.
- Maintenance of passage of traffic through and around the works.
- Any other activity not listed above in either category but deemed to be necessary by the Engineer, shall be subject to the Engineer's formal instructions and within the mode of payment stipulated either by day works or on a measured basis.

2.8 Operation Phase Activities

This is the phase when the road has been commissioned. Most of the activities in this phase will involve monitoring of the activities of the project in line to the objectives of the

project. These will include repairs to destroyed areas, expansions, policy development and implementation and general maintenance of the road and the associated structures.

2.9 Decommissioning phase

Decommissioning refers to the final disposal of the project and associated materials at the expiry of the project life span. In respect to the road, decommissioning is not anticipated. However, it will be sustained in accordance to transportation demands of the project area.

Nevertheless, after the construction period, construction equipment and dismantled camp materials will be salvaged and removed from the site by the contractor.

2.10 Environmental Protection

The Contractor is supposed to ensure so far as is reasonably practicable and to the satisfaction of the responsible proponent agent ; that the impact of the construction on the environment shall be kept to a minimum and that appropriate measures as brought out in the ESMP are taken to mitigate any adverse effects during the construction. These measures shall include:

a) After extraction of construction materials, all quarries and borrow pits shall be back-filled and landscaped to their original state to the satisfaction of the Engineer. In particular those near the project road shall be back-filled in such a way that no water collects in them.
b) Spilling of bitumen, fuels, oils, lubricants and other pollutants shall be avoided and if spilt, shall be collected and disposed off in such a way as not to adversely affect the environment.
c) Long traffic diversion roads shall be avoided so as to minimize the effect of dust on the surrounding environment. In any case all diversions shall be kept damp and dust free.

2.11 Project Cost

The construction of the proposed Rhamu Mandera road project is estimated to cost approximately Kshs. 5,960,000,000.00.

CHAPTER THREE: BASELINE INFORMATION

3.1 Introduction

This chapter examines the baseline environmental, socio-economic and cultural characteristics of the route through which the proposed Rhamu-Mandera road will pass. The chapter provides information on the existing environmental conditions including sensitive areas that will be potentially impacted by the project. The objective is to document the status quo for the purpose of establishing and assessing the impacts of the project in future. The proposed road project area traverses in some parts of the former Northern Frontier District (popularly known as NFD) at independence that had a history of armed conflict between Kenya and Somalia Governments over its control. 80% of the population is nomadic.

3.2 Mandera County Socio-economic profile

3.2.1 Administration

Mandera County is one of the 47 counties in Kenya located in the North Eastern part of Kenya and borders Ethiopia to the North, Somalia Republic to the East and Wajir County to the South (Figure 3-1). It is about 1,100km from the capital city of Nairobi by road. The county has an approximate population of 1,025,756 and covers an area of 25,991.5 km^2 (Table 3-1). The County Administratively is sub-divided into six Sub Counties namely Mandera West, Mandera South, Banisa, Mandera North, Mandera East and Lafey and further into 30 administrative wards. The proposed road traverses through Mandera East Sub-county in Rhamu town and its environs and Mandera Central Sub-county in Mandera town and its environs.

Table 3-1: Area of the County and Sub-Counties

Sub-County	Banissa	Mandera West	Mandera East	Lafey	Mandera North	Mandera South	**TOTAL**
Area (Km^2)	3,356.1	4,778.5	2,797	3,378	5,533.5	6,148.4	**25,991.5**

Source: Mandera County Integrated Development Plan, 2013-2017

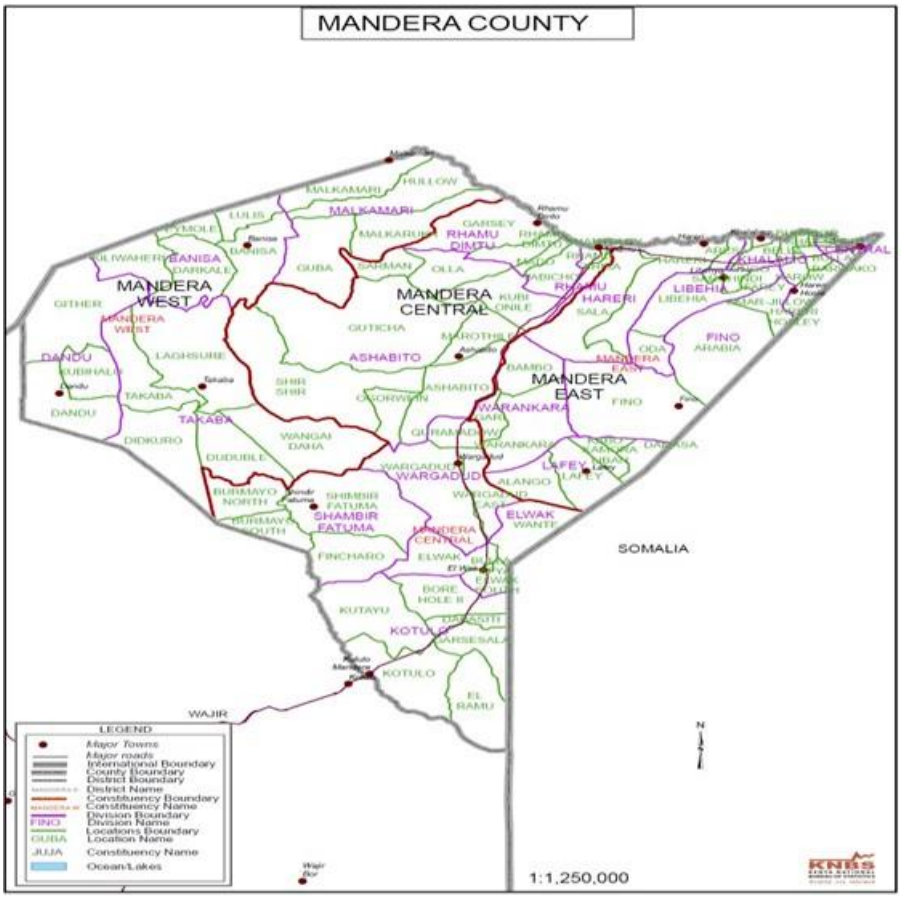


Figure 3-1: Map of Mandera County *(Source: Mandera County Integrated Development Plan, 2013-2017)*

3.2.2 Human population

The project area is mainly covered by ethnic Somalis who are traditionally nomadic pastoralists but now fall more into the category of agro-pastoralists as they practice some cultivation of staple crops - maize and beans along the Daua River. In the proposed project area, high human population is concentrated in Rhamu (14,161) and Mandera (30,208) towns (KNBS, 2009). The sections of the road between Rhamu and Mandera is characterized by six major villages/settlements and pockets of isolated households. Some of the villages are characterized by high human population while others have low population. Sala village which lies on $03^{0}55.974'$ and $041^{0}16.257'$ longitudes and latitudes respectively and a general elevation of 258m above the sea level has a total of slightly above 600 households. Household size in all villages is between 2-10 individuals. Qumbiso village which lies on $03^{0}54.313'$ and $041^{0}22.330'$ longitudes and latitudes respectively and a general elevation of 261m above the sea level has a total of at least 500 households. Sarohindi village ($03^{0}54.538'$, $041^{0}33.258'$, 262m) is half the size of Qumbiso with total of 250 households. few kilometres from Sarohindi village is a much smaller Farey village which houses approximately 100 households and lies on $03^{0}52.739'$ and $041^{0}36.020'$ longitudes and latitudes respectively and a general elevation of 256m above the sea level. The population in villages keeps on dropping (Figure 3-2) as one moves from Rhamu towards Mandera townas evidenced Caro village ($03^{0}53.568'$, $041^{0}40.650'$, 277m) which houses approximately 60 households. Garbaqoley village ($03^{0}54.209'$, $041^{0}44.818'$, 230m) is

close to Mandera town and has almost a similar household number as Caro village. Though all the six villages lie along the proposed road corridor, very few will be affected directly by the road construction works since cases of housing structures very close to the road corridor are isolated.

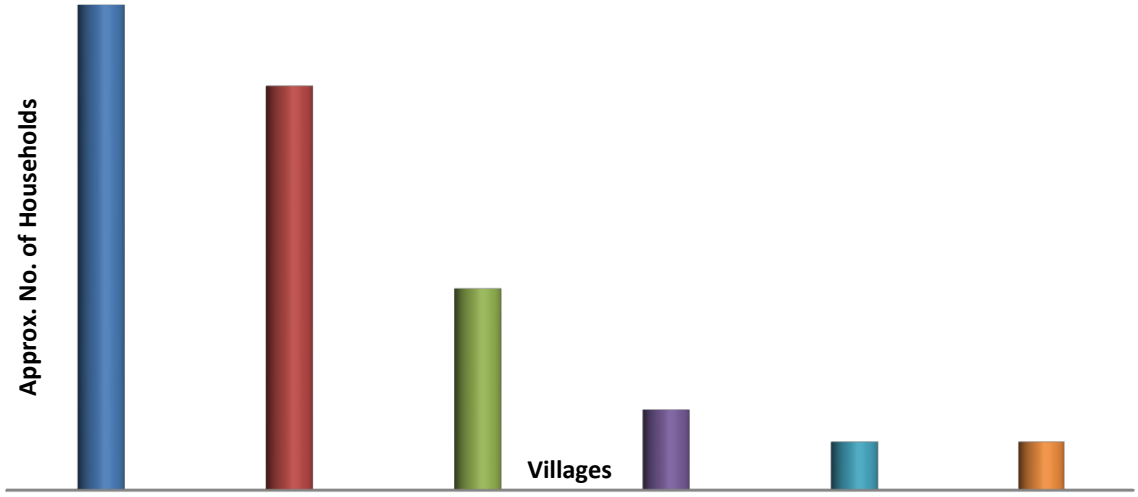


Figure 3-2: Households in six villages along the proposed road corridor *(Source: Mandera County Integrated Development Plan, 2013-2017)*

Generally, Mandera County has an approximate population of 1,025,756 (KNBS, 2009). Table 3-2, 3-3 and 3-4 below gives an outline of Population Projection by Age Cohort, population projections by urban centers and Population Distribution and Density by Sub-county respectively as per Mandera Integrated Development plan 2013-2017. The communities living along the proposed road project belongs to different social classes ranging from the low social class to middle. The ages ranges from the old 50-80 and younger generations of the ages 20 - 49. They are all Muslims and mosques are located at the heart of Mandera and Rhamu towns including in almost all the six villages.

Table 3-2: Population projection by age cohort

Age group	2009 (Census)			2012 (Projections)			2015 (Projections)			2017 (Projections)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	73,452	71408	144860	82528	80232	162760	92726	90146	182872	100215	97426	197641
5-9	105,648	92882	198530	118703	104359	223062	133370	117254	250624	144142	126725	270867
10-14	117,852	89587	207439	132415	100657	233072	148777	113095	261872	160793	122229	283022
15-19	84,291	52022	136313	94707	58450	153157	106409	65673	172082	115004	70977	185981
20-24	41,824	28024	69848	46992	31487	78479	52799	35378	88177	57063	38235	95298
25-29	21,325	27053	48378	23960	30396	54356	26921	34152	61073	29095	36910	66005
30-34	19,859	27492	47351	22313	30889	53202	25070	34706	59776	27095	37509	64604

35-39	17,806	25749	43555	20006	28931	48937	22478	32506	54984	24294	35131	59425
40-44	21049	18643	39692	23650	20947	44597	26572	23535	50107	28718	25436	54154
45-49	15183	11203	26386	17059	12587	29646	19167	14143	33310	20715	15285	36000
50-54	13628	7614	21242	15312	8555	23867	17204	9612	26816	18594	10388	28982
55-59	7221	3466	10687	8113	3894	12007	9116	4375	13491	9852	4729	14581
60-64	8603	3530	12133	9666	3966	13632	10860	4456	15316	11738	4816	16554
65-69	3166	1464	4630	3557	1645	5202	3997	1848	5845	4320	1997	6317
70-74	4330	2229	6559	4865	2504	7369	5466	2814	8280	5908	3041	8949
75-79	1461	954	2415	1642	1072	2714	1844	1204	3048	1993	1302	3295
80-84	3143	2385	5528	3531	2680	6211	3968	3011	6979	4288	3254	7542
85+ (NS)	102	108	210	115	121	236	129	136	265	139	147	286
TOTAL	**559,943**	**465,813**	**1,025,756**	**629,134**	**523,372**	**1,152,506**	**706,873**	**588,044**	**1,294,917**	**763,966**	**635,537**	**1,399,503**

The age cohort 0 – 19 years which is 67% of the total population is composed of infants and the school going-age. This implies that this population forms a high dependency ratio in the County compared to that of the aged which is 1.9% of the total population. The high population in the age cohort0-19 years will require the county to develop more infrastructural facilities particularly in the education and health sub-sectors to avoid straining the existing ones.

Table 3-3: Population projections by urban center

Urban Centre	2009 (Census)			2012 (Projections)			2015 (Projections)			2017 (Projections)		
	Male	Femal	Total	Mal	Femal	Total	Male	Female	Total	Male	F/ma	Total
Mandera	30,208	27,484	57,692	33,941	30,880	64,821	38,135	34,696	72,831	41,215	37,498	78,713
Elwak	13,125	11,243	24,368	14,747	12,632	27,379	16,569	14,193	30,762	17,907	15,340	33,247
Rhamu	14,161	9,876	24,037	15,911	11,096	27,007	17,877	12,467	30,344	19,321	13,474	32,795
Takaba	11,835	9,639	21,474	13,297	10,830	24,127	14,941	12,168	27,109	16,147	13151	29,298
Total	69,32	58,24	127,57	77,89	65,438	143,33	87,522	73,524	161,04	94,590	79,46	174,05

Table 3-4: Population distribution and density by constituency/sub-county

Constituenc	Area	2009 (Census)	2012 projections	2015 projection	2017 projection

y / Sub-County		populatio n	Density	Population	Densit y	population	density	Population	density
Mandera South	6,180.7	247,619	40	278,216	45	312,595	51	337,842	50
Mandera North	5502	169,675	31	190,641	35	214,198	39	231,498	42
Mandera	2,797	178,831	64	200,929	72	225,757	81	243,990	87
Lafey	3,377.1	109,856	33	123,431	37	138,682	41	149,884	44
Mandera	4,778.5	161,701	34	181,682	38	204,132	43	220,619	46
Banissa	3,356.2	158,074	47	177,607	53	199,553	59	215,670	64
TO TAL	**25,991.5**	**1,025,75**	**39**	**1,152,506**	**44**	**1,294,917**	**50**	**1,399,503**	**54**

Mandera East that hosts the County headquarters at Mandera Town is the most densely populated constituency with 72 persons per square Kilometer that is project to be 81 and 87 persons per square kilometer in 2015 and 2017 respectively. Mandera North is the least densely populated constituency with 35 persons per square kilometer that is projected to be 39 and 41 persons per square kilometer in 2015 and 2017 respectively. Population distribution in the county affects infrastructure development and provision of social amenities.

3.2.3 Human settlements and urban centers

There are six markets/urban centers in the county namely Rhamu, Elwak, Takaba, Banissa, Mandera and Lafey. The proposed road project will only affect Rhamu and Mandera towns. The proposed Rhamu-Mandera road will start at least 1km to Rhamu town proposed geometric design running off the town for the primary road and service roads designed to run through the town and six villages before terminating at point N05^{0}55.150' E041^{0}47.875' at the outskirts of Mandera town. The starting point of the road has another road upgrading project (Plate 3-1) towards El Wak and the terminating point, also, has a similar project that traverses through Mandera town. The six villages are clusters of Manyattas intermixed with isolated permanent and semi-permanent structures.

It is important to note that most settlements in the road alignment are determined by availability of water especially where the County Government and other stakeholders have sunk boreholes and constructed earth pans. The pastoralist homesteads are found in the six villages, which may sometimes double as administrative units. For instance, Sala village serves the Ward administrative center. It is expected that the proposed project activities may create more water points especially where the proponent will drill boreholes and borrow pits that that may later act as water collection points. Residents of the six villages were of the opinion that the proponent should concentrate new water points within the vicinity of the existing villages to avoid mushrooming of other villages.

Plate 3-1: A different tarmacked road upgrading project at the starting point of the proposed Rhamu – Mandera road (Source: AWEMAC)

Along the proposed road corridor, the main urban centres are Rhamu (N03^{0}55.792' E041^{0}13.537') and Mandera (N05^{0}55.150' E041^{0}47.875'). The two urban centres are characterized by high concentration of human settlements. If the proposed road passes through Rhamu town, few permanent and temporary structures (Plate 3-2) will be affected. It is, however, important to note that the owners of the building structures are aware that they are on the road reserve and as such are willing to vacate to pave way for the road construction.

Plate3-2: Temporary structures constructed on road reserve in Rhamu town (Source: AWEMAC)

In the six villages between Rhamu and Mandera town, all existing permanent human settlement structures are not within the proposed road corridor. This implies that no demolition of such structures will be expected. However, in Sala village (03^{0}55.974' , 041^{0}16.257', 258m), the parking lot for Sala Palace hotel (Plate 3-3) may be affected to pave way for road leave way. Typically, the permanent structures will be majorly

affected by short-term negative impacts such as dust, noise, vibrations amongst others. These impacts can be mitigated appropriately.

Plate 3-3: Sala Palace whose parking lot might be affected (Source: AWEMAC)

Several temporary human settlement structures exist in the six villages. Most of these structures serve as temporary hotels and groceries for local residents. The owners of such structures are willing to voluntarily relocate them once the project starts. Since they are temporary shanties, the cost of their demolition and relocation is minimal and hence the impact minimal (value of 1). A case of such temporary structures to be demolished to pave way for the road construction is in Qumbiso village (03^{0}54.313', 041^{0}22.330', 311m) where some structures extend to existing road drainage areas (Plate 3-4).

Plate 3-4: Temporary structures on road reserve in Qumbiso village (Source: AWEMAC)

3.2.4 Infrastructure and Access

Lack of basic Infrastructural development, particularly all-weather roads amongst others creates economic hardships for the local population. It is however, important to note that since the introduction of the County system of governance, the County government of Mandera is investing a lot of resources in infrastructure development. The County has four airstrips as discussed below. The main infrastructure in Mandera County include:

3.2.4.1 Roads

According to the County integrated Development plan, the County has a total of 1,884.5km of road network. Before the County system of governance was introduced in 2013, there was no bitumen road in the entire Mandera County. However, several sections of major roads including the road network in Mandera town are being upgraded. The gravel surface covers an approximate length of 494.5 km while earth surface covers an approximate length of 1390km. The proposed upgrading of the Rhamu-Mandera road (Plate 3-5) to bitumen will greatly increase bitumen surfaces in the County. The county has neither rail network nor sea/lake ports. The county is served by four (4) functional airstrips in Rhamu, Elwak, Mandera and Takaba. There are other 4 non-serviceable airstrips in Malkamari, Arabia, Banissa and Lafey.

Plate 3-5: Current status of sections of the Rhamu-Mandera road proposed for upgrading (Source: AWEMAC)

Animals are widely used in the area for transport purposes. Donkeys (Plate 3-6) and camels in particular, are used to transport goods to and from the market centers and for fetching water and firewood. In addition, when shifting to new grassing areas, the camels are used to carry luggage over long distances.

Plate 3-6: A donkey transporting water in Rhamu town (Source: AWEMAC)

3.2.4.2 Postal and Telephone Services

Postal services are available in Mandera and Rhamu towns including the six villages. From these areas letters can be delivered to individual rented Post office box numbers. The areas are served by Subscribers Trunk Dialing telephone facilities. In addition, Safaricom and Airtel have provided mobiles phones services coverage across several sections within the project road. For instance Plate 3-7 below show Safaricom and Airtel booster masts for Qumbiso village ($03^{0}54.313'$, $041^{0}22.330'$)

Plate 3-7: Telecommunication services at Qumbiso village along the proposed road alignment (Source: AWEMAC)

3.2.4.3 Electricity Supply

Electricity supply in Rhamu and Mandera towns is supplied by diesel generators located within the towns. All the other centers use wood fuel, kerosene and diesel for lighting. Wood fuel is mainly inform of charcoal and firewood obtained from the expansive savannah woodland vegetation that characterize the road alignment. The County has invested in solar energy as evidenced by solar plants (Plate 3-8 and 3-9), solar street lights and wind mills in several sections of the proposed project area.

Plate 3-8: A solar plant in Mandera (Source: AWEMAC)

Plate 3-9: Electricity supply and solar street lighting in Rhamu town

3.2.5 Economic Activities

The main economic activity in the project area is livestock keeping. Camels, donkeys, goats, sheep and cattle are the main livestock reared in the County. The major livestock breeds in the project area are cattle (Borana and dairy crosses), sheep (black head Persian), goats

(Galla and Totenberg) and camel (dromedary). The livestock farmers practice nomadic pastoralism.

Other economic activities in the project area include horticulture farming in a small-scale and quarrying, sand harvesting, oil exploration that constitute the main ongoing mining activities undertaken in the county. Oil exploration is currently being undertaken in Ashabito and Kotulo in Mandera North Constituency by multinational companies to ascertain its viability. The County has small scale agriculture production with small scale farmers engaging in horticulture farming. Mangoes, pawpaw, onions, kales and bananas produced locally are sold in the local market. As a result of devolution, Mandera County has attracted many investors who have invested in hotels, transport, banks and other small businesses.

3.2.6 Education

At the proposed project area and the larger Mandera County, the level of illiteracy is high with few people having attained even the primary level education. Efforts to take children through the formal education in the project area is made difficult by pastoralism. Though the government has tried to concentrate schools in the villages, sometimes residents are forced to move out in search of pasture especially during periods of severe droughts. As parents shift in search of water, they take their children away from schools. The agro-pastoralist community living along the Daua River cultivate the flood plains, which in some areas extend 2.5 kilometres perpendicularly to the river edge. The income realized from these activities is used to cater for school fees among other basic needs.

In Mandera County, there are 175 public primary schools, 32 public secondary schools and ten private secondary schools and three operational youth polytechnics and one mid-level College that offers Diploma and Certificate courses (Mandera County Integrated Development Plan, 2013-2017). Mandera County has no Public University. The county has no public college but has two private colleges Border Point Teachers College and Maarifa College. Mandera County has a total of five Youth Polytechnics namely Mandera East YP, Takaba YP, Elwak YP, Banisa YP, and Fino YP.

Along the proposed road corridor, majority of educational institutions are situated in Rhamu and Mandera towns and very few in some of the six villages. Each of the six villages (Sala, Qumbiso, Sarohindi, Farey, Caro and Garbaqoley) has a primary school but no secondary school. No tertiary institutions and village polytechnics in the six villages. The level of education in the six villages is generally low characterized by high prevalence of primary school drop outs and low transition from primary level to secondary. It should, however, be noted that none of the educational institutions in the towns and the villages will be affected by major and long term negative impacts. However, institutions near the road such as Matarajio Junior Academy (Plate 3-10) in Rhamu will be affected negatively by short term impacts such as noise, dust amongst others.

Plate 3-10: Matarajio Junior Academy near the proposed project area (Source: AWEMAC)

3.2.7 Health and Sanitation

According to Mandera County integrated Development Plan, there are six Level IV facilities in the county, nine level III facilities, 24 Level II facilities, six Nursing homes and 60 Private clinics. The doctor/population ratio is 1:114,000 while the nurse/population ratio is 1:25,000. At the proposed road project corridor, health facilities are concentrated in Rhamu and Mandera town. In the six villages, only two (Sala and Qumbiso) have dispensaries. In Sarohindi village, residents have to walk for at least 2hours to access health services while residents of Farey village have to walk over 15km to access the same. At Caro village, the nearest dispensary is Khalalio which is 4 hours walk while residents of Garbaqoley have to walk to Mandera town to access health service. Surprisingly, rarely use medicinal herbs to cure illness. Malaria followed by typhoid is the common diseases in the proposed road corridor. Other problematic diseases include upper respiratory infections, intestinal worms, skin and eye infections and rheumatism. The proposed project area is a mosquito infested zone due to low altitude, high temperatures and presence of ideal breeding grounds for mosquitoes. It is expected that the proposed road project will open up the region especially the villages and make health services accessible to all.

Mandera and Rhamu town generates substantial liquid and solid wastes. Major buildings in the two towns have liquid waste management structures such as septic tanks among others. In Rhamu and Mandera towns, both legally and illegally designated solid wastes disposal points exists where waste is generally disposed by burning. In the six villages, negligible liquid waste is generated. This is attributed to the fact that water is a major challenge in all the six villages characteristic by maximum utilization of any available water. In the six villages, plastic wastes mainly polythene papers and plastic bottles are the solid wastes. Generally, there is no system of managing the solid wastes in the villages but isolated cases of disposal by burning exist. At the County level, 82.2% of households use burning as the key waste disposal method, 12.2% use garbage pits, 3.9% use public garbage heap, 0.8% dispose by using private firms, 0.5% by local authorities while 0.4% by neighbourhood community groups.

3.2.8 Energy sources

From ground surveys, it was evident that the main source of energy in Rhamu and Mandera towns is charcoal and fuel wood for cooking/heating while electricity/kerosene is used for lighting. Residents of the six villages use fuel wood as the main source of energy since it is cheap and readily available. In Rhamu and Mandera towns, the County government has invested in renewable energy by installing solar lights (Plate 3-11) for street lighting.

Plate 3-11: Solar power street lights at Rhamu town (Source: AWEMAC)

At the County level, the main source of energy is firewood, which is used by 95.6% of the house holds for cooking (Mandera County Integrated Development Plan 2013-2017). Mandera East, Mandera North, Mandera South and Mandera West Sub-County headquarters have electricity supply. New electricity coverage is being extended to Lafey and Banissa Sub-counties.

3.2.9 Land Tenure System

In Kenya land is categorized as public, private or community Land. Mandera County has an area of 25,991.5 km^2. The road alignment traverses community land in Mandera County. Community land in Kenya is vested in the community. In this respect, the term "community" has been defined to mean a consciously distinct and organized group of users of community land who are citizens of Kenya and share any of the following attributes: common ancestry, similar culture or unique mode of livelihood; socioeconomic or other similar common interest; geographical space; ecological space; or ethnicity.

The land tenure system is the area that is governed by the Community Land Act 2016. The tenure system is customary tenure. The land is not yet registered as provided for under the Community Land Act 2016. Under such circumstance of unregistered customary land, the land is held in trust by the County governments on behalf of the

communities. Any compensation for the land or investment in it is handled by the County governments on behalf of the communities.

The proposed road designed at the preliminary stage passes through the already existing road alignment. In the rural areas there may be no any direct effect on physical properties of the communities. However in the urban and trading centers communities have put residential and commercial properties along the road for instance in Rhamu town. In this town, property and businesses for communities may therefore be affected by the road reserve and construction. However, it is proposed that the detailed geometric design will consider relocating the main road off the town/settlement area so as to achieve a 60m road reserve whilst putting in place a design for service roads within the town. The image maps in Figure 3-3 shows the buildings that may be affected by the road the 60 meters road reserve. A resettlement and compensation plan will not be required taking into consideration the proposed main road (highway) re-alignment. To get an understanding of the social impact of the highway within the present road alignment, a preliminary census of structures likely to be affected presented in Chapter six of this report presents findings of the various structures to be affected. Within town, a 25m road reserve was considered.

Figure 3-3. Satellite image of Rhamu Town indicating the effect of the Road Reserve on Buildings (Source: Google)

3.2.8.1 Land Use and Cover

The area is characterized by low lying rocky hills located on plains that rise up to 970 meters above sea level on the border with Ethiopia. The major land cover types are grasslands, shrub lands, and riverine forest. The main land use is livestock grazing as main livelihood of the people is nomadic pastoralism. Cattle, goats and camels are kept for subsistence use and for sell at the trading centers. There is urban land use in Rhamu and Mandera towns. There is also crop cultivation along River Daua .The river covers a distance of about 150 km along the Kenya –Ethiopia boundary. The source of the river is the Ethiopian highlands and flows through Malkamari, Rhamu, Libehaley, Khalilio and Mandera towns.

The road alignment follows closely the River Daua. The river is the only permanent source of surface water in the area as there are no lakes, swamps and dams. Earth pans and groundwater are the other sources of water. Mandera County is characterized by dry river beds (Laghas) which get filled up by run-off water in the rainy season but dry up as soon as the rain ceases. The availability of water and vegetation along the river attracts the settlement of people and livestock.

There is a marked relation between topography and economic activities along the River Daua. The riverine area that lies above 970 meters above sea level is suitable for livestock and subsistence farming. During the rainy seasons a lot of farming activities take place in the higher grounds of the catchment where maize and millet are grown. Along the river a lot of agriculture activities are practiced using irrigation. This is the only area in Mandera County which is classified as medium potential for agriculture. During the dry seasons livestock depends heavily on the areas near the river. Plate 3-12 below shows watering of livestock along the Daua River.

Plate 3-12: Goats Drinking Water at River Daua (Source: AWEMAC)

Because of sparse vegetation, bare lands and hilly terrain along the road alignment, the area experiences one of the highest soil erosion and land degradation rates in Kenya. Figure 3-4 below represents the land degradation in Mandera County. It is therefore important that the road construction and earth work movements to consider implementing appropriate mitigation measure.

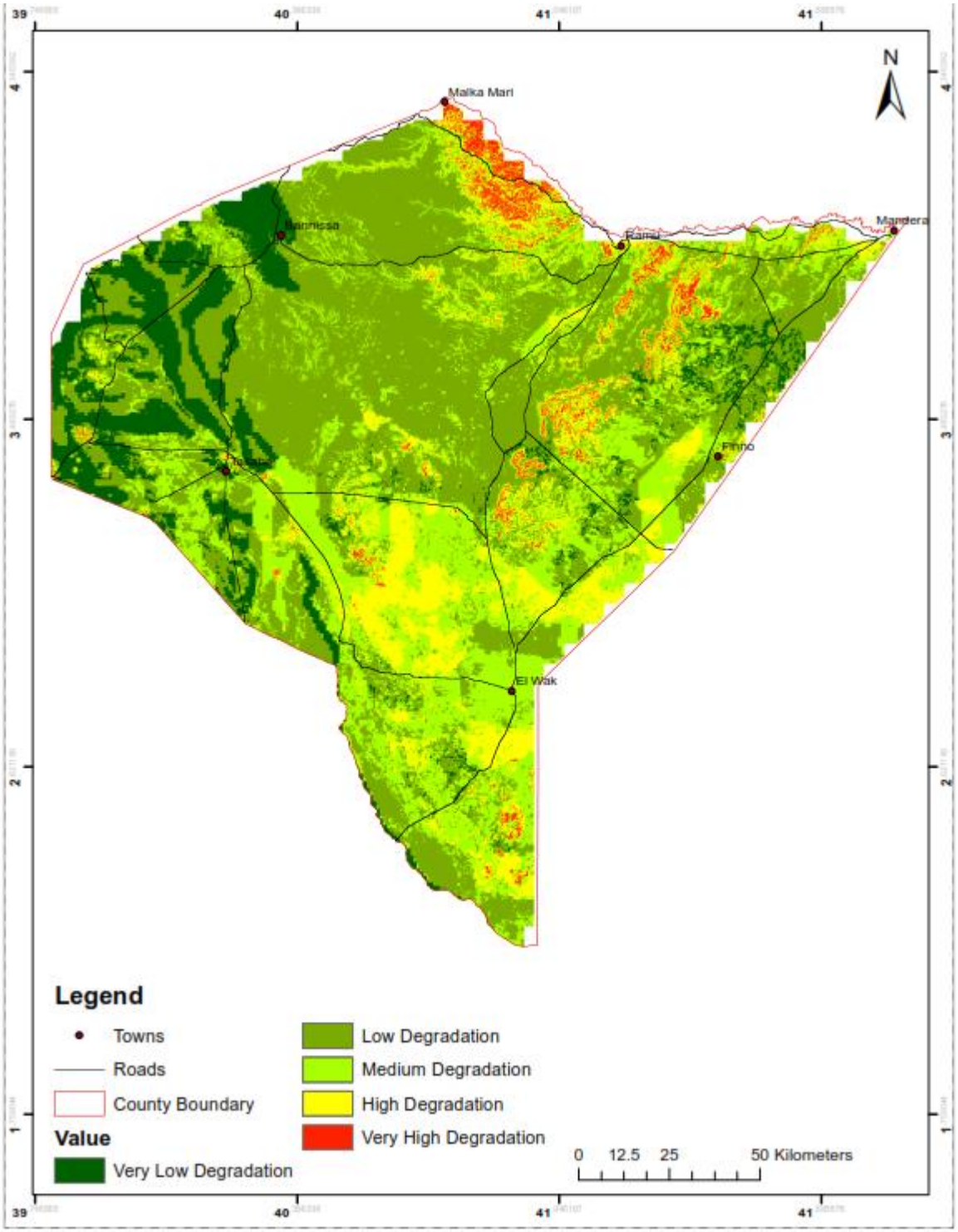


Figure 3-4: Land Degradation Map of Mandera County

3.2.8.2 Pastoralism

Nomadic pastoralism is the most prominent land use and livelihood source in the project area covering more than 90% of land-use in the proposed project area and the larger Mandera County due to the arid nature of the area. Over 90% of the total population depends on livestock and livestock products for their livelihood. The people of the proposed road alignment and the larger Mandera keep 5 kinds of livestock that is

cattle, sheep, goats, camels and donkeys (Plate 3-13). Based on the interview done in Mandera and Rhamu towns including the six villages, goats and sheep are the common livestock kept in the proposed project area. Donkeys are kept as beasts of burden given the migratory nature of the local people mainly for transporting water and fuel-wood.

Despite the extensive land, pasture sometimes affects pastoral activities. During drought seasons, the nomads move their animals over long distances in search of pasture and water. The recurring drought accelerates the existing web of economic, social and security problems in the region and has the potential of creating serious problems at the national level. It has impacted negatively on livestock production forcing the people to liquidate their only source of income to maintain them and restock when conditions improve. At the proposed road alignment, loss of livestock especial goats and sheep to hyenas is a major challenge to livestock production. Despite many incidences of livestock loss to wild game, the local people rarely report the cases to KWS.

Plate 3-13: Livestock along the proposed road alignment (Source: AWEMAC)

Meat and milk forms the staple diet of the people. Pasture and water influence the migratory nature of the pastoralists. Livestock movements and grazing are not controlled since the land is community owned. However areas that have permanent water points have higher livestock concentrations like Mandera and Rhamu towns. The main buyers of livestock are local traders who transport them mainly to Nairobi and the other urban centers for slaughter. Local people walk long distances with livestock (Plate 3-14) to the main livestock auction market in Mandera town. The local traders also sell them to middlemen. The middlemen control the market. Livestock products like milk and meat are sold locally except hides and skins which are exported and earn substantial amount of income to the locals.

Plate 3-14: Camel along Rhamu-Mandera road enroute to Mandera livestock auction market (Source: AWEMAC)

3.2.8.3 Crop growing

The proposed road alignment falls under Mandera East and Mandera Central Sub-counties which are classified under LM (IV-VI) agro ecological zone. This zone is predominantly pastoral. In the context of agricultural production land suitability for crop production is limited to availability of water hence the concentration of crop production activities along river Daua and other places with laghas where water settles. Generally the soils in most parts of the county are fertile since they have not been exploited. There are a few areas with soil salinity and sodicity where arable crop production cannot be practiced. Under irrigation 4000ha is exploited but the potential area is 15,000-20,000ha. Most of the area under irrigation is along Daua River with silt providing fertile soil for agriculture. Assorted cereals, legumes, vegetables, fodder and fruits are grown under irrigation along the river. For instance, at point (03054.313', 041022.330', 195m) along the banks of Daua River and at the outskirts of Mandera town, small plantations of Bananas (*Musa acuminata*), Napier grass and Mangoes (*Mangifera indica*) exists (Plate 3-15). It is important to note that most of the vegetables and fruits consumed in Mandera town originate from farmlands along Daua River.

Plate 3-15: Irrigated agriculture along Daua River in the project neighborhood (Source: AWEMAC)

Under rain-fed agriculture, the exploited area is very low considering that reliability of rainfall is below 30%. Pockets of small farmlands under rain-fed agriculture exist along the proposed road alignment. It is important to note that these pockets are restricted to areas prone to lowland areas subject to seasonal flooding during heavy storms. For instance, point 03055.687', 041017.307', 254m), small maize farms (Plate 3-16) exist. A seasonal stream discharges water to the area making it appear like a small flood plain. There is need to focus on increasing area under irrigation by developing irrigation infrastructure and exploiting ground water sources. There is also need for sustainable land use practices and environmental conservation in the county.

Plate 3-16: A small maize farm along the proposed road alignment (Source: AWEMAC)

3.2.10 Trade

The proposed road project is a major traffic distributor not only in Mandera but also the larger North Eastern region. Therefore, the road is a strategic regional route which

feeds traffic into other lower class roads which in most cases branch off the road at major towns and market centres. The road traverses fully built up areas within Mandera and Rhamu Townships but the road reserves are free of encroachment apart from temporary structures and service lines such as overhead telephone cables, power lines and water pipes. Rhamu and Mandera towns are the two strategic trading zones in the proposed project area. Main trading activities include livestock auction markets, large and small scale businesses, hospitality industry, transport, *jua kali* workshops amongst others. Small scale trading activities exist in the six villages along the road alignment. Upgrading of the road to bitumen standards will greatly open the area and promote trading activities.

3.2.11 Gender and inequality

According to Mandera County Strategic Development plan 2013-2017, the female population is slightly lower than that of men (80:100). the female gender have limited access to economic assets and there exists negative cultural practices that hinder females from fully participating in the development activities and decision making. Men take leading roles in making major decisions.

The enrolment rates for both primary and secondary school show higher figures for boys than those of girls. The dropout rate for girls at secondary schools level is higher than that of boys. The completion rate for girls is equally lower. This is due to the communities preferring to educate males to females in spite of the great potential of women to contribute towards economic growth. This constraints the economic empowerment of women and predisposes young women to economic dependence and early marriages. The county government of Mandera is however, trying to bridge the gender gap by offering job opportunities to the female gender though the number is below the constitutional requirement of one third.

3.3 Physical environment

3.3.1 Climate

3.3.1.1 Temperatures

The proposed project area falls under ASALs characterized by high temperatures and unreliable rainfall regimes. Temperatures are relatively very high with a minimum of 24oC in July and a maximum of 42°C in February (Mandera County Integrated Development Plan, 2013-2017). Variation in altitude brings differences in temperatures across the entire road alignment and the larger Mandera County where places near Banissa Sub-County experiences low temperatures due to neighboring highlands in Ethiopia.

3.3.1.2 Rainfall

The neighborhood of some sections of Rhamu - Mandera road corridor is characterized by raising hilltops forming key relief feature at the project area. The hilltops experiences relatively high rains and acts as catchment areas for most of the streams downstream of the proposed project site. The region traversed by the road has two wet

periods; the long rains which peak in November and the short rains which peak in March. Rainfall is scanty and unpredictable averaging 255mm. On average there is no rain between June and September, and the moisture index is designated as arid. Most parts of the county experiences long hours (approximately 11 hours) of sunshine in a day. This causes high evaporation rates thus causing withering to most of the vegetation before maturity. The continuous sunshine in the county has a potential for harvesting and utilization of solar energy.

3.3.2 Topography

The proposed road alignment traverses a terrain of changing elevation where the topography slopes gently from Rhamu 285m above the sea level to Mandera 216m above the sea level. However, at the neighbourhood of Quimbiso village, the elevation raises sharply at Qumbiso village (03054.313', 041022.330') reaching 311m above the sea level before dropping gently towards Mandera town. The high elevation areas are characterized by low lying rocky hilltops (Plate 3-17). The hilltops adjoin the neighborhood Ethiopian highlands at the border of the two countries. According to Mandera County Integrated Development plan, the County is generally characterized by low lying rocky hills located on the plains that rise gradually from 400 meters above sea level in the south at Elwak to 970 meters above sea level on the border with Ethiopia. The rest of topography is low lying, characterized by dense vegetation with thorny shrubs of savannah type. This is especially found along foots of isolated hills, and the area are covered by bushes, shrubs, boulders and invasive *Prosopsis juliflora* (mathenge) coverage. The flat plains make drainage very poor, causing floods during heavy rain downpours.

Plate 3-17: Higher elevation sections of the proposed road alignment (Source: AWEMAC)

3.3.3 Soils

Generally, the soils in most parts of the county are fertile since they have not been exploited. There are a few areas with soil salinity and sodicity where arable crop production cannot be practiced. Presence of saline soils in most parts of the county greatly pose a challenge for crop farming. Silt especially along river Daua provides fertile soils for agriculture. However, efforts to practice irrigation along the river face major drawbacks during flood seasons. In sections of the proposed road alignment characterized by hilly elevation and rock outcrops, soil profiles (Plate 3-18) showed layers of loosely packed rocks suitable for construction works. Generally, from the geological formation, the soils along the Rhamu – Mandera alignment are mainly from sandy loam to sandy clay loams extending from 1.0 m up to 15 m and very small rock out crops. The soil drainage characteristics have been classified in accordance with the TRRL Report 706 classification, reproduced in Table 3-5 below.

Table 3-5: Soil permeability classification

Soil class	Description
Impeded Drainage	Very low permeability. Clay soils with high swelling potential. Shallow soils over largely impermeable layer, very high water
Slightly impeded Drainage	Low permeability. Drainage slightly impeded when soil fully wetted.
Well drained	Very permeable. Soil with very high infiltration rates such as sands, gravels and aggregated clays.

Source: *TRRL Laboratory Report 706, Transport and Road Research Laboratory, Department of Environment, UK, 1976.*

Plate 3-18: Soil profiles showing loosely packed rocks in sections of the project area (Source: AWEMAC)

3.3.4 Geology

According to geological studies by Joubert, P (1959 and 1960); Thompson and Dodson (1960); Miller, J (1955) and Baker, B (1958), the geology along the project road is composed mainly of the following rocks:-

- Triassic rocks represented by the Mansa Guda Formation mainly unfossiliferous sedimentary sequence of sandstones, quartzite and conglomerates;
- Jurassic rocks mainly limestone with intercalated shale, ranging in age from Lias to Tithonian;
- Cretaceous rocks represented by Maheran series mainly siltstones and flaggy fine grained sandstones overlain by a thick formation of cross bedded sandstones;
- Basement System rocks mainly sandstones, shale and limestone that have been metamorphosed heat and pressure or by impregnation by providing fluids;
- Quaternary sediments of Pleistocene and Recent age widely represented in the area.

The regional dip of the Jurassic sediments is normally 10^0 to 20^0 to the southeast and that of Marehan series 30^0 to the south-south-east. In parts, the dips have been disturbed by subsequent mild folding and by intense faulting. Faults and folds have disturbed the formation within the area. The anticlines are often fractured along their crests with the fractures dipping at steep angles to the southwest. Several regional fault systems, folds and fractures cross the Daua river basin. Further, some contact zones are controlled by faults.

3.3.5 Water resources and General Hydrology

In Mandera County, the notable hydrological features are the seasonal laghas, River Daua, Banisa borehole and other water pans that around Rhamu and Mandera areas. The main river in the project area is the Daua which drains the Ethiopian hills and mountains as shown in the figure 3-5 below. Most of the flowing water resources and laghas have a North Easterly directional flow into River Daua which flow eastwards to Somalia. During the rainy season, there are several seasonal swamps/temporary wetlands that form from Didima, Gudediye, Gingro, Hafadi, Jirma, Shafshafe to Handadu. These swamps and drainage serve as dry season grazing zones at the same time allow some cultivation for extended periods of time. During the rainy season water collects in the earth dams forming water points for the locals and their livestock. Percolation of water in the sandy flood plains and subsequent low evaporation rates provides water for the local communities during much part of the year.

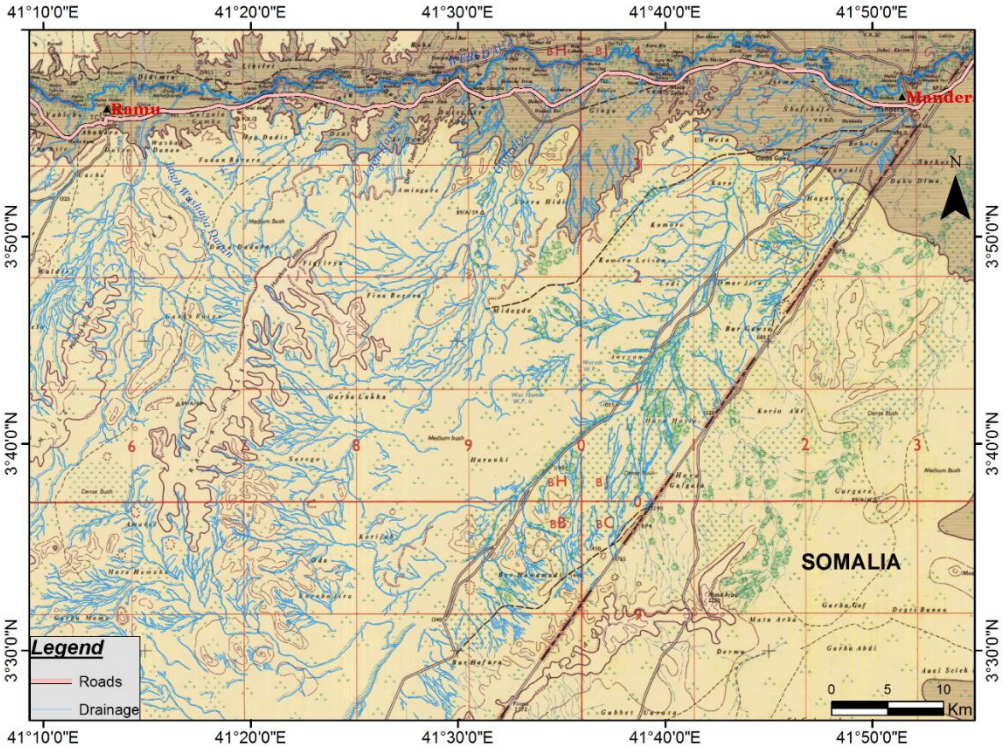


Figure 3-5 Map of the North Eastern part of Kenya showing the major roads (Rhamu-Mandera section), river Daua and the general drainage

The proposed road alignment traverses a region with limited water resources and water loss through evaporation which is extremely high due to the climatic conditions in the area. Boreholes, roof catchment, ponds, earth pans, protected dug wells and unprotected dug wells, streams and rivers are the main sources of water at the proposed project area and its environs. According to the Mandera County Integrated Development Plan 2013-2017, water from most of these sources are of poor quality and residents are always advised to treat the water before consumption. Daua River ($03^{0}56.827'$, $041^{0}49.916'$, 195m) and boreholes are the only reliable sources of water. Water from Daua River (Plate 3-19) is not only used for domestic purposes but also irrigation. The river recharges shallow boreholes at its banks. For instance three shallow boreholes (20 – 30 m deep) drilled on the banks of the Daua River provides a combined yield of approximately $54m^3$/hr. These shallow boreholes provide clean and adequate water to residents of Mandera town and its neighborhood. Water bowsers ferry the water from the shallow boreholes and distribute it to various areas. Water samples from Daua River were taken for laboratory analysis and results presented and discussed in this section.

Plate 3-19: Sections of Daua River near Mandera town (Source: AWEMAC)

It is important to note that Daua River maintains extremely high flows during rain seasons at times breaking its banks. During dry seasons, the river maintains moderate to low base flows occasionally drying up in the months of September and February. The river has a big catchment characterized by extensive stream network. The stream network comprises of major and minor seasonal streams that originate from the hilltops at the neighborhood of the proposed road alignment. Between Rhamu and Mandera towns, over 10 seasonal streams pass across the road. Out of these streams only three situated at points ($03^0$55.8955', $041^0$16.196', 255m), ($03^0$53.825', $041^0$25.077', 273m) and ($03^0$52.857', $041^0$32.355', 263m) are relatively big. However, despite their size, they maintain moderate to high flows during rain seasons and extremely low to no base flows during the dry seasons. According to the local residents, during heavy storms, the streams (Plate 3-20) make the road impassable.

Plate 3-20: A resident crossing one of the big streams along the proposed road alignment (Source: AWEMAC)

Water pans have also, been constructed along the road alignment. The water pans actas key water points for local residents, livestock and wild game. In the neighborhood of Qumbiso village, a small water pan is located at point (03^{0}54.298', 041^{0}22.355', 302m). The water level at the water pan (Plate 3-21) is low due to low rains being experienced in the area. At the neighborhood of this water pan is the Quimbiso and Birkhad earth pan. At Sala village (03^{0}55.974', 041^{0}16.753', 258m), Sala irrigation canal funded by Deutschland and implemented by Helpage International Racida Kenya exist as another water source.

Plate 3-21: A small water pan adjacent the proposed road project near Quimbiso village (Source: AWEMAC)

Several players are involved in water sector. These includes the County government of Mandera, Mandera Water and Sewerage Company, Donor agencies such as UKaid, Red Cross, Care Kenya, Save the Children, FH Kenya, Islamic Relief, and Deutschland amongst others. The players are not only involved in construction of the water

structures but also in distribution of the water through construction of high level water tanks and piping network (Plate 3-22). It is important to note that boreholes, earth pans and water storage structures are mostly concentrated in Mandera and Rhamu towns and the six villages along the proposed road alignment.

Plate 3-22: Water storage and distribution network along the proposed project area (Source: AWEMAC)

3.3.6 Water quality

Environmental baseline survey of the proposed Rhamu –Mandera road project was undertaken on 3rd to 5th May 2017. Water quality samples were collected from two source points along the Daua River to provide data that will act as a reference for monitoring of the water resources in the project area in future. The first point was near Rhamu town and the second point was near Mandera town as shown in the table below. The concentration levels of the analyzed parameters were compared with the first schedule on quality standards for sources of domestic water (GOK 2006). Twelve water quality parameters were determined. The water quality parameters analyzed showed that there were variations in the determined parameters from those provided by NEMA standards/guidelines, KEBS Standards (KS 49-1:2007) and World Health Organization standards (WHO). In particular, heavy metal concentrations of lead (0.34 and 0.37 mg/l) were found to be way above the acceptable limits of the NEMA standards. However, the pH range was near neutral and within the acceptable levels in the sampled points. Flowing waters such as found at River Daua, may have elevated levels of total suspended solids but to have a record of >100 times high as the acceptable limit by NEMA could not be adequately explained (Table 3-6). Turbidity (8520 and 6370 NTU) and total suspended solids (9100 and 7500 mg/l) concentrations were similarly high and such magnitudes will typically be found in highly disturbed environments with activities such as irrigation, flooding and erosion events. Since the Daua River serves as a major source of drinking water for the livestock and domestic use, such values may then be viewed as normal because of the high disturbance rates. Nitrites and total phosphorus relatively high and ordinarily can result a water body being classified as eutrophic as they may also trigger algal blooms. The other parameters sampled within the project area depicted ranges that were within the NEMA guideline values (Table 3-6) below.

Table 3-6: Concentration of water quality indicators in the proposed project area (sampled 05 May 2017) viewed against WHO Standards, KEBS Standards (KS 49-1:2007) and NEMA guideline values (1st Schedule).

Sampling point/Parameter	Daua River Mandera 1	Daua River Mandera 2	WHO Standards	KEBS Standards	Guideline values
GPS	$00^0$43.760'S $39^0$10.565' E	$00^0$43.957'S $39^0$10.567' E			
pH	7.65	7.69	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5
Turbidity (NTU)	8520	6370	< 5	< 5	
Conductivity (μScm^{-1})	283	280	< 2500	-	-
COD (mgO_2l^{-1})	316	316			
TDS (mgl^{-1})			<1500		1200
TSS (mgl^{-1})	9100	7500			30
T. alkalinity (mgl^{-1})	40.2	59.4	< 500		
T. hardness (mgl^{-1})	118	120	< 500	< 300	
Lead (mgl^{-1})	0.34	0.37			0.05
Nitrates (mgl^{-1})	< 0.01	< 0.01			10
Nitrites (mgl^{-1})	0.03	< 0.01	< 0.1	< 0.003	3
T Phosphorus (mgl^{-1})	0.66	0.046			-
Sulphate (mgl^{-1})	< 0.3	< 0.3	< 450	< 400	1.5

3.4 Biological environment

3.4.1 Vegetation

The indigenous vegetation in the project area is predominantly typical savannah woodland characterized by natural dry land tree and bush land species. Farm forestry in the proposed project area is limited due to semi-arid nature of the proposed project area and its environs. Urban forestry is only restricted in Rhamu and Mandera towns and isolated cases in the six villages along the proposed road alignment. At the proposed project area and the larger there are no gazetted forests. As such, most of the vegetation is found on community land though Kenya Forest Service (KFS) offers technical support in management of the forest resource. Generally, vegetation is important in landscaping, reducing the heat by providing the cooling effects, shade, wind break, fodder, fruits, construction materials, soil erosion control, bee foraging, medicinal value, fuel wood, nitrogen fixation among others (Cheboiwo & Langat, 2006). Vegetation cover and land use affects the runoff by controlling the volume, hydrograph base time and hence the peak flow. Key vegetation type along the proposed road alignment is briefly discussed below.

3.4.4.1 Indigenous Forests

Though the vegetation type is basically savannah type woodland, the dominant species changes as one moves from Rhamu to Mandera towns along the proposed road

alignment. At the outskirts of Rhamu town (03^{0}55.730', 041^{0}13.889', 282m) and along a seasonal stream, the predominant species is *Prosopsis juliflora* (Mathenge). The vegetation transits from *prosopsis* dominated woodland formation to *Acacia tortilis* intermixed with *Acacia mellifera* woodland at (03^{0}55.955', 041^{0}16.196', 255m). At Quimbiso village around point (03^{0}54.298', 041^{0}22.355', 302m) through Caro village (03^{0}53.568', 041^{0}40.650', 277m) and Garbaqoley village (03^{0}54.209', 041^{0}44.818', 230m), the vegetation transits into a different woodland formation dominated by *Terminalia orbi* (Bissik) intermixed with *Acacia xanthophloea* especially along the streams and flood plains. Some of the dominant species in different sections of the woodland formation are typical dry land climax species in mature dry land forests.

Prosopsis juliflora (Plate 3-23), which is the key vegetation at the extreme ends of the road alignment (Rhamu and Mandera towns), is a dry land species introduced into the country in 1980s to combat desertification in dry land regions of Kenya such as the entire North Eastern Kenya, Baringo, Tana river amongst others. The species has since become invasive in the country. As a typical invasive species, it aggressively colonizes any open gaps or disturbed environments and out-competes the native vegetation in the long run. This explains the reason why the species at the proposed project area is colonizing the periphery of Rhamu and Mandera towns and along the banks of streams and rivers. As you enter Mandera town along Rhamu-Mandera road, the species form heavy and impenetrable thickets. Though a very important fodder and excellent ground cover in dry lands, the local people in the proposed project area have a negative attitude towards *Prosopsis juliflora* due to its intimidating thorns/spikes, effects on animal teeth and aggressive colonization of grazing lands by replacing native vegetation.

Plate 3-23: Thickets of *Prosopsis juliflora* along Rhamu-Mandera road (Source: AWEMAC)

As a predominantly pastoral area, these acacia species are key livestock sector in the locality. *Acacia tortilis* (Plate 3-24) and *A. mellifera*, which are key species in sections of the woodland formation along the proposed project area are typical dry land species with a wide distribution in Kenya. The two including other acacia species livestock and wildlife trees proving a wide range of benefits such as forage, fuel,

shelter to birds and shade to both human, livestock and wild game. When temperatures are extremely high, the big acacia trees comes at hand by providing shade to the wild game and livestock thereby reducing loss to heat stroke. The mature acacias, also, form excellent bird nesting and breeding zones. The acacia species adequately protects banks of the main streams in the proposed project area (Plate 24).

Plate 3-24: *Acacia tortilis* along a stream in the proposed project area (Source: AWEMAC)

Terminalia orbi (Plate 3-25), locally known as 'Bissik', is another dominant species in sections of the dryland woodland formation in the proposed project area. The species is also a typical dryland species with a wide distribution range in Mandera, Baringo, and Somali amongst others. At the proposed project area especially around Quimbiso village, the species forms pure stands of woodland. The species has wide uses among the locals such as fuelwood, forage amongst others. Another major savannah woodland species intermixed with *Terminalia orbi* is the yellow-barked *Acacia xanthophloea* also called fever tree. It is an important riverine species and also an ecosystem indicator of raised water table. It forms a key food resource for livestock and wild game especially giraffes in the proposed project area. *Acacia xanthophloea* is always targeted for charcoal production in many ecosystems though charcoal making at the proposed project area and its environment is neglible. However, according to KFS Ecosystem conservator, Mandera County, 90% of the charcoal used in the County comes from Somali and Ethiopia.

Plate 3-25: A pure stand of *Terminalia orbi* near Quimbiso village in the project area (Source: AWEMAC)

Generally, it is important to note that each of these savannah woodland formations along the proposed road alignment creates a habitat for the various animals in the forests. The forest formations influence the distribution of birds and other wild animals that live on trees such as birds and different types of primates (monkeys) while the bush-land and open grasslands provide a habitat for browsers, grazers such as Duikers, Dikdiks, antelopes, giraffes, and carnivores such as foxes, hyenas amongst others. The riverine vegetation along the banks of the streams in the proposed project area provide protection against soil erosion and collapse of stream banks and provide a habitat for amphibians and reptiles. Further, woodlands play critical ecological roles such as nutrient cycling, water catchment, erosion control, removal of pollutants among others. As such, during construction phase, the contractor should restrict earthworks to critical and mandatory sections as per the project designs. Further, restricting traffic to designated and most efficient routes as well carrying out enrichment tree planting adversely affected site is strongly advocated for.

3.4.4.2 Farm forestry

The proposed project area is predominantly pastoral. However, farm forestry takes place on farms under irrigation along Daua River. The farm forestry is characterized by assorted fruit tree species such as *Mangifera indica* (mangoes), *Persia americana* (avocados), *Citrinus sinensis* (oranges) amongst others. Most of the fruit consumed in Rhamu and Mandera towns originate from farm forestry activities. Other agroforestry species common on-farms include *Azadirachta indica* (Neem), *Grivellea robusta* among others. It is important to note that these farms are far away from the proposed project area and will not be adversely affected by the proposed project road. Along the proposed road alignment, farm forestry is very limited since harsh climatic condition does not favour farming activities. However at point ($03^{0}54.298'$, $041^{0}22.355'$, 302m) which appears to be a seasonal flood plain, a small plantation of *Azadirachta indica*

(Mwarobaini) exists (Plate 3-26). Though the plantation is near the road corridor, it will not be affected by the construction activities

Plate 3-26: A small plantation of *Azadirachta indica* (Mwarobaini) on a farm near the project area (Source: AWEMAC)

3.4.4.3 Urban forestry

Urban forestry entails planting of trees and shrubs in urban environment. Urban forestry plays a critical role in urban environments by providing aesthetic through improvement visual appearance of urban landscapes. The tree component also plays critical role such as provision of shade, reduction of dust and general amelioration of the town microclimate. Due to harsh climatic conditions at the proposed project area and its environs, urban forestry is restricted to Rhamu and Mandera town including isolated but planted trees in some of the six villages. The main urban forestry species in the entire project area is *Azadirachta indica* (Mwarobaini). Other urban tree species are only restricted in hospitality facilities such as hotels and restaurants where the species are surviving under intensive management through continuous watering. In Rhamu and Mandera towns, *Azadirachta indica* (Plate 3-27) has been planted inform of highway tree planting along the road reserve. Though the trees have been planted at the same point where we have service lines such as power, water and telephone lines, they may be minimally affected during road construction. Given the challenges of growing trees in the project area, it is advisable that the contractor exercises utmost caution to avoid vegetation disturbances.

Plate 3-27: Urban tree planting along Rhamu-Mandera road in Rhamu town (Source: AWEMAC)

3.4.2 Wildlife and Tourism Resources

Markamali National Park (876km^2) is the only gazetted conservation area in Mandera and it is approximately 40 km from the project road (Figures 3-6 and 3-7). The park lies along the Daua River on the Kenya Ethiopia border in the extreme north east of Kenya on the Mandera plateau, Mandera County. Initially the park had a high population of wild animals including elephants, various species of antelopes, lions, hippos, crocodiles and cheetah among others. Apart from the elephants the other animals are still in existence, though they have been scared away due to rampant human activities in the park.

The park has various unique tourists' attractions which include wildlife and beautiful sceneries. Notable wildlife species include; Reticulated giraffes, antelopes, Oryx, lesser kudu, greater kudu, impalas, lions, cheetah, leopards, wild dogs, baboons, velvet monkeys, bush babies, several species of bird life and aquatic animals such as crocodiles, hippos and fish. Attraction sceneries include old colonial military caves, old colonial buildings and ruins, mountains, Daua River and its vegetation, colonial air field and hills steps.

Unlike other protected areas in Kenya, the park has no structured management save for wildlife surveillance, security patrols and community education on importance of wildlife conservation by KWS personnel stationed at Mandera Town, 350km form the Park. In addition there are no wildlife research programmes leaving a huge gap in regard to wildlife populations, migratory patterns and conservation challenges. The only information available is gathered by the security personnel on patrols.

Through information availed by KWS, it has been established that the County Government of Mandera has initiated discussions on how to sustainably manage Malkamari National Park for future generations (In 2014, Mandera county officials led by the Governor, Hon.Cpt Ali Roba met the Director General at KWS Hq in Nairobi and their aim was to discuss the operationalization of the park).

At the proposed road alignment, wild game exists though siting of the same during day time was occasional. Among the big game, only giraffe roam at the project area. Several small game such as dikdik, antelopes, foxes, hyenas, rabbits amongst others are common. According to livestock keepers and village residents, hyenas and foxes, inflict major livestock losses. The targeted livestock are mainly goats and sheep. Residents rarely report these losses to KWS offices in Mandera town and as such no compensation. According to KWS director in Mandera County, compensation is done only when the cases are reported and killing of livestock occurs within the confines of the villages but not grazing fields.

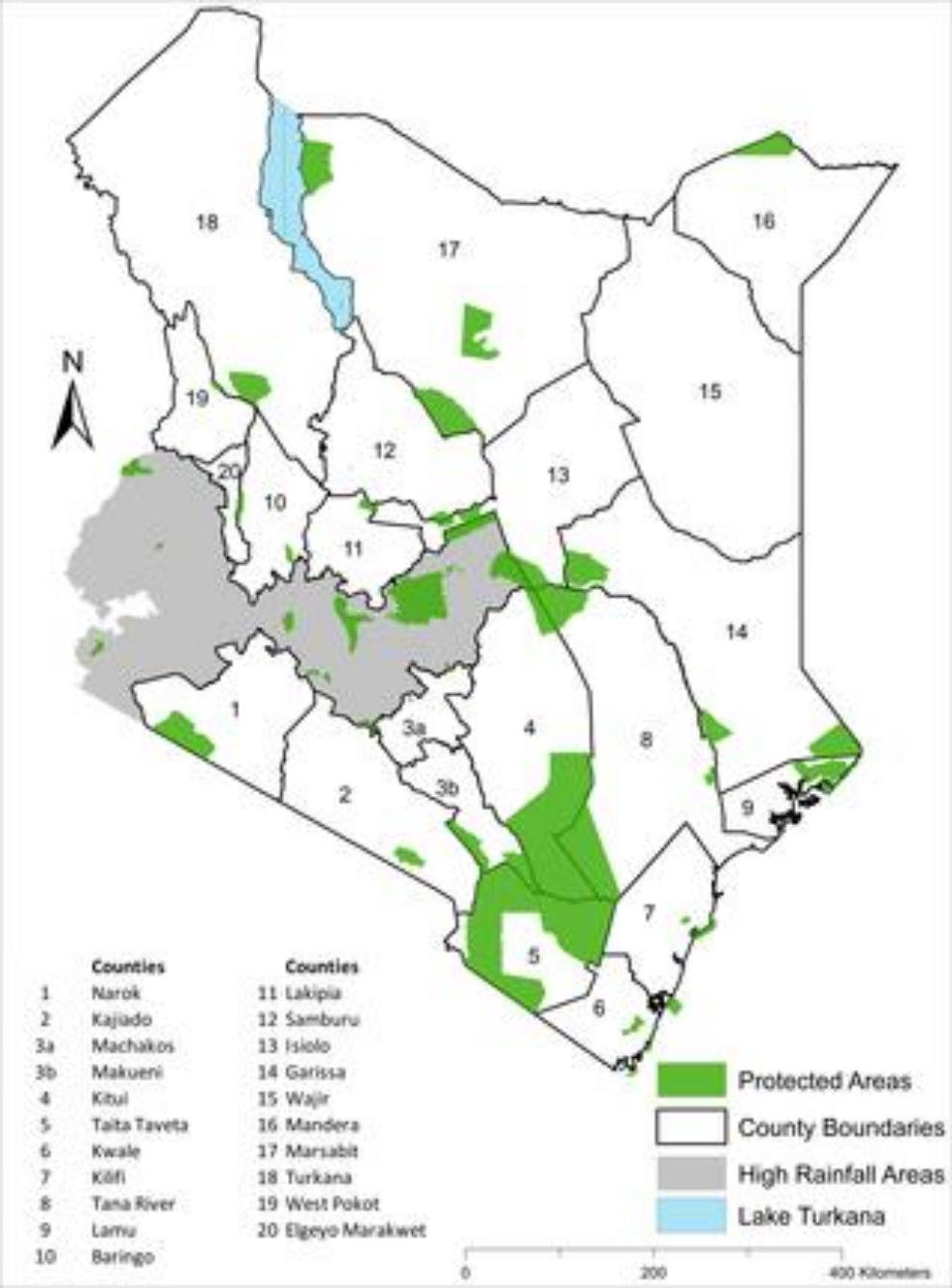


Figure 3-6: Map of Kenya showing the rangeland counties (Source: DRSRS, 2016)

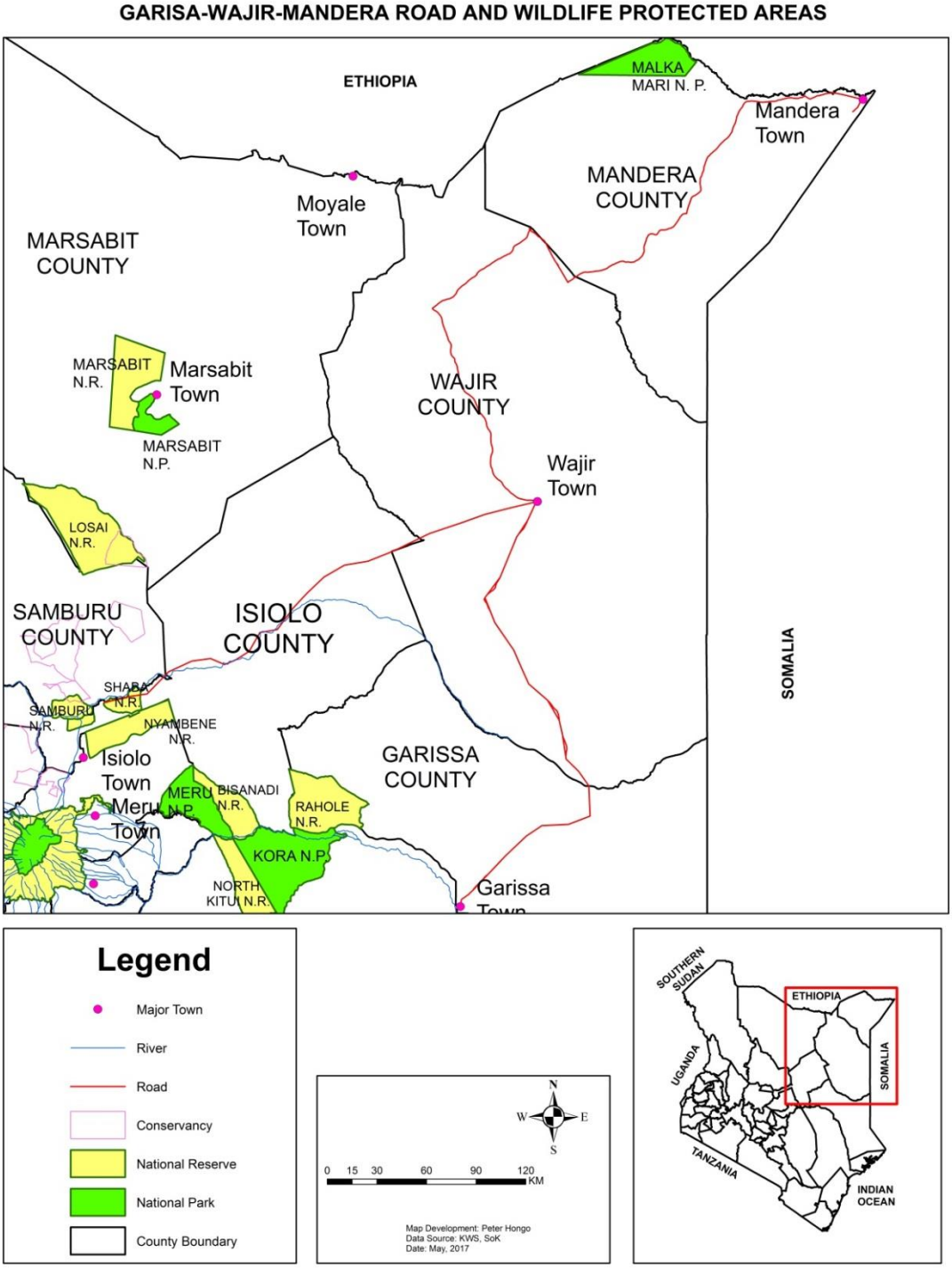
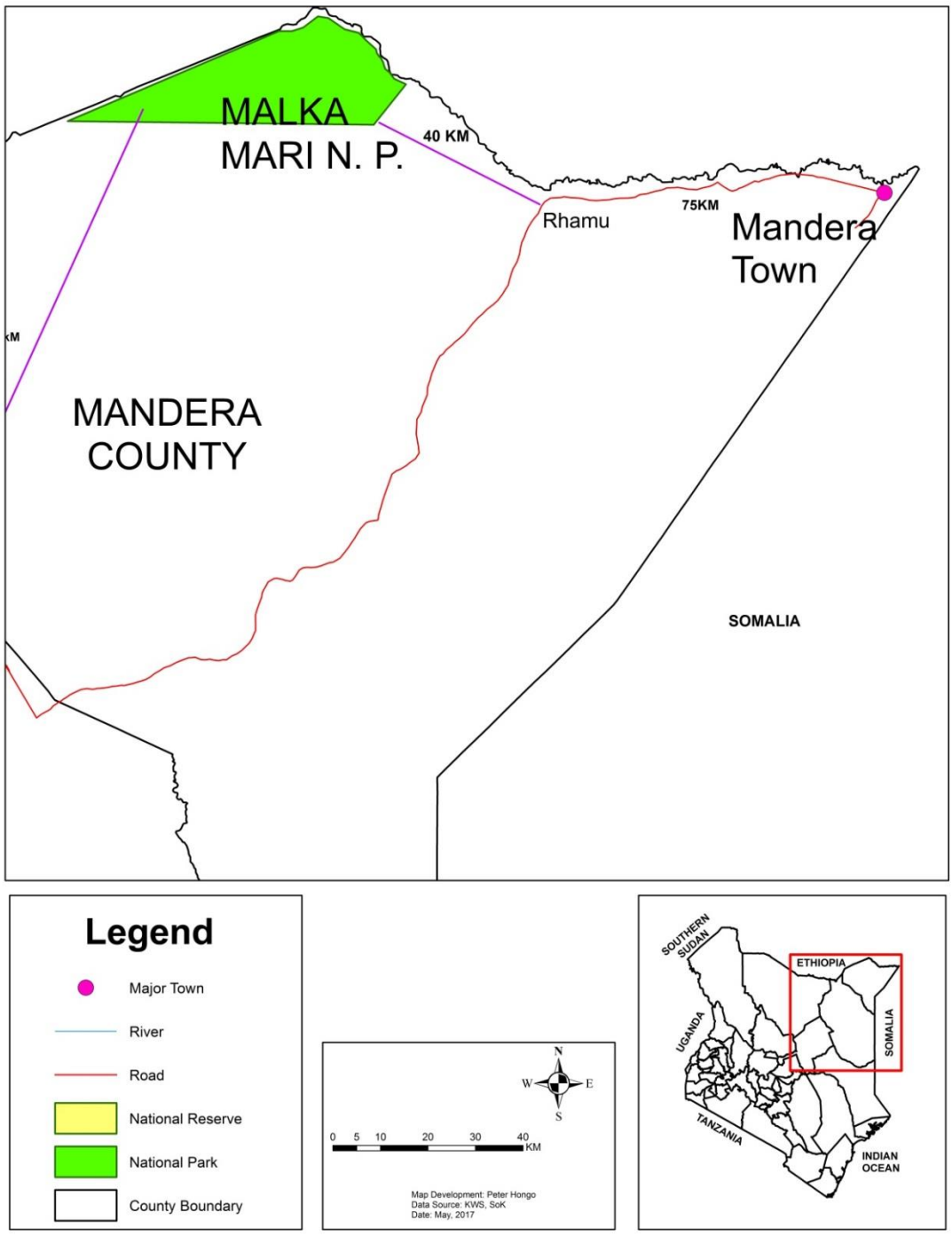


Figure 3-7: Map of Rhamu-Mandera Road in Relation to Malkamari National Park (Source: DRSRS, 2016)


MALKA
MARI N. P.
40 KM
75KM
Rhamu
Mandera
Town
MANDERA
COUNTY
SOMALIA
Legend
Major Town
River
Road
National Reserve
National Park
County Boundary
N
W
E
S
0 5 10 20 30 40
KM
Map Development: Peter Hongo
Data Source: KWS, SoK
Date: May, 2017
SOUTHERN SUDAN
ETHIOPIA
UGANDA
SOMALIA
TANZANIA
INDIAN OCEAN

CHAPTER FOUR: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

The Republic of Kenya has policies, legal and administrative framework for environmental management. The Government's policy on road transport is to provide efficient and reliable road network to spur socio-economic development and improve security. Under the administrative framework, the National Environment Management Authority (NEMA) is responsible for ensuring that environmental impact assessments (EIAs) are carried out for new projects and environmental audits on existing facilities as per the requirements of the Environmental Management and Coordination Act (EMCA) 1999/2015 amendments. Projects subject to this requirement are specified in the Second Schedule of the EMCA, 1999.

On the international platform, there are various applicable frameworks and requirements to ensure sustainability is achieved in any project development. Among them the Equator Principles, World Bank Performance Standards, Multilateral Environmental Agreements among others.

Environmental and Social Impact Assessments (ESIAs) are carried out in order to identify potential positive and negative impacts associated with a proposed project. The aim is to amplify the positive impacts and develop mitigation measures for the negative ones. The ESIA also ensures that baseline environmental and socio-economic data for the proposed project is collected and used in the design of projects financed by the bank. Also, this data is used for monitoring and evaluating project impacts during the project cycle. It is a requirement by both NEMA, CFC Stanbic Bank and the World Bank that a clear management plan and action plan that describe and prioritize the actions required implementing mitigation measures are put in place.

The government of Kenya has established regulations to facilitate the process on ESIAs and environmental audits. The regulations are contained in Kenya Gazette Supplement No. 56, legislative, Supplement No.31, Legal Notice No.101 of 13th June 2003 and Environmental(Impact Assessment and Audit) (Amendment) Regulations, 2016. In Kenya, it is a legal requirement that any proposed project of the scale described in this report should undergo an Environmental and Social Impact Assessment. These requirements are stipulated in the Environmental Management and Coordination Act (EMCA 1999) and EIA/EA Regulations 2003. This section outlines the Policy, Legal and Institutional framework pertaining to the proposed road development project.

4.2 National Policy Framework

The broad objectives of the national environmental policy in Kenya are:-

- To ensure optimal use of natural resources while improving environmental quality.
- To conserve natural resources such that the resources meet the needs of the present without jeopardizing future generations in enjoying the same.

- To develop awareness that inculcates environmental stewardship among the citizenship of the country.
- To integrate environmental conservation and socio-economic aspects in the development process.
- To ensure that national environmental goals contribute to international obligations on environmental management and social integrity.

To achieve the above policy objectives, it is a policy directive that appropriate reviews and evaluations of all forms of developmental project plans and operations are carried out to ensure compliance with the environmental policy and legal frameworks. The following section provides details on the relevant policies in the country.

4.2.1 The Constitution of Kenya of 2010

The Constitution of Kenya has taken onboard various issues that are related to environmental management. Article 42 of the Bill of Rights contained in the Constitution provides that '*every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures'*. Chapter 5 of the Constitution is dedicated to land and the environment. The constitution requires that land be used and managed in a manner that is equitable, efficient, productive and sustainable. Part 2 of Chapter 5 of the constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides that the state shall provide encourages efforts towards sustainable of natural resources, increasing of the national forest cover public participation in the management, protection and conservation of the environment, protection of genetic resources and biodiversity, environmental impact assessment, environmental audit and monitoring of the environment, etc. The proposed project should ensure compliance with the constitutional requirements in as far as equitable sharing of the resources between various stakeholders is concerned on matters of sustainability of livelihoods and biological resources public participation Resettlement Action Plan among others.

4.2.2 Kenya Vision 2030

Kenya Vision 2030 is a comprehensive national development plan for period 2008 to 2030. The plan was developed following successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation which ensured the country's economy was back on the path for realization of rapid economic growth since 2002. The county's GDP growth rose from 0.6% to 7% in 2007, but declined to 1.7% and 1.8% in 2008 and 2009, respectively. The objective of the Vision 2030 is to transform Kenya into a middle income country with a consistent annual economic growth of 10 % by the year 2030. The 2030 goal for urban areas is to achieve "a well-housed population living in an environmentally-secure urban environment." This goal is expected to be achieved by developing basic infrastructure services such as roads, street lights, water and sanitation facilities, storm water drains, footpaths, and others while ensuring that the country has a clean, secure and sustainable environment by 2030 through reduction of pollution and improvement of waste management. The plan also requires that the current land use practices in the country be reviewed due to the fact that they are incongruent with the ecological

zones. The proposed road project will contribute to the realization of the goals of Vision 2030 through improvement of a reliable and efficient road infrastructure facility, provision of employment opportunities, and provision of faster and efficient mode of transport, among others.

4.2.3 The Land Policy (2007)

The Land Policy in Kenya is guided by the environmental management principles which are aimed at restoring the environmental integrity through introduction of incentives and encouragement of use of technology and scientific methods for soil conservation, among others. The policy further requires fragile ecosystems to be managed and protected by developing a comprehensive land use policy bearing in mind the needs of the surrounding communities. The policy also requires zoning of catchment areas to protect them from degradation and establishment of participatory mechanisms for sustainable management of fragile ecosystems. The policy also called for development of procedures for co-management and rehabilitation of forest resources while recognizing traditional management systems and sharing of benefits with contiguous communities and individuals. Lastly, all national parks, game reserves, islands, front row beaches and all areas hosting fragile biodiversity are declared as fragile ecosystems under the policy.

The policy recognizes that sustainable management of land based natural resources depends largely on the governance system that defines the relationships between people and resources. To achieve an integrated approach to management of land-based natural resources, all policies, regulations and laws dealing with these resources need to be harmonized with the framework established by the Environmental Management and Coordination Act (EMCA) 1999.

The policy also addresses land management particularly in Section 3.4.3.2 on ecosystem protection (including wetlands). Measures for protection are required for fragile ecosystems. The policy also calls for the protection of watersheds, lakes, drainage basins and wetlands. The policy prohibits settlement and agricultural activities in water catchment areas and calls for identification, delineation and gazettement of all water courses and wetlands.

4.2.4 National Policy for the Sustainable Development of Northern Kenya and other Arid Lands

In Kenya, the ASAL occupy 89% of the country (Figure 4-1) and are home to about 36% of the population, 70% of the national livestock herd and 90% of the wild game that supports the country's tourism industry.

Arid lands of Northern Kenya cover close to 400,000 km^2 of land but have less than 700 km of tarmac road, most of which is in disrepair. This has an impact on the attraction of investment and communication in the region

Since 2003 the Government has demonstrated renewed commitment to the ASALs, for example through the Economic Recovery Strategy launched in 2003, which recognized 'the important contribution the ASALs can make to national development'. The Government of Kenya is committed to putting in place a holistic policy framework that facilitates and fast-tracks sustainable development in the

region, reducing levels of inequality with the rest of Kenya and releasing its potential for the benefit of the nation as a whole.

The Government recognizes that Kenya will not achieve sustained growth in her economy and progress as a nation if the ASALs are not appropriately factored into national planning and development. Trickle-down benefits from areas which already have more favourable investment climates have not worked across the country; moreover, the potential for significant growth in these areas is now limited. The Government also recognizes that Kenya will not achieve the goals of Vision 2030 or meet international commitments such as the Sustainable Development Goals (SDGs) if regional inequalities are not addressed. Poverty, inequality and insecurity in one part of the country negatively affect the country as whole. Accelerated investment in ASALs is necessary if all Kenyans are to have an equal chance of sharing in the promise and benefits of Vision 2030. Through appropriate financing, the Government will provide leadership in mobilizing and allocating resources necessary for strengthening the foundations for development, including roads, energy, ICTs, water, education, health and security in ASAL areas.

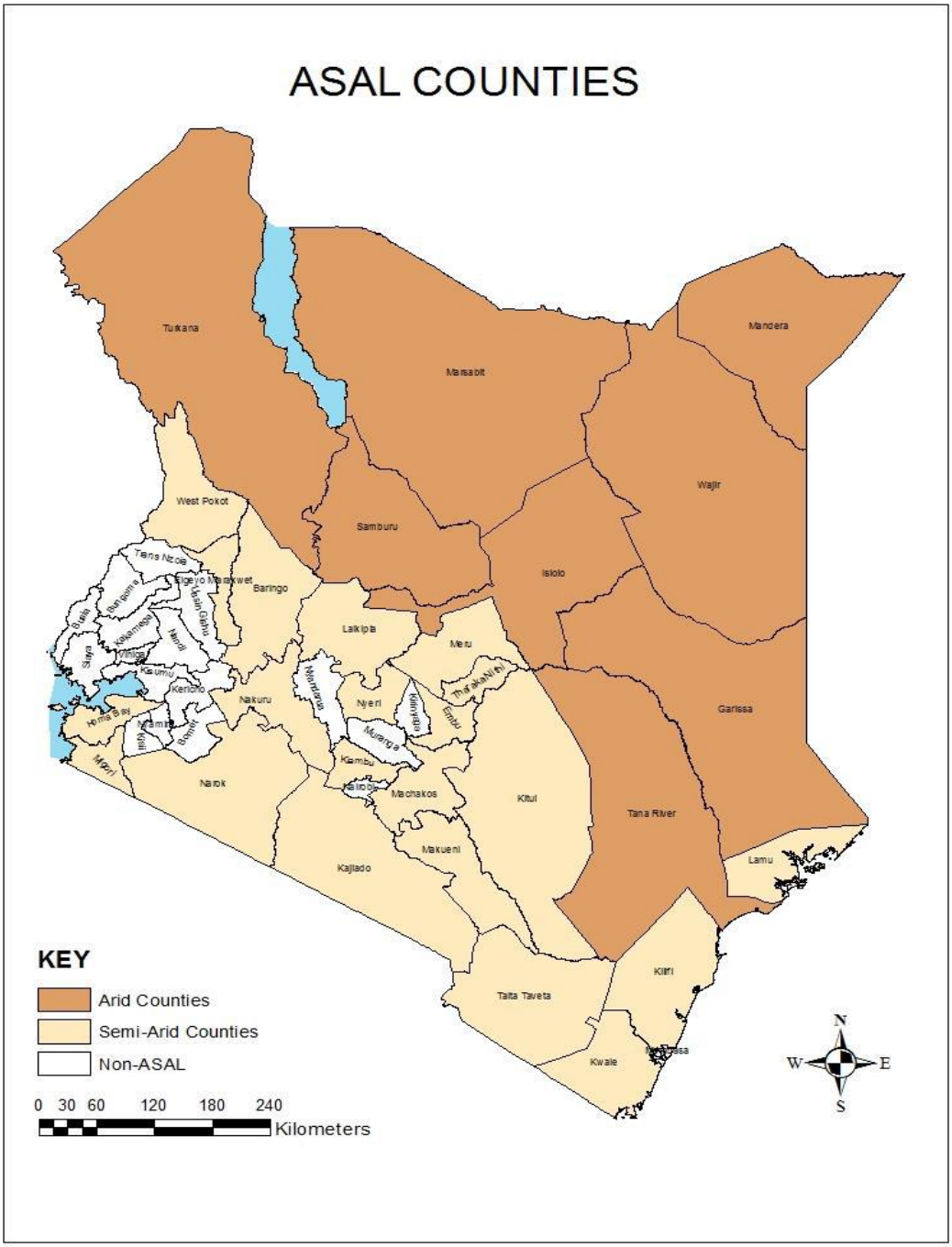


Figure 4-1: Map of ASAL Counties in Kenya (National Policy for the Sustainable Development of Northern Kenya and other Arid Lands)

4.2.5 The National Biodiversity Strategy of 2000

The National Biodiversity Strategy and Action Plan (NBSAP) was formulated in order to enable Kenya address national and international commitments defined in Article 6 of the Convention on Biological Diversity (CBD). The strategy is a national framework of action for ensuring that the present rate of biodiversity loss is reversed and present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity; to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally,

including the exchange of information in support of biological conservation. The proposed road project will need to comply with the requirements of this strategy since the project may lead to loss of biodiversity in some sections along the proposed route.

4.2.6 Forest Policy (2014)

This policy by the Ministry of Environment, Water and Natural Resources intends to ensure forests in the country are protected from wanton destruction. The goal of the policy is to increase the area under forest to 10% of the total land area in the country. The proposed road project will therefore be required to be consistent with this policy. Where clearance of forests or sections of forests is envisaged, especially during clearance of the road reserve, establishment of workers' camps, quarries and material borrowing sites, it would be important to put in place appropriate mitigation measures such as those specified in the environmental management plan of this ESIA report.

4.2.7 Wildlife Policy of 2011

The wildlife policy is aimed at promoting protection and conservation of wildlife in Kenya, both in protected and non-protected areas. The policy is implemented by the Kenya Wildlife Service (KWS). The proposed road project will need to be consistent with this policy. Where wild animals will be disturbed during the construction and operation of the highway, appropriate mitigation measures must be implemented to minimize disturbance to wildlife.

4.2.8 Environment and Development (Sessional Paper No. 6 of 1999)

The Kenya's policy paper on the Environment and Development was formulated in 1999. The policy defined approaches that will be pursued by the Government in mainstreaming environment into development. The policy harmonized environmental and developmental objectives with the broad goal of achieving sustainable development. The policy paper also provided guidelines and strategies for government action regarding environment and development. With regard to wildlife, the policy reemphasized government's commitment towards involving local communities and other stakeholders in wildlife conservation and management, as well as developing mechanisms that allow them to benefit from the natural resources occurring in their areas. The policy also advocated for the establishment of zones that allow for the multiple use and management of wildlife. This policy is relevant to the proposed development project in view of the potential impacts on the environment and involvement of the public in project planning.

4.2.9 National Environmental Action Plan (NEAP) of 1994

The National Environment Action Plan (NEAP) for Kenya was formulated in 1994 through a consultative process involving various stakeholders. The action plan was aimed at integrating environmental considerations into the country's socio-economic development. The integration process was to be realized through development of a comprehensive framework that ensures linkage of environmental management of natural resources to decision-making processes. The NEAP also established the process of identifying environmental problems and issues, awareness raising, building national consensus, defining policies, legislation and

institutional needs, and planning environmental projects. An Environmental Action Plan for Arid and Semi-arid Lands (ASAL) and County-specific Environmental Action Plans for 24 ASAL districts were also formulated thus forming part of the building block to the NEAP.

4.2.10 The Occupational Health and Safety Policy of 2012

This policy is intended to protect safety and health of workers in work places. The proposed road project will provide employment opportunities to many workers at various categories. The contractor will be expected to comply with the requirements of this policy when engaging workers in various construction activities. The environmental management plan provides mitigation measures that can be undertaken to ensure compliance with the requirements of this policy.

4.2.11 The National Poverty Eradication Plan (NPEP) of 1999

The National Poverty Eradication Plan (NPEP) was formulated with an objective of reducing the high levels of poverty in Kenya by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. The plan also aimed at reducing gender and geographical disparities in order to create a healthy, better-educated and more productive population. The formulation of the plan was guided by the goals and commitments agreed during the World Summit for Sustainable Development (WSSD) of 1995. The plan therefore focuses on the delivery of four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantaged people and creation of an enabling economic, political, and cultural environment through development of transport and communication sector. The plan is implemented by the Poverty Eradication Commission (PEC) that was established in collaboration with various Government Ministries, bilateral and multilateral donors, the private sector, Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOs). The NPEP is relevant since the proposed Rhamu – Mandera road construction will create an enabling environment that will contribute immensely in the enhancement of economic growth in Kenya. The proposed project would also impact business related activities that have great relevancy to poverty eradication in the country.

4.2.12 The Poverty Reduction Strategy Paper (PRSP) of 2000

The Poverty Reduction Strategy Paper (PRSP) for Kenya has the broad objective of reducing poverty and promoting economic growth. This policy articulates Kenya's commitment and approach to tackling endemic poverty through involvement of the poor communities in both rural and urban areas in various socio-economic development activities. The proposed project, during and after implementation will offer various employment opportunities to Kenyans and will therefore contribute directly towards the realization of the broad national goal of reducing poverty in the country. In addition the project would stimulate economic development by creating an enabling environment for other key sectors of the economy to thrive.

4.2.13 Physical Planning Policy

The current policy governs the development and approval all building plans as provided for in the Physical Planning Act (Cap 286). The proposed project will be subjected to the provisions of this policy and legislation.

4.2.14 Public Health Policy of 2014

The public health policy calls upon the project proponents to ensure that buildings are adequately provided with utilities so that they are fit for human habitation. The workers camps must be provided with all amenities/utilities that are essential for safeguarding public health for all people using the facilities.

4.2.15 HIV/AIDS Policy of 2009

The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The Pandemic heavily affects the Kenyan economy through loss of skilled and experienced manpower due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories, among others. Due to the large of number of workers who will be involved in the project and the associated social issues with a projects of such as scale, HIV/AIDS has been considered as one of the possible impacts but adequate mitigation measures have also been proposed to that effect. The contractor needs to conduct regular awareness as proposed in the ESMP.

4.2.16 Gender Policy of 2011

The purpose of the Gender Policy is to institutionalize the Kenya National Policy on Gender and Development (NPGD), within Gender, Children and Social Development. It articulates the policy approach of gender mainstreaming and empowerment of women at the ministry level. The policy seeks to have a society where women, men, children and persons with disabilities enjoy equal rights, opportunities and a high quality of life. This report has in depth addressed matters to do with gender and development and in the concession period the entire project period the project shall be governed under this principle. The same were involved in the public participation and project planning process in order to integrate their opinions to the proposed project as much as possible.

4.2.17 Vulnerable and Marginalized Groups Framework 2016

Principled International Banks have provided financing only where free, prior, and informed consultation results in broad community support by a project especially the affected vulnerable and marginalized groups'. Such Bank-financed projects include measures to:- a) Avoid potentially adverse effects on the Indigenous Peoples' communities; b) When avoidance is not feasible, minimize, mitigate, or compensate for such effects; c) Ensure that the vulnerable and marginalized people receive social and economic benefits that are culturally appropriate and gender as well as inter-generationally inclusive; and that the VMGF is based on free, prior and informed consultations with indigenous peoples leading to broad community support. The objectives of the policy are to avoid adverse impacts on vulnerable and marginalized groups, secure broad community support for projects and to provide Vulnerable and

Marginalized Groups (VMGs) with culturally appropriate benefits. The project should therefore ensure inclusivity of VMGs throughout the design, implementation and operational stages.

4.3 National Environmental Institutional Framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environmental Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS), and Water Resources Authority (WRA) among many others. There are also local and international NGOs involved in environmental issues in the country. Described here below are legal organizations whose aim is to ensure sustainable management of environmental resources, ensuring communities are beneficiaries of development projects within their surrounds, protecting vulnerable ecosystems and organisms and facilitate for coexistence between the built and natural environment.

4.3.1 Public Complaints Committee

The committee performs the following functions:

- Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Council.
- Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment under section 9 (3) and
- To perform such other functions and excise such powers as may be assigned to it by the council.

4.3.2 National Environment Action Plan Committee

This committee is responsible for the development of Environment Action Plans among other duties. The National Environment Action Plan shall:

- Contain analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time.
- Contain analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity.
- Recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and operational processes.
- Recommend methods for building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development.
- Set out operational guidelines for the planning and management of the environment and natural resources.

- Identify actual or likely problems as may affect the natural resources and the broader environment context in which they exist.
- Identify and appraise trends in the development of urban and rural settlements, their impact on the environment, and strategies for the amelioration of their negative impacts.
- Propose guidelines for the integration of standards of environmental protection into development planning and management.
- Identify and recommend policy and legislative approaches for preventing, controlling or mitigating specific as well as general diverse impacts on the environment.
- Prioritize areas of environmental research and outline methods of using such research findings.
- Without prejudice to the foregoing, be reviewed and modified from time to time to incorporate emerging knowledge and realities and;
- Be binding on all persons and all government departments, agencies, States Corporation or other organ of government upon adoption by the national assembly.

4.3.3 Standards and Enforcement Review Committee

This is a technical committee responsible for environmental standards formulation methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures.

Standards and Enforcement Review Committee consists of the members set out in the third schedule to the Environmental Management and Co-ordination Act. The Permanent Secretary under the Minister is the Chairman of the Standard and Enforcement Review Committee. The Director General appoints a Director of the Authority to be a member of the Standards and Enforcement Review Committee who is the Secretary to the committee and who provides secretarial services to the Committee. The Committee also regulates its own procedure. The Standard and Enforcement Review Committee may co-opt any person to attend its meetings and a person so co-opted shall participate at the liberations of the committee but shall have no vote. Finally, the Committee shall meet at least once every three months for the transactions of its business.

4.3.4 National Environmental Tribunal (NET)

This tribunal guides the handling of suits related to environmental offences in the Republic of Kenya. If disputes to this project arise, they are supposed to be presented here for hearing and legal direction.

4.3.5 National Environmental Council (NEC)

EMCA 1999 No. 8 Part III section 4 outlines the establishment of the National Environment Council (NEC). NEC is responsible for policy formulation and directions for purposes of EMCA; set national goals and objectives and determines policies and priorities for the protection of the environment and promote co-operation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged

in environmental protection programmes. It also performs such other functions as assigned under EMCA.

4.3.6 The National Environmental Management Authority (NEMA)

NEMA was established under the Environment Management and Co-ordination Act (EMCA) of 1999, which came into force on **14th January 2000.** The Authority, which is a government parastatal, became operational on **01 July 2002.** Its mandate is to exercise general supervision and coordination over all matters relating to the environment and to be the principal Authority of the government in the implementation of all environmental policies. The Authority is guided by the general principles of the Kenya Constitution, which entitles every person in Kenya to *a clean and healthy environment.*

The Authority *co-ordinates the various environmental management activities being undertaken by the lead agencies; and, also promotes integration of environmental considerations into development policies, plans, programmes and projects* with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya. Among other functions, the Authority shall:

- Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya.
- Take stock of the natural resources in Kenya and their utilization and conservation, with the relevant lead agencies.
- Examine land use patterns to determine their impact on the quality and quantity of the natural resources.
- Carry out surveys, which will assist in the proper management and conservation of the environment.
- Advise the government on legislative and other measures for the management of the environment or the implementation of relevant international conservation treaties and agreements in the field of environment as the case may be.
- Advise the government on regional and international environmental convention treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements where Kenya is a party.
- Undertake and co-ordinate research, investigation and surveys in the field of environment and collect and disseminate information about the findings of such research, investigation or survey.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur.

- Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impeding environmental emergencies is given.
- Undertake, in co-operation with relevant lead agencies programmes intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard.
- Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.
- Render advice and technical support, where possible to entities engaged in natural resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.
- Prepare and issue an annual report on the state of the environment in Kenya and in this regard may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency and,
- Perform such other functions as government may assign to the Authority or as are incidental or conducive to the exercise by the authority of any or all of the functions provided under EMCA.

This project shall comply with all conditions as provided by the Authority, way from implementation of the EMCA 1999/2015 amendments; Environmental Impact and Audit Regulations adhering to conditions provided in the EIA License and implementing the requirement of the EMCA 1999 subsidiary regulations during the different phases of project development.

4.3.7 The Standards and Enforcement Review Committees

EMCA 1999 provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee (SERC). NEMA through EMCA has established standards for the various environmental parameters that requires management such the water quality standards, noise and vibration control standards, waste management standards among other standards mentioned in this report. The committee through the compliance and enforcement department of NEMA monitors the compliance level of various projects to ensure pollution control standards are implemented. The committee also follows up on pollution complaints reported by the public.

4.3.8 The County and Sub-county Environment Committees

The County and Sub-county Environmental Committees contribute to decentralization of activities undertaken by NEMA. This has enabled local communities to have greater access to environmental management information. It has also enabled the County and Sub-county Environment Committees to conduct quick site visits and review of reports of proposed projects. The ESIA Study report will be submitted to the National NEMA County office, owing to the nature of the project. However, the ESIA Study report will also be reviewed in Mandera County to

create awareness and obtain ownership at county level. Public participation exercise conducted incorporated opinions and views raised by the NEMA office in the Mandera County.

4.4 Administrative Framework for the Proposed Project

KeNHA has a project implementation structure that has provisions for environmental and social integration. The recommended structure for implementation of environmental issues is as follows;

4.4.1 The Treasury (The PPP Unit)

The Public Private Partnership Unit (PPPU) was established, as a specialized unit within the National Treasury, to promote and oversee the implementation of the GOK PPP Program and project. It was established under Section 8 of the Public Private Partnership (PPP) Act, 2013. The unit is applicable to the proposed project since it will be implemented under PPP arrangements.

4.4.2 Ministry of Roads and Infrastructure

The Ministry, through the State department of Infrastructure is charged with the responsibility of providing basic infrastructure facilities to the public. The main responsibility of the state department include:

- National roads development policy
- Development, standardization and maintenance of roads
- Mechanical and transport services
- Enforcement of axle load control
- Materials testing and advice on usage
- Maintenance of security roads
- Protection of road reserves
- Registration of Engineers
- Registration of road contractors
- Development and maintenance of Air Strips

4.4.3 The Kenya Roads Board

The Kenya Roads Board was established in 2000 through an Act of Parliament (The Kenya Roads Board, 1999, No. 7) and mandated to do these functions, among others, to: co-ordinate the implementation of all policies relating to the development, rehabilitation and maintenance of the road network; co-ordinate the development, rehabilitation and maintenance of the road network with a view to achieving efficiency, cost effectiveness and safety; administer the funds derived from the fuel levy and any other funds that may accrue to it; monitor the operations or activities undertaken by road agencies in the development, rehabilitation and maintenance of roads and evaluate, by means of technical, financial and performance audits, the delivery of works and many other.

4.4.4 Kenya National Highways Authority (KeNHA)

The Kenya National Highways Authority (KeNHA) is a State Corporation established under the Kenya Roads Act, 2007 with the responsibility for management,

development, rehabilitation and maintenance of national roads of class A, B and C. The proposed road will be managed by KeNHA since it's classified as Class B. The main functions of KeNHA include:

- Development, standardization and maintenance of roads
- National roads development policy
- Mechanical and transport services
- Enforcement of axle load control
- Materials testing and advice on usage
- Maintenance of security roads
- Protection of road reserves
- Registration of Engineers
- Registration of road contractors
- Development and maintenance of Air Strips

4.5 Development Partner (Equator Principles Financial Institutions)

The proposed road project will be financed by the Stanbic Bank of South Africa. The bank utilizes Equator Principles (EP) to fund developments in order to achieve sustainable development.

The Equator Principles Financial Institutions (EPFI), IFC World Bank Safeguard Policies and the World Bank Environmental Assessment Source Book Volume II provides the relevant sectoral guidelines including the Banks Operation Policies/Bank Procedures.

EPFI have adopted the Equator Principles in order to ensure that the Projects they finance and advise on are developed in a manner that is socially responsible and reflects sound environmental management practices. The Institutions recognize the importance of climate change, biodiversity, and human rights, and believe negative impacts on project-affected ecosystems, communities, and the climate should be avoided where possible. If these impacts are unavoidable they should be minimized, mitigated, and/or offset. The Equator Principles are intended to serve as a common baseline and framework. The Institutions will not provide Project Finance or Project-Related Corporate Loans to Projects where the client will not, or is unable to, comply with the Equator Principles.

A. Principle 1: Review and Categorization

When a Project is proposed for financing, the EPFI will categorize it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorization process of the International Finance Corporation (IFC).

Using categorization, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts.

The categories are:

- **Category A** – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

- **Category B** – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and
- **Category C** – Projects with minimal or no adverse environmental and social risks and/or impacts.

The proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road project falls under Category B of the projects.

B. Principle 2: Environmental and Social Assessment

For all Category A and Category B Projects, the EPFI will require the client to conduct an Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The Assessment Documentation should propose measures to minimize, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project.

The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialized studies may also need to be undertaken.

This ESIA report fulfils this Principle 2 which is a truthful representation of the findings and as per the information provided by the Proponent.

C. Principle 3: Applicable Environmental and Social Standards

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.

EPFIs operate in diverse markets: some with robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment; and some with evolving technical and institutional capacity to manage environmental and social issues.

In fulfillment of this principle, both the local and international applicable regulations, statutes and standards have been incorporated in the proposed project.

D. Principle 4: Environmental and Social Management System and Equator Principles Action Plan

For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS).

Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to

outline gaps and commitments to meet EPFI requirements in line with the applicable standards.

Chapter 9 of this ESIA presents the Environmental Management Plan for the proposed project. It will also be prudent for the contractor to formulate an action plan for the implementation of the recommendations put forth in the ESMP.

E. Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

To facilitate Stakeholder Engagement, the client will, commensurate to the Project's risks and impacts, make the appropriate Assessment Documentation readily available to the Affected Communities, and where relevant Other Stakeholders, in the local language and in a culturally appropriate manner.

The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.

EPFIs recognize that indigenous peoples may represent vulnerable segments of project-affected communities. Projects affecting indigenous peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for indigenous peoples contained in relevant national law, including those laws implementing host country obligations under international law. Consistent with the special circumstances described in IFC Performance Standard 7 (when relevant as defined in Principle 3), Projects with adverse impacts on indigenous people will require their Free, Prior and Informed Consent (FPIC).

In fulfillment of this principle, the Public Consultation and Stakeholders Engagement Chapter in this report exhaustively depicts the level of engagement with the various stakeholders consulted.

F. Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.

The grievance mechanism is required to be scaled to the risks and impacts of the Project and have Affected Communities as its primary user. It will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process.

The Impact Mitigation Chapter in this reports presents the various grievance mechanism that needs to be adopted during the project construction, operation and decommissioning phases.

G. Principle 7: Independent Review

Project Finance

For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.

The Independent Environmental and Social Consultant will also propose or opine on a suitable Equator Principles AP capable of bringing the Project into compliance with the Equator Principles, or indicate when compliance is not possible.

Project-Related Corporate Loans

An Independent Review by an Independent Environmental and Social Consultant is required for Projects with potential high risk impacts including, but not limited to, any of the following:

- Adverse impacts on indigenous peoples
- Critical Habitat impacts
- Significant cultural heritage impacts
- Large-scale resettlement

In other Category A, and as appropriate Category B, Project-Related Corporate Loans, the EPFI may determine whether an Independent Review is appropriate or if internal review by the EPFI is sufficient. This may take into account the due diligence performed by a multilateral or bilateral financial institution or an OECD Export Credit Agency, if relevant.

H. Principle 8: Covenants

An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.

I. Principle 9: Independent Monitoring and Reporting

Project Finance

To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

Project-Related Corporate Loans

For Projects where an Independent Review is required under Principle 7, the EPFI will require the appointment of an Independent Environmental and Social Consultant after Financial Close, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

J. Principle 10: Reporting and Transparency

Client Reporting Requirements

The following client reporting requirements are in addition to the disclosure requirements in Principle 5.

For all Category A and, as appropriate, Category B Projects:

- The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.
- The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO.

EPFI Reporting Requirements

The EPFI will report publicly, at least annually, on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

4.6 World Bank Operational Policies

The proposed project has been rated Category B under the World Bank Operational Policy on Environmental Assessment (OP4.01), requiring a partial Environmental Assessment (EA). A proposed project is classified as Category B if the potential impacts on the environment are typically site-specific, reversible in nature; less adverse than those of Category A projects and for which mitigatory measures can be designed more readily Reference has been made to the World Bank Safeguard Policies, and the World Bank Environmental Assessment Source Book Volume II, which provides the relevant sectoral guidelines including the Banks Operation Policies/Bank Procedures.

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for Bank and borrower staff

in the identification, preparation, and implementation of programs and projects. Operational policies have often provided a platform for the participation of stakeholders in project design and have been an important instrument for building ownership among local populations.

4.6.1 World Bank Operational Policy 4.01-Environmental Assessment

The environmental assessment process provides insights to ascertain the applicability of other World Bank safeguard policies to specific projects. This is especially the case for the policies on natural habitats, pest management, and physical cultural resources that are typically considered within the Environmental Assessment (EA) process. The policy describes an EA process for the proposed project. The breadth, depth, and type of analysis of the EA process depend on the nature, scale, and potential environmental impact of the proposed project. The policy favors preventive measures over mitigatory or compensatory measures, whenever feasible. The operational principles of the policy require the environmental assessment process to undertake the following:

1. Evaluate adequacy of existing legal and institution frameworks, including applicable international environmental agreements. This policy aims to ensure that projects contravening the agreements are not financed;
2. Stakeholder consultation before and during project implementation;
3. Engage service of independent experts to undertake the environmental assessment;
4. Provide measures to link the environmental process and findings with studies of economics, financial, institutional, social and technical analysis of the proposed project;
5. Develop programmes for strengthening of institutional capacity in environmental management.

The requirements of the policy are similar to those of EMCA, which aim at ensuring sustainable project implementation. Most of the requirements of this safeguard policy have been responded to in this report, by evaluating the impact of the project, its alternatives, existing legislative framework and, conducting public consultations and by proposing mitigation measures for the potential impacts identified.

4.6.2 Bank Operational Policy 4.04-Natural Habitats

This operational policy requires that the EIA study applies the precautionary principle approach to natural resource management to ensure environmental sustainability. The policy requires conservation of critical habitat during project development. To ensure conservation and project sustainability, the policy requires project alternatives to be sought when working in fragile environment areas and key stakeholders to be engaged in project design, implementation, monitoring and evaluation including mitigation planning.

The requirements of this policy were observed as much as possible during the preliminary ESIA study. The consulting team engaged several stakeholders during project impact assessment process so as to incorporate their concerns and views in the ESIA and Environmental and Social Management Plan.

4.6.3 Bank Operational Policy 4.10: Indigenous Peoples

This policy contributes to the World Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous people. The project planning therefore must involve in-depth consultations with the public all the involve key stakeholders in ensuring the objectives of this policy are attained by (a) avoiding potentially adverse effects on the Indigenous Peoples' communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. The proposed project should also be designed to ensure that the indigenous people receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.

The communities predominantly identified along the transport corridor are: the Somali, and mostly other Cushitic communities.

4.6.4 Bank Operational Policy 4.11-Physical Cultural Resources

This policy guides in preserving physical cultural resources and helps reduce chances of their destruction or damage. The policy considers Physical Cultural Resources (PCR) to be resources of archaeological, paleontological, historical, architectural, and religious (including graveyards and burial sites), aesthetic or other cultural significance.

During public participation in Mandera town, local community identified a section along the project corridor with salt mineral which is used as feed to livestock. This salt mineral is vital to the local community. Nevertheless ,the Contractor is still responsible for familiarizing themselves with the following "Chance Finds Procedures", in case culturally valuable materials are uncovered during excavation, including:

1. Stop work immediately following the discovery of any materials with possible archaeological, historical, paleontological, or other cultural value, announce findings to project manager and notify relevant authorities;
2. Protect artifacts as well as possible using plastic covers, and implement measures to stabilize the area, if necessary, to properly protect artifacts
3. Prevent and penalize any unauthorized access to the artifacts
4. Restart construction works only upon the authorization of the relevant authorities.

4.6.5 Bank Operational Policy 4.12-Involuntary Resettlement

The objective of this policy to avoid where feasible, or minimize, exploring all viable alternative project designs in order to avoid resettlement. This policy is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

This policy covers direct economic and social impacts that both result from Bank-assisted investment projects. The policy is applicable if there will be (a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets, or (iii) loss of income sources or means of livelihood,

whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.
The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to project appraisal of proposed projects. The objective of this policy to avoid where feasible, or minimize, or explore all viable alternative project designs, to avoid resettlement.

The policy requires the displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms should be established for these groups. In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities.

This policy will be triggered as the project causes the involuntary taking of land and other assets resulting in:

1. Relocation or loss of shelter;
2. Loss of assets or access to assets;
3. Loss of income sources or means of livelihood, whether or not the affected persons must move to another location;
4. Loss of land.

The Resettlement Action Plan brief presented in chapter 6 in this ESIA study presents findings on the businesses to be relocated if the road will pass through Rhamu town.

4.7 World Bank Policy on Access to Information

The World Bank Policy on Access to Information sets out the policy of the World Bank on public access to information in its possession. This Policy supersedes the World Bank Policy on Disclosure of Information, and took effect on July 1, 2010. This Policy is based on five principles:

1. Maximizing access to information;
2. Setting out a clear list of expectations;
3. Safeguarding the deliberative process;
4. Providing clear procedures for making information available;
5. Recognizing requester's right to an appeals process;

In disclosing information related to member countries/borrowers in the case of documents prepared or commissioned by a member country/ borrower (in this instance, safeguards assessments and plans related to environment and resettlement: OP/BP 4.01, Environmental Assessments, and OP/BP 4.12 Involuntary Resettlement) the Bank takes the approach that the Country/Borrower provides such documents to the Bank with the understanding that the Bank will make them available to the public.

4.8 Alignment of WB and GOK Polices relevant to this ESIA

Both the World Bank safeguards and Government of Kenya (GoK) legislation are generally aligned in principle and objective:

1. Both require Environmental Impact Assessment before project design and implementation. This also includes an assessment of social impacts.
2. Both require public disclosure of EIA reports and stakeholder consultation during preparation.
3. While OP 4.01 of World Bank stipulates different scales of EIA for different category of projects, EMCA requires EIA for all sizes of projects listed in Schedule 2.
4. Where EMCA requires Strategic Environmental Assessments, OP 4.01 requires that an Environmental Assessment be conducted depending on the project category while an ESMF should be prepared for municipal projects.
5. EMCA recognizes other sectorial laws while WB has safeguards for specific interests;
6. The Bank requires that stakeholder consultations be undertaken during planning, implementation and operation phases of the project which is consistent to the requirements of EMCA.
7. Additionally, statutory annual environmental audits are required by EMCA.

In Kenya, it is a mandatory requirement under EMCA 1999 for all development projects (listed in Schedule Two) to be subjected to an EIA study. Thus, under the Laws of Kenya, environmental assessment is fully mainstreamed in all development process consistent with World Bank policies. However, since EMCA provides no minimum size threshold, all projects are screened at identification stage so as to determine level of environmental assessment required under EMCA. Further, in order to fully insure against triggers to World Bank safeguard policies, individual investments are screened against each policy as part of the EIA Study.

4.9 National Environmental Legal Framework

The Republic of Kenya has numerous statutes that guides environmental management and conservation in the Country. Most of these statutes are sector specific and cover a wide range of issues including public health, soil conservation, protected areas conservation, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use, among others. The relevant legislations are described in the following sections.

4.9.1 Environmental Management and Coordination Act No 8 of 1999 and the (Amendment) Act 2015

The Section Part VI of EMCA 1999 Part II states that every person is entitled to a clean and healthy environment and has the duty to safeguard the same. In order to achieve this goal, the projects listed under the Schedule No. 2 of EMCA must be subjected to Environmental Impact Assessment (EIA). The aim of EIA is to reduce negative environmental outcomes of the listed projects by implementing mitigation measures. The proposed project falls within the Second schedule and must therefore comply with EMCA requirements in as far as EIA is required. There are also several regulations that have been formulated within the framework of EMCA 1999 that are applicable to the proposed project. These are listed in the following sections.

4.9.1.1 Environmental Management and Co-ordination (Environmental Impact Assessment and Audit) Regulations, 2003 and the (Amendment) Regulations 2016

The Environmental (Impact Assessment and Audit) Regulations provides guidelines for conducting EIA studies. The regulations provide details on the parameters to be evaluated when undertaking an EIA study. It also provides guidelines on the conduct of environmental audits and development of project monitoring plans. The proposed project must comply with the requirements of the regulations that also include conducting continuous monitoring and annual audits on the proposed project.

4.9.1.2 Environmental Management and Co-ordination (Water Quality) Regulations, 2006

The EMCA (Water Quality) Regulations, 2006 provide guidelines on the use and management of water sources in order to safeguard quality of water for domestic use and irrigation, among others. The proposed project will need to comply with the requirements of this regulation in order to ensure water sources along the route are protected from pollution and over abstraction. The project will also need to comply with the regulations that prohibit undertaking of development within a minimum of 6m from the highest ever recorded flood level of a river system. Section 4(2), 6 and Section 24 of the regulation prohibits pollution of water bodies and requires that all substances discharged into the water bodies should meet the standards set under the Third Schedule of the regulation.

Everyone is required to refrain from any actions, which directly or indirectly cause water pollution, whether or not the water resource was polluted before the enactment of the Environmental Management and Coordination Act (EMCA) Gazetted in 1999. It is an offence to contravene the provisions of these regulations with a fine not exceeding five hundred thousand shillings.

In response to the above, the project design team should be advised on the requirements of this regulation and appropriately incorporate the regulations in the project design document.

4.9.1.3 Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations, 2006

The EMCA (Fossil Fuel Emission Control) Regulations, 2006 aims at eliminating or reducing emissions emitted from internal combustion engines to acceptable levels. The regulation provides guidelines on use of clean fuels, use of catalysts and inspection procedures for engines and generators. This regulation is applicable to the proposed project since there would be use of vehicles, machineries and equipment that consume fossil fuel as their source of energy. The requirements of the regulation must be implemented in order to eliminate or reduce air quality degradation. Sections of the regulation citing the standards of recommended emission levels will be given to the contractor and or pinned at strategic points in the contractor's field offices.

4.9.1.4 Environmental Management and Co-ordination (Waste Management Regulations, 2006)

The Waste Management Regulations are basically aimed at streamlining the handling, transportation and disposal of various types of wastes. The broad goal of the regulations is to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source. The regulations have also classified various types of waste and recommended appropriate disposal methods for each waste type. Under the regulations, NEMA is supposed to licenses transporters, incinerators, landfills, composers, recyclers and transfer stations. Facilities to be licensed include local authorities, transporters and handlers of various types of waste. The licensing employs a risk-based approach by concentrating on facilities considered to pose a high risk to the environment. The regulations also provide an opportunity for investment in various aspects of waste management. During the construction of the proposed road, proper disposal of wastes will need to be observed by the contractor at the workers camps and the road works. This will ensure good hygiene and healthy working environment for workers.

4.9.1.5 Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007

The EMCA (Controlled Substances) Regulation is aimed at controlling the production, consumption and, exports and imports of controlled substances. Controlled substances are grouped into three lists as indicated below:

- Group 1 list consists of halogenated flouro-chemicals with ozone depleting substances.
- Group 2 list consist of hydrobromoflourocarbons with ozone depleting substances.
- Group 3 list consist of bromochloromethane with ozone depleting substances.

Products containing controlled substances include air conditioners, air coolers, refrigerants, portable fire extinguishers, heat pump equipment, dehumidifiers, insulation boards, panels and pipe covers, pre-polymers, etc. The project contractors will need to ensure that the requirements of this regulation are observed in order to ensure that equipment, machinery, vehicles and chemicals containing such components are not imported into the country for use in the proposed project.

4.9.1.6 Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009

The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009 applies to all wetlands in Kenya whether occurring in private or public land. The objectives of the regulations is to provide for the conservation and sustainable use of wetlands and their resources in Kenya and promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development. The act also aims at ensuring the conservation of water catchments and the control of floods and the sustainable use of wetlands for

ecological and aesthetic purposes for the common good of all citizens. The act also makes provision for the protection of wetlands as habitats for species of fauna and flora. It also provides a framework for public participation in the management of wetlands.

The Act requires wetland resources to be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services. The Act requires special measures to be undertaken to preserve and maintain knowledge innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity in wetlands.

The regulation also calls for sustainable use of wetlands through integration into the national and local land use plans to ensure sustainable use of wetlands in the country. The road crosses several seasonal rivers (approximately 20) which are valuable wetlands and water resources along the Rhamu – Mandera route. The contractor will need to employ measures for the preservation and conservation of these wetlands and river systems and by provision of the necessary infrastructure like bridges at various crossing points.

4.9.1.7 Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009

The Noise and Excessive Vibration Pollution Control Regulations, 2009 prohibits excessive noise and vibration. It states that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. The contactor of the proposed road will have to ensure that no excessive noise and vibrations are made during the construction of the road. This is important since the construction of the new road will involve use of heavy earthmoving equipment and trucks which can generate excessive noise and vibrations which in return might impact negatively on the locals in the nearby villages. Motor vehicles used during the construction of the proposed road should also adhere to the regulations which prohibit excessive noise. The provision of the act on motor vehicle states that no person shall operate a motor vehicle which produces any loud and unusual sound exceeding 84 dB(A) when accelerating. The Act also states that no person shall at any time sound the horn or other warning device of a vehicle except when necessary to prevent an accident or an incident. Any person carrying out construction, demolition, mining or quarrying work should ensure that the vibration levels do not exceed 0.5 centimeters per second beyond any source property boundary or 30metres from any moving source.

4.9.2 The Occupational Safety and Health Act (OSHA), 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

The key areas addressed by the Act include:

- General duties including duties of occupiers, self-employed persons and employees;

- Enforcement of the act including powers of an occupational safety and health officer;
- Registration of workplaces;
- Health General Provisions including cleanliness, ventilation, lighting and sanitary conveniences;
- Machinery safety including safe handling of transmission machinery, hand held and portable power tools, self-acting machines, hoists and lifts, chains, ropes & lifting tackle, cranes and other lifting machines, steam boilers, air receivers, refrigeration plants and compressed air receiver;
- Safety General Provisions including safe storage of dangerous liquids, fire safety, evacuation procedures, precautions with respect to explosives or inflammable dust or gas;
- Chemical safety including the use of material safety data sheets, control of air pollution, noise and vibration, the handling, transportation and disposal of chemicals and other hazardous substances materials;
- Welfare general provisions including supply of drinking water, washing facilities, and first aid.

Under section 6 of the act, every occupier is obliged to ensure safety, health and welfare of all persons working in his workplace.

The employers' positive contribution towards the welfare of the employees include provision and maintenance of adequate supply of wholesome drinking water - section 91 and a first aid box or cupboard of the prescribed standard - section 95 at suitable point (s) conveniently accessible to all employees.

Other precautionary measures include: issuance of a permit to work to any employee, likely to be exposed to hazardous work processes or hazardous working environment, including such work processes as the maintenance and repair of boilers, dock work, confined spaces, and the maintenance of machinery and equipment, electrical energy installations, indicating the necessary precautions to be taken - section 96 (1); provision and maintenance for the use of employees, adequate, effective and suitable protective clothing including suitable gloves, footwear, goggle and head coverings in any workplace where employees are likely to be exposed to wet, injurious or offensive substance section 101 (1).

During construction and operations phases of the project, large labor force will be required. This Act makes provisions for safety, health and welfare of persons upon which provision of their protection will be based. These will protect them against hazards to health and safety arising out of or in connection with their activities at work especially during the construction phase. This Act therefore safeguards workers welfare during the project phases by ensuring capacity building on Health and safety of workers at work place. In summary, this act will be used a guideline to ensure health and safety of workers is guaranteed. The proponent will ensure that the contractor includes in the contract adequate measures to promote safety and health of workers during all phases of the proposed project.

There is a number of subsidiary legislation that was enacted to operationalize the OSHA 2007. The following are subsidiary legislation under OSHA 2007 which is relevant to the proposed project.

4.9.2.1 The Factories (First-Aid) Order- L.N 160/1979

The rules have been provided in an effort to address to injuries and accidents on site before further health care is provided. This necessitates for a number of first aid facilities and equipment to be provided at a workplace (both during construction and operation phases of the proposed project), their respective contents and first aid management at a given workplace.

The first aid order also requires that the First Aiders be trained by approved institutions and given annual refresher courses.

The contractor should therefore provide first aid equipment and facilities on site commensurate with the population of the workforce and train a number of first aiders commensurate to the number of the workforce and spatial distribution of the site.

4.9.2.2 The Factories and other Places of Work (Safety and Health Committees) Rules, 2004

These rules provide guidelines on the formation of safety and health committee and their roles at workplaces. Rule number 2 states; A Safety and Health Committee shall consist of safety representatives from the management and the workers.

The rules define the roles of the committee members and the frequency of meetings. As per the rules, meetings should be held at least once after every four months and the minutes of the meeting be submitted to DOSHS. Under these rules, the occupier should arrange for the statutory training of the committee members by an approved organization.

When the works commence, the contractor should formulate a safety and health committee with reference to the population of the workforce and follow the procedures provided for in these rules when electing safety representatives. Arrangements should also be made for annual training of the safety committee members by an accredited firm.

4.9.2.3 The Factories and Other Places of Work (Medical Examination) Rules, 2005

These Rules are made under the Occupational Safety and Health Act, 2007, through Legal Notice No. 24 of 1st April 2005. Rule number four requires the employer to ensure that all persons employed in any of the occupations outlined in the Eighth Schedule to the Act undergo both pre-employment and periodic medical examinations by the designated health practitioner (DHP) as outlined in the First Schedule of the Act.

The contractor will be expected to identify workers exposed to various hazards and conduct pre-employment, periodic and post-employment medical examinations. Workers exposed to noise should undergo audiometric tests

4.9.2.4 The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005

The aim of these rules is to ensure a workplace free of noise hazards or a workplace where the noise hazard has been reduced to manageable levels.

Rule 6 (1) (i), states; It shall be the duty of the occupier to carry out measurements of noise at least once in every period of twelve months in order to determine the prevailing noise conditions.

The Rules give directions on the maximum exposure level of different noise measurements in a workplace;

No worker shall be exposed to a noise level in excess of—

a) The continuous equivalent of ninety (90) dB (A) in eight hours within any twenty four hours duration;
b) One hundred and forty dB (A) peak sound level at any given time.

Where noise is intermittent, noise exposure shall not exceed the sum of the partial noise exposure equivalent continuous sound level of ninety (90) dB (A) in eight hour duration within any twenty four hours duration.

It shall be the duty of the occupier to ensure that noise that gets transmitted outside the workplace shall not exceed fifty five dB (A) during the day and forty five dB (A) during the night; and

Where noise in a workplace exceeds the continuous equivalent of eighty five (85) dB (A) the occupier must develop and implement an effective noise control and hearing conservation programme.

The contractor should ensure that the maximum permissible noise levels are not exceeded at all phases of the project during the construction phase of the project. In addition, it is recommended to the contractor to obtain a noise permit during noisy works from NEMA.

4.9.2.5 The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007

These rules provides for measures to be undertaken by occupiers to control the risks of fire outbreaks in work places. The measures include provision of portable firefighting equipment, training of the firefighting team and maintenance of the firefighting appliances provided on sites.

The rules give directions on safe storage, transport and general handling of flammable material on site.

The rules provide for putting in place appropriate emergency preparedness plans for fire.

Under these rules the contractor will be required to carry out the following inter alia;

- Carry out a fire safety audit of the site (to be done by an approved fire safety auditor) annually
- Provide and periodically service appropriate firefighting appliances
- Put in place emergency preparedness arrangements
- Conduct fire drills annually to test the effectiveness of the emergency procedures put in place.

Train fire marshals and give them refresher training annually

4.9.3 The Mandera County Public Works Act, 2014

This is an Act of Mandera County Assembly to make provision for storm water management, County water services and sanitation and for related matters. Part II of the Act provides for storm water management. Section 3 (Protection of storm water system) states that a person shall not, unless with the written consent of the Executive Member and subject to any conditions it may impose:

i. Discharge, permit to enter or place anything other than storm water into the storm water system;
ii. Damage, endanger, or destroy the storm water system or its operation;
iii. Construct or erect any structure or thing or over or in such a manner to interfere with or endanger the storm water system or its operation;
iv. Discharge, permit to enter or place anything likely to cause storm water pollution;
v. Make an opening into a storm water pipe, canal or culvert;
vi. Drain, abstract or divert any water directly from the storm water system; or
vii. Fill, excavate, shape, landscape, open up or remove the ground above, within, under or immediately next to any part of the storm water system

Section 8 of the Act states that the County Executive Member will from time to time make regulations related to this Act for implementation. It will be prudent for the proponent and the contractor to adhere to this Act during construction phase of the project.

4.9.4 The Mandera County Air Pollution, Noise Pollution, Nuisances and Outdoor Advertisement Act, 2014.

This is an Act of the County Assembly of Mandera to provide for the regulation and management of air pollution, noise pollution and other nuisances; outdoor advertising and for connected purposes. Section 10, Part III (Air Pollution) of the Act prohibits incidences of air pollution. Section 23, Part IV (Noise Pollution) of the Act requires a person undertaking noise activity whose noise levels may constitute danger to make an application for a license prior to undertaking the activity.

4.9.5 Community Land Act 2016

The Community Land Act, No. 27 of 2016 (the Act) came into force on 21 September 2016.

The Act aims at: 1. Giving effect to Article 63 of the Constitution of Kenya, 2010 (the Constitution) which provides for a classification of land known as community land. To this end, the Constitution provides that community land shall vest in and be held by communities. 2. Providing for;

- The recognition, protection and registration of community land rights.
- The management and administration of community land.
- The role of county governments in relation to unregistered community land and related matters.

The Act repeals the Land (Group Representatives) Act (Chapter 287 of the Laws of Kenya) and the Trust Lands Act (Chapter 288 of the Laws of Kenya). This project shall uphold the requirement of all the relevant land legislations, involving key administrative stakeholders and the affected parties (i.e. the community) facilitating in coexistence with the surrounding community.

4.9.6 The Land Registration Act, 2012

This is an Act of Parliament that revises, consolidates and rationalizes the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes. The Act provides for proper marking and maintenance of boundaries of properties. An interested person who has made an application to the Registrar for his/her boundaries to be ascertained, the Registrar shall give notice to the owners and occupiers of the land adjoining the boundaries in question of the intention to ascertain and fix the boundaries. With regard to the maintenance of boundaries, the Act requires every proprietor of land to maintain in good order the fences, hedges, stones, pillars, beacons, walls and other features that demarcate the boundaries, pursuant to the requirements of any written law.

4.9.7 The National Land Commission Act, 2012 (No. 5 of 2012)

The National Land Commission of Kenya is an independent government commission whose establishment was provided for by the Constitution of Kenya to, amongst other duties, manage public land on behalf of the national and county governments, initiate investigations into present or historical land injustices, recommend appropriate redress, monitor and have oversight responsibilities over land use planning throughout the country. It was officially established under The National Land Commission Act, 2012. The mandate of the National Land Commission is drawn from the National Land Policy of 2009, Constitution of Kenya 2010, National Land Commission Act, 2012, the Land Act 2012 and the Land Registration Act of 2012. Under the National Land Commission Act, the Commission shall among others duties monitor the registration of all rights and interests in land and ensure that public land and land under the management of designated state agencies are sustainably managed for their intended purpose and for future generations. Also, the commission is required to manage and administer all unregistered trust land and unregistered community land on behalf of the county government and develop and encourage alternative dispute resolution mechanisms in land dispute handling and management. The Commission is also required in consultation and cooperation with the national and county governments, to establish county land management boards for the purposes of managing public land.

4.9.8 The Environment and Land Court Act, 2011

This is an Act of Parliament to give effect to Article 162(2)(b) of the Constitution to establish a superior court to hear and determine disputes relating to the

environment and the use and occupation of land. The Environment and Land Court is one of the Courts contemplated by article 162(2). It is a Superior Court and has the same status as the High Court. The court is established under section 4 of the Environment and Land Court Act No. 19 of 2011. It has jurisdiction to hear any other dispute relating to environment and land. The jurisdiction of the court is provided under section 13 of the Act. The Court has original and appellate jurisdiction to hear and determine all disputes in accordance with Article 162(2) (*b*) of the Constitution and with the provisions of the Act or any other written law relating to environment and land. The court has powers to deal with disputes relating to land administration and management. The court is also empowered to hear cases relating to public, private and community land and contracts or other instruments granting any enforceable interests in land. The court also exercises appellate jurisdiction over the decisions of subordinate courts or local tribunals in respect of matters falling within the jurisdiction of the Court. The court further exercises supervisory jurisdiction over the subordinate courts, local tribunals, persons or authorities in accordance with Article 165(6) of the Constitution.

4.9.9 Natural Resource (Benefit sharing Bill), 2014

The Natural Resource (Benefits sharing) Bill 2014 was published by the senate on September 12, 2014. The Bill intends to streamline natural resource sharing between the two levels of government with specific emphasis on trickling benefits back to the communities in areas with abundant resources. There has been a resurgent need for Kenya to explore mineral deposits ranging from traces of oil and natural gases, to deposits of rare earth minerals at the Coast. The recent discovery of oil and large aquifer of water in Turkana has attracted investors and oil exploration companies to head to the North. Hence this Bill came at an opportune moment resulting in county economic development and stability.

The Bill proposes a benefits sharing agreement between an affected organization and the respective county government; that will also include non-monetary benefits after the Bill becomes law. This will essentially help communities living around the natural resource mining sites to keep the firms legally accountable to the provisions in the agreements signed. These natural resources include water and forests, which stand to benefit further projects pledged by the firms. This Bill also allows county governments to be in control of the mining activities going on in their areas and safeguard the interest of their population.

A county-benefit-sharing committee composed of the county executive committee member responsible for finance, the chairperson of the committee of the respective county assembly responsible for matters relating to natural resources, and five persons elected by the local community where the resource bestrides will be formed. It also provides avenues for county administrations to make demands, including employment quotas, where the county demands a certain percentage of employees be from the devolved unit. This will help counties in provision of employment opportunities to the population through employment and contracts in supplies and hospitality. The county governments are also the biggest beneficiary in this Bill especially on revenues from fees and royalties charged on natural resources. Under the Bill, the county where the resource is utilized will receive 32 per cent of the revenues while the national government's portion has been reduced to 48 per cent.

If approved, the Bill will settle squabbles over the sharing of revenue from natural resources including oil, gas, minerals, forest resources, water and wildlife. Currently, mining firms are only required to submit revenue to the national government, denying locals a chance to reap from the natural resources. This Bill will stem the perennial destruction of environment, regulate exploitation of natural resources and improve the benefits that accrue to the counties and hence enhance better living conditions for the population. Meanwhile the project shall ensure sustainable development principles are adopted throughout the entire project cycle, with the local community enjoying the benefit of natural resources they have been bestowed with.

4.9.10 The Forest Conservation and Management Act, 2016

Part IV of the Act provides for the Conservation and Management of Forests be it either public, community or private forests. Section 42 of the Act further states that all indigenous forests and woodlands shall be managed on a sustainable basis for purposes of:

- Conservation of water, soil and biodiversity;
- Riparian and shoreline protection;
- Cultural use and heritage;
- Recreation and tourism;
- Sustainable production of wood and non-wood products
- Carbon sequestration and other environmental services:
- Education and research purposes.
- Habitat for wildlife in terrestrial forests and fisheries in mangrove forests;

Section 75.(1) of the Act states that where a provision of this Act requires a person to conserve or protect the environment, the relevant provisions of the Environmental Management and Co-ordination Act, 1999, shall also apply with respect to the manner in which the conservation or protection shall proceed. (3)A user or other related right shall not be granted under this Act where the requirement for a strategic environmental, cultural, economic and social impact assessment licence under the Environmental Management and Co-ordination Act, 1999, has not been complied with.

4.9.11 The Wildlife Conservation and Management Act 2013

The Wildlife Conservation and Management Act deals with the conservation and management of wildlife in Kenya; the Act provides that wildlife should be conserved so as to yield optimum returns in terms of cultural, aesthetic, scientific and economic benefits. The Act requires that full account be taken of the inter-relationship between wildlife conservation and land use. The Act controls activities within the national parks, which may lead to the disturbance of wild animals. Unauthorized entry, residence, burning, damage to objects of scientific interest, introduction of plants and animals and damage to structure are prohibited under this law.

4.9.12 The Water Act 2016

The Water Act, 2016 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, and requirement for permits, state schemes and community projects.

Part III, section 11, of the Water Act 2016 provides for regulation of the management and use of water resources. Following on this, sub-section 12 allows the Water Resources Authority (WRA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information thereof furnished to the Authority.

The contractor shall ensure proper water use, management and conservation. In the event of borehole drilling WRA shall be consulted by the project hydro geologists for the purpose of attaining permits for borehole sinking.

4.9.13 The Kenya Roads Act, 2007

This is an Act of Parliament that provided for the establishment of Kenya Road Agencies i.e. Kenya National Highways Authority (KeNHA), the Kenya Urban Roads Authority (KURA) and the Kenya Rural Roads Authority (KeRRA), and provided powers and functions of the authorities.

KeNHA is mandated to manage, develop, rehabilitate and maintain all national roads. Other function vested to this authority relevant to the proposed project are: controlling national roads and road reserves and access to roadside developments; implementing road policies in relation to national roads; ensuring adherence to the rules and guidelines on axle load control prescribed under the Traffic Act (Cap. 403) and under any regulations under this Act; ensuring that the quality of road works is in accordance with such standards; in collaboration with the Ministry responsible for Transport and the Police Department, overseeing the management of traffic and road safety on national roads; collecting and collating all such data related to the use of national roads as may be necessary for efficient forward planning under this Act; monitoring and evaluating the use of national roads; planning the development and maintenance of national roads and liaising and coordinating with other road authorities in planning and on operations in respect of roads.

4.9.14 The Kenya Roads Board Act, 1999

The Act was assented in January 2000. Establishing a board to oversee the road network in Kenya and thereby coordinate its development, rehabilitation and maintenance and to be the principal adviser to the Government on all matters related to Road Development.

The Standard Specifications for Road and Bridge construction has guidelines on environmental protection and mitigation. Standard Specification Clauses 116,117,125,135,137 specifically address protection of the environment, with

regard to water, health, safety and accidents, water supply, maintenance of the engineers' staff houses, offices, laboratories, and attendance upon the engineer and his staff. The provisions of these standards and codes must not be contravened during project implementation. These provisions are largely supportive of EMCA 1999 and forms part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement.

4.9.15 Public Roads and Roads of Access Act Cap 399

The Public Roads and Roads of Access Act Cap.399 Act states that a public road is any road which the public has a right to use immediately before the commencement of this Act, or all proclaimed or reserved roads and thoroughfares being or existing on any land sold or leased or otherwise held under the East Africa Land Regulations, 1897, the Crown Lands Ordinance,1902, or the Government Lands Act at any time before the commencement of this Act and all roads and thoroughfares hereafter reserved for public use. The construction of the proposed road will need to take note of the provisions of this Act

4.9.16 The Traffic Act Cap 403 of 2013

The Traffic Act reserves the use of the road corridor for road facilities only. Any vegetation grown to protect the road edges should not cause problems during maintenance. Encroachment along the road corridor will have to be checked especially during the operational phase of the project. The Act also spells out conditions for use of roads by motorists, among others.

4.9.17 Work Injury Benefit Act 2007

The Work Injury Benefit Act (WIBA) 2007 provides guideline for compensating employees on work-related injuries and diseases contacted in the course of employment. The Act also requires provision of compulsory insurance for all employees. The Act defines an employee as any worker on contract of service with employer. It will be important for the Contractor of the proposed project to ensure that all workers contracted during the project implementation phase are provided with appropriate insurance covers so that they can be compensated in case they get injured while working. An employee can only be subject to incentives provided by this regulation upon injury or disablement only if the employer has registered their workplace with the Work Injury Benefit Administration.

4.9.18 The Public Health Act (Chapter 242) of Revised Edition 2012

The Public Health Act (Chapter 242) is an Act of Parliament that provides for securing and maintaining good health of citizens. The Act contains directives that are focused on ensuring protection of human health. There are provisions within the Act that deal with water, air and noise quality as they pertain to human health. An environmental nuisance includes the emission from premises of waste waters, gases and smoke which could be regarded as injurious to health. The owner and/or occupier of premises responsible for such nuisances are liable to prosecution under the Act. The construction of the proposed highway has potential pollution risks related to water and air. The contractor will need to ensure that air and water pollution is controlled and does not affect people living along the proposed road and even workers residing in various construction camps established all along the route

4.9.19 The Valuers Act cap 532, 1985

The revised edition 1985 of the Valuers Act Cap 532 makes provisions for the relevant charges and conducts of valuers in relation to valuation of assets. During the field survey, it was noted that the proposed road will displace some businesses within Rhamu town. An inventory conducted established approximately 3 permanent structures, 33 semi-permanent structures and 88 temporary (*kiosks*) structures along the 25m road reserve within Rhamu town. In this regard, there will be a need for valuation of these properties along the road corridor in the event that the proposed road project will pass through the town. This must be conducted as per the laid Abbreviated Resettlement Action Plan guidelines by World Bank and as per the Valuers Act.

The Act also provides the relevant regulations and guidelines in the undertaking of the valuation works. The Act requires that adequate valuation is carried out to help meet the actual compensation measures and the market rates and reduce any acts of malice in the exercise. A competent valuer will have to be deployed to site to carry out the professional valuation of assets for compensation.

4.9.20 Physical Planning Act (No. 6 of 1996)

This Physical Planning Act (No. 6 of 1996) provides for the preparation and implementation of physical development plans. Section 36 of the Act provides for environmental impact assessments and states that 'if in connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report'. The proponent and contractors of the proposed road project will need to comply with the requirements of this Act

4.9.21 The Penal Code (Cap. 63)

The Penal Code (Cap. 63) chapter on "Offences against Health and Conveniences" strictly prohibits the release of foul air into the environment, which affects the health of other persons. Any person who voluntarily violates the atmosphere at any place, to make it noxious to health of persons in general dwelling or carrying out business in the neighborhood or passing along public ways is guilty of misdemeanor and shall be subjected to imprisonment not exceeding two years with no option of fine. Under this code, any person who for the purpose of trade or otherwise makes loud noise or offensive awful smell in such places and circumstances as to annoy any considerable number of persons in the exercise of their rights, commits an offence, and is liable to be punished for a common nuisance, i.e. imprisonment not exceeding one year with no option of fine. The contractor of the proposed road project will therefore need to ensure that all emissions are controlled during the construction phase of the project to avoid interference on health of the local communities and the workers.

4.9.22 The Employment Act, 2007

The Employment Act, 2007 defines the fundamental rights of employees including the basic conditions of employment of workers. It also regulates employment of

children. The contractor on site will have to employ casual laborers from the local communities where the road traverses during construction.

The basic conditions of employees should be observed to avoid unnecessary conflicts during the construction works. The Contractor shall pay the entire amount of the wages earned by or payable to the workers. Payment of such wages should be done at the end of a working day at or near the place of work. The Contractor shall also ensure that all statutory deductions are submitted without delay to appropriate government agencies e.g. Kenya Revenue Authority, NSSF, NHIF, among others.

4.9.23 Building Code 2000

This by-law recognizes the county governments as the leading planning agencies. It compels potential developers to submit development applications for the approval. The county governments are hence empowered to approve or disapprove any plans if they do or don't comply with the law, respectively. Any developer who intends to erect a building must give the respective local authority a notice of inspection before the erection of the structure. On completion of the structure, a notice of completion shall be issued by the local authority to facilitate final inspection and approval. No person therefore shall occupy a building whose certificate of completion has not been issued by the county government.

Section 214 of the by law requires that any public building where the floor is more than 20 feet above the ground level should be provided with firefighting equipment that may include one or more of the following; hydrants, hose reels and fire appliances, external conations portable fire appliances, water storage tanks, dry risers, sprinkler, drencher and water spray spring protector system.

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the local authority for a permit to connect to the sewer and all the waste water must be discharged to the sewers. Finally section 196 provides that the county government may refuse to admit to sewer any trade waste or any other effluent unless it has been treated in an approved manner. In this regard, the county government may cause the occupier of the premise to construct an approved manhole connected to the pipe conveying such effluent. In the development of the project, the proponent will have to comply with the provisions of this Act especially during the establishment of the workers' camps.

4.9.24 Security Laws (Amendment) Act, 2014

This act entails a legal framework and jurisdiction on security matters. It is a constitutional entitlement to live and feel secure from agents that may compromise ones' life and safety. Security measures are vital in this project following past terrorist experiences reported in the area; the contractor shall embark on a community policing program to be executed by a competent security firm. It is recommended that the government provides adequate support to enhance the security of persons involved in the project and the community at large, providing critical intel that will trigger a review of the existing security measures and tactics.

4.9.25 HIV / AIDS Act, 2006

Section 3 of the Act indicates the purpose of the legislation including public awareness and rights to people living with HIV/AIDS. Public awareness shall be achieved through education, public campaigns even at workplaces. This Act's provisions then gives the guidelines unto which the project shall follow in educating workers and staff and providing of incentives to combat HIV/AIDS.

4.9.26 Energy Act, 2007

This is an Act of Parliament to amend and consolidate the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority, and for connected purposes. The provisions of this Act apply to every person or body of persons importing, exporting, generating, transmitting, distributing, supplying or using electrical energy; importing, exporting, transporting, refining, storing and selling petroleum or petroleum products; producing, transporting, distributing and supplying of any other form of energy, and to all works or apparatus for any or all of these purposes.

The Act establishes a Commission known as the Energy Regulatory Commission, that among other roles, is expected to regulate (i) importation, exportation, generation, transmission, distribution, supply and use of electrical energy, (ii) importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products; (iii) production, distribution, supply and use of renewable and other forms of energy.

4.9.27 Public Private Partnership (PPP) Act, 2013

This is an Act of Parliament that was signed into law in February 2013 to provide for the participation of the private sector in the financing, construction, development, operation, or maintenance of infrastructure or development projects of the Government through concession or other contractual arrangements; the establishment of the institutions to regulate, monitor and supervise the implementation of project agreements on infrastructure or development projects and for connected purposes.

The Act also established a PPP unit committee whose powers and functions are provided in section 7 of the Act.

4.9.28 Urban Areas and Cities Act No 13 of 2011

This is an Act of Parliament to give effect to Article 184 of the Constitution, to provide for the classification, governance and management of urban areas and cities and to provide for the criteria of establishing urban areas. The Act also provide for the principle of governance and participation of residents of towns and cities. Under the Act a town is an urban area with a population of at least ten thousand residents. Also, under the Act the management of a city and municipality is vested in the county governments. The County Governments may impose such fees, levies and charges for delivery of services by the municipality or the city

4.9.29 The National Gender and Equality Act, 2011

National Gender Equality Commission (NGEC) is a constitutional Commission established by an Act of Parliament in August 2011, as a successor commission to the Kenya National Human Rights and Equality Commission pursuant to Article 59 of the Constitution. NGEC derives its mandate from Articles 27, 43, and Chapter Fifteen of the Constitution; and section 8 of NGEC Act (Cap. 15) of 2011, with the objectives of promoting gender equality and freedom from discrimination.

Gender mainstreaming in road projects ensures that the concerns of women and youth form an integral dimension of the project design, implementation, operation and the monitoring and evaluation ensures that women and men benefit equally, and that inequality is not perpetuated.

4.9.30 The Sexual Offences Act, 2006 and its amendment 2012

Observing a standard work ethic is recommended to ensure persons from both genders are not subjected to sexual offences. Ample working environment should prevail in all work places in the project, to be enhanced through implementation of a Sexual Misconduct Policy.

4.9.31 Matrimonial Property Act (No. 48 of 2013)

Matrimonial property is property owned or obtained by either or both married spouses before or during their marriage. It is sometimes called 'matrimonial assets.' Matrimonial property includes the matrimonial home; the home that the couple lived in during their marriage. It also includes many other things, not just physical property like land or houses but also things like the contents of the home, furniture and appliances, vehicles that a couple owns while married, and sometimes other things as well. It may include work pensions that either spouse may have, and also certain debts that the parties have.

The law that deals with matrimonial property in Kenya is called the *Matrimonial Property Act*. This act only applies to married couples, or couples who are in a Registered Domestic Partnership. This act does not apply to common law couples.

When a married couple separates, either person can apply to the court to divide property, pensions, or debts. These issues, though, are usually dealt with during a divorce. It is important to speak to a lawyer for advice before dividing property, pensions, or debts. Once a couple is divorced, these issues are usually finished. You usually can't re-open them in the future if you've made a mistake.

4.9.32 Persons with Disability Act, Chapter 133

This act protects the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The act guarantees that (1) No person shall deny a person with a disability access to opportunities for suitable employment. (2) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.

A person with disability is entitled to exemptions which apply with respect to exemptions and deductions as described in Schedule 42 subsection (2) of the act, among other provisions within this act that should be complied with all parties involved.

4.10 International Conventions

There are number Multi-Lateral Environmental Agreements (MEAs) that are relevant to the proposed project. These are described in the following section.

4.10.1 Vienna Convention on the Protection of the Ozone Layer

This was an Intergovernmental negotiation for an international agreement to phase out ozone depleting substances concluded in March 1985 which saw the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of CFC production, and the exchange of information.

4.10.2 United Nations Convention on Biological Diversity (UNCBD)

The purpose of this convention is to ensure the conservation and sustainable use of biodiversity. Kenya signed the convention on 5th June 1992 and ratified the same on 26th July 1992. The National Environment Management Authority (NEMA) is the National Focal Point to this Convention. The provisions of this Convention have been integrated in many laws of Kenya.

4.10.3 African Convention on the Conservation of Nature and Natural Resources

This convention reaffirms the importance of natural resources both renewable and non-renewable, particularly the soil, water, flora and fauna. The main objective is to facilitate sustainable use of the above resources. The convention was adopted in Algiers on 15th September, 1968 and came into force on 16th June 1969.

4.10.4 Convention on International Trade in Endangered Species

This Convention was adopted on 3rd March 1973 and came into force on 1st July 1975. The purpose of the Convention is to regulate the international trade in wild plants and animals that are at risk of extinction as a result of trade. The Convention seeks to control trade not only in live species but also in dead specimen and their derivatives. The Kenya Government ratified CITES on 13th December 1978. The lead agency for the CITES in Kenya is the Kenya Wildlife Service (KWS).

4.10.5 United Nations Convention to Combat Desertification (UNCCD)

The above Convention was adopted on 17th June 1994 in Paris and came into force on 26th December 1976.Kenya ratified the Convention in 24th June 1997. The purpose of the UNCCD is to address the problem of the degradation of land by desertification and the impact of drought particularly in arid and dry semi-humid areas. NEMA is the focal point for the Convention.

4.10.6 The 1992 United Nations Framework Convention on Climate Change (UNFCCC)

The primary purpose of the convention is to establish methods to minimize global warming and in particular the emission of the greenhouse gases. The UNFCCC was adopted on 9th May 1992 and came into force on 21st March 1994. The Convention has been ratified by 189 states. Kenya ratified the Convention on 30th August 1994. NEMA is the focal point for the Convention.

4.10.7 Kyoto Protocol to the United Nations Framework Convention on Climate Change

The Kyoto Protocol requires signatories to the United Nations Framework Convention on Climate Change to reduce their greenhouse emissions levels to 5% below 1990 levels by the year 2012. The Protocol came into force on 16th February 2005, after it received the pre-requisite signatures. However, major countries like United States, China, India, and Australia are not signatories to the Protocol. NEMA is the national focal point for this Protocol.

4.10.8 Earth Summit on Sustainable Development Agenda 21

Agenda 21 is a non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development. It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992. It is also regarded as an action agenda for the UN, other multilateral organizations, and individual governments around the world that can be executed at local, national, and global levels. The "21" in Agenda 21 refers to the 21st Century. Agenda 21 Section I on Social and Economic Dimensions is directed toward combating poverty, especially in developing countries, changing consumption patterns, promoting health, achieving a more sustainable population, and sustainable settlement in decision making.

Section II on Conservation and Management of Resources for Development Includes atmospheric protection, combating deforestation, protecting fragile environments, conservation of biological diversity (biodiversity), control of pollution and the management of biotechnology, and radioactive wastes.

Section III focuses on strengthening the Role of Major Groups including the roles of children and youth, women, NGOs, local authorities, business and industry, and workers; and strengthening the role of indigenous peoples, their communities, and farmers. Kenya continues to implement Agenda 21 to support sustainable development through the integration of environmental concerns into the national development policies, plans, and programmes. Also relevant is the implementation of Agenda 17. The proposed project would need to be consistent with the objectives of Agenda 21.

4.10.9 Sustainable Development Goals (SDGs)

The SDGs include 17 Sustainable Development Goals and 169 targets. They seek to build on the Millennium Development Goals and complete what they did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

4.10.10 Convention on the Rights of the Child (CRC)

The Convention on the Rights of the Child (CRC), 1989 is the most comprehensive compilation of international legal standards for the protection of the human rights of children. The CRC is also the most widely ratified international human rights treaty, ratified by all countries in the world, with the exception of two.

The Convention acknowledges children as individuals with rights and responsibilities according to their age and development (rather than the property of their parents or as victims), as well as members of a family and community. Underlying the Convention are four main principles: non-discrimination, the best interests of the child, the right to life, survival and development and the right to participation.

4.10.11 Convention on the Elimination of all forms of Discrimination against Women (CEDAW)

The Convention on the Elimination of all forms of Discrimination against Women (CEDAW) places explicit obligations on states to protect women and girls from sexual exploitation and abuse. Universal Declaration of Human Rights (Article 7), the UN Charter (Articles 1, 13, 55, and 76) and the International Covenant on Civil and Political Rights (Article 24) reaffirm the freedoms and rights of all children, including internally displaced children.

4.10.12 International Labour Organization

The International Labour Organization (ILO) is built on the constitutional principle that universal and lasting peace can be established only if it is based upon social justice. The ILO has generated such hallmarks of industrial society as the eight-hour working day, maternity protection, child-labour laws, and a range of policies which promote workplace safety and peaceful industrial relations.

The ILO has four principal strategic objectives:

- To promote and realize standards, and fundamental principles and rights at work.
- To create greater opportunities for women and men to secure decent employment.
- To enhance the coverage and effectiveness of social protection for all.
- To strengthen tripartism and social dialogue.

The key ILO Conventions applicable to the proposed road project include:

- Equal Remuneration Convention (1951) (No. 100) - Calls for equal pay and benefits for men and women for work of equal value.
- Discrimination (Employment and Occupation) Convention (1958) (No. 111) - Calls for a national policy to eliminate discrimination in access to employment, training, and working conditions, on grounds of race, colour, sex, religion, political opinion, national extraction or social origin, and to promote equality of opportunity and treatment.

- Minimum Age Convention (1973) (No. 138) - Aims at the abolition of child labour, stipulating that the minimum age for admission to employment shall not be less than the age of completion of compulsory schooling.
- Worst Forms of Child Labour Convention (1999) (No. 182) - Calls for immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour which include slavery and similar practices, forced recruitment for use in armed conflict, use in prostitution and pornography, any illicit activity, as well as work which is likely to harm the health, safety, and morals of children.

4.11 Project Administration

4.11.1 Establishment of an Environmental, Health and Safety Office

The ESIA Process will culminate with the formulation of a comprehensive Environmental and Social Management Plan. In order to ensure the latter is fully implemented, the Contractor should be required to establish an Environmental, Health and Safety (EHS) office that will continuously advise on EHS components of the project implementation. Elements in the environmental and social management plan are expected to be integrated in the project with appropriate consultations with KeNHA through the supervising environmental and social expert.

The EHS officer of the contractor will also be expected to full understand the engineering and management aspects of the project for effective coordination of relevant environmental issues listed in the Environmental and Social Management Plan.

4.11.2 Environment Supervisor

The environment supervisor should be appointed by KeNHA (as the project client) to ensure effective implementation of the environmental management plan. It is expected that the supervisor will engage the services of an environmental expert who should master all environmental recommendations and the proposed action plans, timeframes and expected targets. The environmental expert should be the liaison person between the contractor and the KeNHA on the implementation of environmental concerns as well as issues of social nature associated with the implementation of the project.

4.11.3 Environmental and Social Section (KeNHA)

KeNHA has an established Environmental and Social Management Department to facilitate compliance of road projects with the requirements of environmental laws and regulations. This office advises KeNHA projects on various compliance issues. The office also has established linkages with NEMA. Projects contracts should be reviewed by this office directly or through the environment supervisor. Regarding the implementation of the social and economic aspects of the ESMP, it is proposed that the Resident Engineer works closely with the Environmental and Social officer of KeNHA in order to address relevant issues such as the resettlements, HIV/AIDS, gender, health and safety issues and conflicts during the implementation of the project.

4.12 World Bank Environmental and Social Performance Standards

The World Bank's environmental and social performance standards are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for Bank and borrower staffs in the identification, preparation, and implementation of programs and projects. In essence, the performance standards ensure that environmental and social issues are evaluated in decision making, help reduce and manage the risks associated with a project or program, and provide a mechanism for consultation and disclosure of information.

4.12.1 Performance Standard 1 (Environmental Assessment)

Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the developer/proponent, its workers, local communities directly affected by the project and, where appropriate, other stakeholders. The Standard covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and trans-boundary and global environment concerns. A range of instruments can be used to conduct Environmental Assessments i.e. EIA, Environmental Audit, hazard or risk assessment and Environmental and Social Management Plan (ESMP). The Borrower is responsible for carrying out the EIA.

The performance standard has the following objectives:

- To identify and evaluate environmental and social risks and impacts of the project.
- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.
- To promote improved environmental and social performance of project proponent through the effective use of environmental management systems.
- To promote and provide means for adequate engagement with Affected Communities such as the immediate neighbors and project beneficiaries throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

In fulfillment of this performance standard, this ESIA Study was undertaken to identify impacts related to the project using the standard local and international guidelines.

4.12.2 Performance standard 2 (Labour and Working Conditions)

This standard's provisions have been guided by the International Labor Organization (ILO) and the United Nation and it recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. For any business,

the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention, and can jeopardize a project.

Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, project proponents/developer may create tangible benefits, such as enhancement of the efficiency and productivity of their operations.

With one of its key objectives being promotion of compliance with national employment and labor laws it thus gives provisions in ensuring Occupational Health and Safety of workers for any development projects.

4.12.3 Performance Standard 3 (Resource Efficiency and Pollution Prevention)

This performance standard recognizes that increased economic activity and development often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies practices have become more accessible and achievable in virtually all parts of the world. These are often implemented through continuous improvement methodologies similar to those used to enhance quality or productivity, which are generally well known to most industrial, agricultural, and service sector companies.

This Performance Standard outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices.

The objectives of this standard are applicable to the proposed project:

- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To promote more sustainable use of resources, including energy and water.
- To reduce project-related GHG emission such us by use integrated Pest Management Methods (IPM) in agriculture hence reducing use of aerosols.

4.12.4 Performance Standard 4 (Community Health, Safety, and Security)

The standard recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the developer's responsibility to avoid or minimize the risks and impacts to community health,

safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.

In conflict and post-conflict areas, the level of risks and impacts described in this Performance Standard may be greater.

The risks that a project could exacerbate an already sensitive local situation and stress scarce local resources should not be overlooked as it may lead to further conflict.

The objectives that are in line with the Proposed Project are:

- To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

4.12.5 Performance Standard 5 (Land Acquisition and Involuntary Resettlement)

Performance Standard 5 identifies that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement involves both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

To help avoid expropriation and eliminate the need to use governmental authority to enforce relocation, clients are encouraged to use negotiated settlements meeting the requirements of this Performance Standard, even if they have the legal means to acquire land without the seller's consent.

The objectives of this standard are:

- To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs.
- To avoid forced eviction.
- To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.

- To improve, or restore, the livelihoods and standards of living of displaced persons.
- To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure5 at resettlement sites.

4.12.6 Performance Standard 6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources)

Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."

This Performance Standard addresses how clients can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle.

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services.
- To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.

4.12.7 Performance Standard 7 (Indigenous People)

Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases. Private sector projects can create opportunities for Indigenous Peoples to participate in, and benefit from project related activities that may help them fulfill their aspiration for economic and social development.

Furthermore, Indigenous Peoples may play a role in sustainable development by promoting and managing activities and enterprises as partners in development. Government often plays a central role in the management of Indigenous Peoples' issues, and clients should collaborate with the responsible authorities in managing the risks and impacts of their activities.

The proposed project area in mainly occupied by people with Somali culture. Most of them are nomads as they move from place to place in search for pasture. Six villages have been established along the proposed road corridor.

The major objectives these standards are:

- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.
- To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation with the Indigenous Peoples affected by a project throughout the project's life-cycle.
- To ensure the Free, Prior, and Informed Consent of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.

4.12.8 Performance Standard 8 (Cultural Heritage)

Performance Standard 8 affirms the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that developers protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. Objectives

- The objectives the standards are:-To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To promote the equitable sharing of benefits

Critical cultural heritage consists of one or both of the following types of cultural heritage:

(i) The internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or

(ii) Legally protected cultural heritage areas, including those proposed by host governments for such designation.

During public participation, and area near Sala hill had salty rock that plays a critical role in the community as feed to the livestock. The salty rock has been in existence for quite some time and it will be prudent for the proponent and contractor to take note and preserve this vital mineral.

The client should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances when impacts on critical cultural heritage are unavoidable, the client will use a process of Informed Consultation and Participation (ICP) of the Affected Communities as described in Performance Standard 1 and which uses a good faith negotiation process that results in a documented outcome. The client will retain external experts to assist in the assessment and protection of critical cultural heritage.

CHAPTER FIVE: PUBLIC PARTICIPATION AND STAKEHOLDERS ENGAGEMENT

5.1 Introduction

The Public Participation Process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58, on ESIA. It is an important process through which stakeholders including beneficiaries and members of public living in or along project areas (both public and private), are given an opportunity to contribute to the overall project design by making recommendations and raising concerns projects before they are implemented. In addition, the process creates a sense of responsibility, commitment and local ownership for smooth implementation.

This chapter describes the process of the public consultation and public participation that was followed in order to identify the key issues and impacts of the proposed project. Views from the local community, local leaders, surrounding institutions and development partners for the proposed road project, who in one way or another would be affected or have interest in the proposed project were sought through interviews and public meetings as stipulated in the Environment Management and Coordination Act, 1999, the Equator Principles and the World Bank Performance Standards.

5.2 Consultation and Public Participation (CPP)

The objective of the consultation and public participation was to:

- Disseminate and inform the stakeholders about the project with special reference to its key components and location,
- Create awareness among the public on the need for the EISA for the proposed project,
- Gather comments, suggestions and concerns of the interested and affected parties,
- Incorporate the information collected in the ESIA study.
- Comply with EMCA 1999 Section 58 regulations.

In addition, the process enabled the establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government; and the concerns of the stakeholders to be known to the decision-making bodies at an early phase of project development.

5.3 Methodology used in Consultative Public Participation

The Consultative Public Participation involved in-depth consultations with key informants including the County Governments and National Government Coordinators, CBOs, local leaders, local community elders and traders along the road corridor. The in-depth interviews were used as a tool for stakeholder identification and mobilization as well as collection of baseline data and information. In addition, it provided an opportunity to the participants to raise their concerns about the proposed project and make recommendations on how negative impacts can be minimized as well as enhancing the positive impacts. In addition, the team also

obtained information from the public through observations and discussions with stakeholders.

The CPP culminated to two public meeting which were held in Rhamu Town (Sub-County Office in Rhamu Town) on the 3rd May, 2017 and Mandera Town (Red Sea Hotel, Mandera Town) on the 4th May, 2017. Minutes of the meetings and their attendance list are appended in this report. Adequate representation in both towns was observed.

5.4 Key informant interviews

About 250 members of the public (see list in Appendices) working, residing and those owning business properties along the Rhamu - Mandera were consulted. The exercise was conducted by experienced experts via interviews, and focus group discussions (Plate 5-1) using questionnaires designed in such a way that the stakeholders concerns, comments and issues were comprehensively captured. The completion of the questionnaires subsequently allowed for the synthesis and analysis of issues that arose which provided basis upon which the environmental, economic and social aspects of the ESIA was undertaken. The purpose of carrying out the interviews was partly to identify the positive and negative impacts of the project. Interviews also assisted in the identification of miscellaneous issues that if overlooked may introduce conflicts that may hamper the implementation of the project.

Plate 5-1: Focus Group Discussions in Sala and Farey Villages

From the public participation (Plate 5-2 and 5-3), it was apparent that the majority of the members of the public were quite aware of the proposed project. Most of them were glad and appreciative for the coming of the project as it will bring along numerous benefits including employment opportunities, reducing cost of transportation, increased businesses, and improved security among other associated development.

Plate 5-2: Public Participation in Rhamu town at the Sub-County Offices Hall (Source: AWEMAC)

Plate 5-3: Public Participation in Mandera town at the Red Sea Hotel (Source: AWEMAC)

5.5 Stakeholder/Community Consultations

The views from the general public/local communities, local leaders, relevant institutions and development partners who in one way or the other would be affected by the proposed project were sought as stipulated in the Environment Management and Coordination Act, 1999. The survey identified the following as key stakeholders to the project.

- Local residents (including elders and opinion leaders) along the Rhamu - Mandera Transport Corridor.
- County Government of Mandera.
- The Kenya National Highways Authority (KeNHA).
- Kenya Urban Roads Authority (KURA).
- Kenya Rural Roads Authority (KeRRA).
- National Environment Management Authority (NEMA).
- Kenya Wildlife Service (KWS).
- Kenya Forest Service (KFS).
- Water Resources Authority (WRA).
- Businessmen and workers both in Rhamu and Mandera Town.
- Non – Governmental Organizations operating in Mandera County.
- Civil Society Organizations (CSOs).
- The Kenya Power Company (KPC).
- Kenya Electrical Transmission Company (KETC).
- Matatu Sacco plying the Rhamu Mandera route.
- Business operators – Hotel owners, shop owners, truck owners among others.
- Truck drivers.
- Community members/ village elders.

Two public meetings were held, one in Rhamu town (03/05/2017) and one in Mandera town (04/05/2017). The meetings were well attended by the stakeholders above and minutes of the same are attached as annexes to this study report.

5.6 Positive Comments made by the Stakeholders

Following a public meeting held in Rhamu Town and Mandera Town on the 3rd and 4th respectively, the following positive comments were raised:

5.6.1 Employment Opportunities

The respondents who were interviewed consulted were optimistic that the project will create numerous employment opportunities for both for skilled and unskilled labor alike during the construction and operational phases. Despite the fact that most of the project will need skilled labor force during construction, people expressed hope that they will be able to access employment once the project commences mostly as casual workers. The respondents were also optimistic that they will take up relevant training to take up skilled tasks and jobs during construction and operation stage. Indirect businesses during construction phase will also see women and youth engaged in the project. These will be sources of income for several individuals and households and hence is expected to boost the GDP and improve the living standards of Kenyans in Mandera County and beyond.

5.6.2 Business Opportunities

The respondents were optimistic that there will be an increase in business opportunities during the construction and operation of the proposed Rhamu – Mandera Road project. Small scale business people such as food vendors and kiosk owners will benefit greatly during construction. Once the construction of the road is complete, the existing 6 villages along the road corridor will be economically revitalized.

The new road will also lead to the expansion of various businesses in Rhamu and Mandera towns. There is in particular high possibility of development of new enterprises such as petrol stations, hotels and restaurants, shopping malls, etc. due to increased number of motor vehicles (and people) using the route between the two towns, these developments will create job opportunities for the local inhabitants.

5.6.3 Impact on security along the transport corridor

The current status of the road limits the speed at which the vehicles move. This is attributed to the murrum and rough nature of the road. This slow speed in addition with the security status of the route makes the area unsecure to travel especially at night. Following commissioning of this project, the local residents expressed their satisfaction that security will be improved. Street lighting will also make the various villages along the road secure at night.

5.6.4 Impact on transportation along the road

The respondents were positive that the proposed Rhamu – Mandera road project will provide a faster and cheaper means of transport for both cargo trucks, passengers' vehicles and personal cars, from Rhamu - Mandera. During the fieldwork, it was noted that the section before Rhamu town (from El-wak) was being tarmacked, hence the proposed road is a plus to the residents of the wider Mandera County. The road will considerably reduce the transportation time and cost. The respondents stated that they currently pay a cost of Kshs. 3,500.00 one way from

Nairobi – Mandera hence coming of the project will see this amount reduce. Plate 5-4 below represents a section of the current carriageway from Rhamu to Mandera.

Plate 5-4: A section of the Current Rhamu - Mandera Carriage way (Source: AWEMAC)

5.6.5 Impacts on the villages along the road corridor

The public consulted were optimistic that the 6 villages (Sala, Qumbiso, Sarohindi, Farey, Caro and Garbaqoley) located along the proposed road corridor will benefit directly in terms of water projects (boreholes and dams), street lighting and trade. The local community suggested for their involvement during the establishment of the various workers' camps, borrow pits, dams and boreholes so that they can be used even after the construction of the proposed road is complete.

5.7 Negative Concerns of the Stakeholders

5.7.1 Impact on livestock

The local community expressed their concerns over the tarmacking of the road as the current murrum road is used to transport livestock from Rhamu to Mandera by foot and vice versa. The local community also expressed their concern over the safety of the livestock during crossing of the road to access River Daua which happens to be the most common watering points for animals.

In response to this, a proposal of a side road was suggested by the members of the public to be utilized to transport livestock from Rhamu to Mandera. Bumps and various road signage of livestock crossing, children crossing and zebra crossing were also suggested to be included in the project to reduce cases of vehicular accidents involving livestock

5.7.2 Impact on Health and Safety of the locals and other road users

i. Dust Generation

The public expressed concern over possibility of generation of large amounts of dust within the project site and surrounding areas as a result of excavation works and transportation of construction materials. The proponent will thus need to ensure

that dust levels at the site are minimized as much as possible through sprinkling water in areas being excavated and along the tracks used by the transport trucks within the site. Additional mitigation measures presented in this report will need to be fully implemented to minimize the impacts of dust generation.

ii. Noise pollution

There was concern over the possibility of high noise and vibration levels at the project site as a result of excavation and construction works. The source of noise pollution will include, transport vehicles, construction machinery, metal grinding and cutting equipment, among others. Excavations will also cause vibrations. However, the contractor will take appropriate steps to minimize noise pollution through provision of appropriate protective equipment to construction workers, planning and minimizing the frequency of transport of construction materials and ensuring that all construction equipment are well maintained. The contractor is also advised to adhere to the EMCA - Noise and Excessive Vibrations Pollution Control Regulations.

5.7.3 Impact on Agriculture and Vegetation Cover

Members of the public expressed concern that during the construction phase of the project, there will be clearance of vegetation along the corridor and during establishment of workers' camps sites, borrow pits and dams. The locals also expressed their concerns over the productive lands that might be acquired during sourcing of construction materials. This will negatively impacts on the environment and on the social status of the locals. The clearance of vegetation (Plate 5-5) will affect the scenic beauty and ecological functioning of these sensitive areas as some are habitats to wildlife. Also, the clearance of vegetation will have impacts on the soil particularly increased soil loss which subsequently may impact on the water quality and ecosystem productivity. Acquisition of the lands where construction materials are to be sourced could deprive the locals' good agriculturally productive lands. Most of the respondents proposed that a major landscaping and tree planning should be carried out along the road in order to restore the scenic beauty of the project and the environment at large. It was also proposed that establishment of materials sites will be done in consultation with the local community in order to minimize negative impacts on good agricultural productive lands.

Plate 5-5: Some of the vegetation cover observed along the road corridor (Source: AWEMAC)

5.7.4 Impact on businesses along the road corridor

The participants were concerned that the proposed project will lead to compulsory eviction which will lead to displacement of hotels and food vending business along the road corridor and more especially in Rhamu Town.

In this regard, it will be important to ensure that the Resettlement Action Plan is done appropriately and professionally in order to ensure all the affected businesses are identified and compensated appropriately.

5.7.5 Fears for increased loss of human and animal life due to road accidents

The local residents along the road corridor expressed concern that the new tarmacked road will encourage vehicles to move fast and this could be detrimental to traders who transport their animals from Rhamu to Mandera and vice versa.

Currently, the locals use the murrum road to transport their livestock (camels, donkey, sheep, goat and cows). With the tarmacking of the road, the locals will be deprived their transportation route.

They suggested for a side road parallel to the current road which could be used to transport the livestock as vehicles use the tarmacked road. The side road should be equipped with guardrails to prevent animals from accessing or crossing the road in some dangerous sections.

5.7.6 Fear of increased cases of STD, HIV and AIDS infections

The residents along the proposed road corridor expressed concern that there would be increased incidences of sexually transmitted diseases including HIV and AIDS especially during construction of the road as a result of increased prostitution. The

project proponent will need to work jointly with appropriate county and national government public health agencies in order to come with a comprehensive STD, HIV and AIDs control programme during the construction and operational phases of the project.

5.7.7 Erosion of the culture

During construction phase, workers will come from different areas and this will lead to an influx in the population around the project area. The local residents expressed their concerns as the new workers from different areas might start practicing bad vices which could easily erode the culture and traditions of the locals.

The locals requested for the contractor to respect the local beliefs, traditions and practices.

5.8 Summary of Recommendations made by the Public

The following suggestions were made during the public meeting and focused group discussions:-

- Provision of a side road parallel to the current murrum road for use by the locals to transport their livestock (Plate 5-6) from Rhamu – Mandera.

Plate 5-6: Livestock being transported along the Rhamu-Mandera road by foot (Source: AWEMAC)

- The proponent should give priority of employment opportunities to the locals as casuals during construction and operation activities.
- The environment and health of the public should be protected from degradation through mitigation of the effect of dust along the roads,
- Construct foot bridges and underpasses to enable convenient accessibility to either side of the road at strategic animal watering points. The design of the proposed road should have strategic underpasses at intervals where the animals and humans (including school children, pedestrians) can easily find them and access either side of the road.
- Proper drainage facilities should be constructed along the road to direct storm water to the nearby rivers as depicted in plate 5-7 below,

Plate 5-7: The condition of river crossings along the road corridor (Source: AWEMAC)

- The proponent should ensure fair compensation of all displaced businesses and structures in Rhamu Town,
- The proponent should ensure that all the stakeholders (including KWS, Water, Roads, Kenya Power), are involved especially from the design stage of the proposed road to ensure that other infrastructures are considered to minimize disruption. This can be done to ensure integrated planning of infrastructure.
- The design of the project should be able to give provision for further expansion or future plans without its destruction, ensuring full sustainability of the project. The locals suggested a road reserve of 60m to cater for future expansion.
- Where possible and necessary, the developer should install speed bumps, for example in towns, villages and near schools along the road corridor. Other road infrastructure suggested by the public included bus stops, street lighting and animals crossings signs on both sides of the road
- The developer should purpose to come up with a proper drainage mechanism along the road
- The welfare and comfort of the community and neighbours should be considered seriously by the developer. This could be achieved through the Corporate Social Responsibility (CSR). Among the facilities the local community requested include:
    - Borehole drilling in all the six villages along Rhamu – Mandera Road. The boreholes to supply water to the water kiosks to serve the entire village,
    - Health centers/clinic in all villages. Currently, most of the locals travel tens of kilometers to access health care,
    - Veterinary services – The local residents also stated that they lack adequate veterinary services to attend to the various livestock being reared by the residents,
    - The residents also requested if water pans could be established to collect water for use in the various villages for watering animals,

CHAPTER SIX: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 Introduction

The proposed Rhamu – Mandera road project will have both positive and negative environmental and social impacts. These impacts were identified through field surveys and consultations with the key stakeholders. In addition, the consultants also reviewed literature, particularly published reports and scientific papers including the results of environmental impact assessment of similar road projects.

The impacts likely to emanate from this project will generally be linked to the social and physical environment as well as economic aspects along the road corridor. Among the broad linkages are as follows:

i. Natural resources (land and soil, water resources, vegetation cover among others);
ii. Physical environment (hydrology, physiology and drainage);
iii. Social aspects (population and settlement trends, land use patterns, water sources, health and safety among others;
iv. Economic issues including income generation, trading opportunities, transportation, etc.

The impacts will also be felt during the two phases of developing the road i.e. construction and operation.

6.2 Quantification of the Magnitude of Impacts

The Equator Principle 1 categorizes this project under Class B defined as a project with potential limited adverse environmental and social risks and/or impacts that are "few in number, generally site specific, largely reversible and readily addressed through mitigation measures"; The magnitude and significance of impacts were gauged using an objective scale that took into consideration the following:

- Temporal: Whether the proposed project impacts will be short term or long term.
- Spatial: Whether the impacts of the proposed project are of trans-boundary nature or are confined in a local area.
- Severity: Whether the impacts of the proposed project are reversible or irreversible, and whether they are temporary or permanent.

To make the above judgments, expert knowledge on the magnitude of the anticipated impacts was put into good use based on the assessments carried out in the field and also bearing in mind the magnitude of various project components. The scale that was applied in the analysis of impacts is shown in the following table 6-1.

Table 6-1: Levels of scale used in the analysis of impacts

Value	Description	Scale Description
0	No impact	This means that to the best knowledge of the expert, the particular activity/action will not have any known impact on the environment. Such an impact will not in any way affect the

		normal functioning of either the human or the natural systems and does not therefore warrant any mitigation.
1	Minimal impact	Any activity with little impact on the environment calls for preventive measures, which are usually inexpensive and manageable. Such activities have minimum impacts on either natural or human environment or both.
2	Moderate impact	A moderate impact will have localized effect on the environment. If the effect is negative and cumulative, action in form of mitigation measures needs to be put in place to ensure that it doesn't become permanent and /or irreversible.
3	High impact	An impact is high if it affects a relatively high area (spatial), several biological resources (severity) and/or the effect is felt for a relatively long period (temporal) e.g. more than one year. In case the effect is negative, such an impact needs to be given timely consideration and proper mitigation measures put in place to prevent further direct, indirect or cumulative adverse effects.
4	Very high impacts	Such an activity rates highly in all aspects used in the scale i.e., temporal, spatial and severity. If negative, it is expected to affect a huge population of plants and animals, biodiversity in general and a large area of the geophysical environment, usually having trans-boundary consequences. Urgent and specialized mitigation measures are needed. It is the experts' opinion that any project with very high negative impacts **MUST** be suspended until sufficient effective mitigation measures are put in place.
5	Not known	There are activities for which impacts are not yet known e.g. some chemicals are suspected to produce carcinogenic effects but this has not yet been confirmed.

6.3 Positive Environmental and Social Impacts during Construction Phase

The likely positive environmental and social impacts during construction phase of the proposed road project include:-

6.3.1 Creation of Employment opportunities

The respondents who were consulted were optimistic that the proposed project will create numerous employment opportunities for both for skilled and unskilled labor during the construction phases. The project is estimated to employ approximately 1000 workers or more during the construction period. Among the skilled staff to be employed include civil engineers, material laboratory experts, surveyors, EHS officers, Architects, quantity surveyors, mechanical and plumbing engineers and quality control experts among others. Despite the fact that most of the projects will need skilled labor force during construction, local people expressed hope that they will be able to access employment once the project commences mostly as casual workers and some will get training to secure skilled labor. These jobs will be sources of income for several individuals and households and hence is expected to boost the GDP and improve their living standards. This impact will be very high hence value of 4.

6.3.2 Increased Business Opportunities

The respondents and participants were optimistic that there will be an increase in business opportunities during the construction of the proposed Rhamu – Mandera road project. Small scale business people such as food vendors and kiosk owners will benefit greatly during construction. Local businessmen will also be involved actively in trading with the construction materials for the proposed road. This impact will be moderate hence value of 2.

6.3.3 Increased Security

The respondents also noted that security will generally be improved further in various regions where the road expansion will be done. Cases of burglary and carjacking will significantly reduce as security will be provided by the Administration Police throughout the project corridor. The potential high risk/insecure areas due to the presence of terrorists will be substantively reduced as a result of adequately security personnel provided with greater ease to man the entire road section. The security personnel response time will be particularly enhanced futher improving the security status. This impact will be high hence value of 4.

6.3.4 Introduction of new technologies

Due to the magnitude and nature of the project, the public noted that the construction of the proposed road will be undertaken by an international company. This will ensure transfer of various technologies and general construction knowledge for construction of roads in Kenya. The Kenyan engineers and contractors will gain new insights on matters related to road construction technology. The experienced gained in this project would be transferred to other similar projects that would be undertaken elsewhere in Kenya in the near future. This impact will be very high hence value of 4.

6.3.5 Contribution of revenue to the County and National Governments

Both the County and National Governments will benefit from the construction of the new road through levies and taxes that will be imposed on the contractors. In addition, increased business opportunities will increase the revenue base of both the County and National Governments. This impact will be moderate hence value of 2.

6.3.6 Revitalizing of existing villages along the road corridor

There is possibility of re-vitalization of the 6 villages (Sala, Qumbiso, Sarohindi, Farey, Caro and Garbaqoley) existing along the route of the proposed road. Plate 6-1 below shows one of the villages (Qumbiso). The local employees who live in these villages will be employed during the construction works. The businesses which will rise during construction will revitalize these villages to grow. This in turn will contribute in increasing trade and business opportunities in these towns. This impact will be low hence value of 1.

Plate 6-1: One of the villages along the road corridor (Qumbiso) (Source: AWEMAC)

6.4 Negative Environmental and Social Impacts during construction phase

The likely negative environmental impacts during construction activities will include the following:-

6.4.1 Noise pollution and Excessive Vibrations

There was concern over the possibility of high noise and vibration levels at the project site as a result of excavation and construction works which could exceed the recommended 85dB(A) as per the NEMA Noise and Excessive Vibration Pollution (Control) Regulations, 2009. The source of noise pollution will include, transport vehicles, construction machinery, metal grinding and cutting equipment, among others. Excavations will also cause vibrations. However, the proponent will take appropriate steps to minimize noise pollution through provision of appropriate protective equipment to construction workers, planning and minimizing the frequency of transport of construction materials, ensuring that all construction equipment are well maintained.

6.4.2 Air Emissions and Ambient Air Quality

The public expressed concern over possibility of generation of large amounts of dust along the project site/corridor and surrounding areas as a result of demolition, excavation works and transportation of building materials exceeding 140g/cm^3 as recommended in the NEMA Air Quality Regulations 2009. Diversion of traffic during the construction phase will also contribute to high emission of dust. The proponent/contractor will thus need to ensure that dust levels at the site are minimized as much as possible through sprinkling water in areas being excavated and along the tracks used by the transport trucks within the site. The diversion tracks will also need to be sprinkled with water on daily basis. Additional mitigation measures presented in this report will need to be fully implemented to minimize the impacts of dust generation. This impact will be moderate hence value of 3.

6.4.3 Increased Generation of Solid Waste

The members of the public expressed concern over possibility of generation of large volumes of solid wastes during the construction phase. The solid waste materials will be generated from various packaging materials and other construction materials, others which could be hazardous to the receiving environment. Significant quantities of rock and soil materials will be generated from earth moving during construction activities. The contractor shall comply with recommendations provided in the ESMP, and adopt a detailed and effective Solid Waste Management Plan. The plan shall be developed within the provisions of an Integrated Solid Waste Management approach, facilitating in implementation of the Three 3R Principles of Solid Waste Management; Reduce (Source Reduction), Recycle and Reuse.

6.4.4 Increased Discharge of Wastewater, Sewage and Degradation of Water Quality

There will be an increase in the generation of wastewaters and sewage during the construction phase of the project. The increase is mainly due to the presence of construction camp sites, including also in various villages located along the road corridor. This is attributed to increased activities in these villages.

Possible oil spillage during the construction phase, disposal practices of used oil, oil filters during the normal maintenance of machinery could also find their way to the nearby Daua River. In addition, possible washing of the new bituminous layer of the new road could lead to pollution of the nearby river which is the source of water for the local residents. It is highly recommended to the contractor to conduct quarterly water quality testing measurement to ascertain the pollution levels if any in the nearby Daua River. Analysis of the water quality will be based on the NEMA and WHO standards. This impact will be moderate hence value of 2.

6.4.5 Excessive Water Abstraction and Consumption

During the construction of the road, there will be increased abstraction of water from the nearby Daua River, dams and boreholes to be developed along the road corridor. This may reduce the flow of rivers owing to the fact that the project is located in an area which is generally arid. This may further reduce availability of water to the local communities including possibility of degrading aquatic ecosystems due to reduction in base flows. This impact will be moderate hence value of 2.

6.4.6 Modification of hydrology

The increased water abstraction from surface (rivers) and groundwater (boreholes) may modify the hydrological characteristics of these water bodies. Also, dams and borrow pits for extraction of road construction materials (ballast, soil, etc) may provide localized areas for surface water infiltration with the possibility of recharging groundwater aquifers. However, water collecting in such open pits may also provide a large surface for the evaporation of water. Surface runoff may also accumulate along the sides of the road preventing directly flow to river channels. This impact will be low hence value of 1.

6.4.7 Increased Soil Erosion Risk and Soil Quality Degradation

The construction of the proposed road will involve creation of large impervious surface that restricts the infiltration of rainwater. This leads to high generation of surface runoff that flows on the sides of the road in drainage ditches. Where the surface runoff is channeled directly to bare steep slopes with loose soil, it can lead to serious soil erosion problem. This can undermine the stability of the road including associated facilities such as bridges. Sediment and erosion from construction activities and storm water runoff may also increase turbidity of surface waters. It is highly recommended to the contractor to ensure mechanisms are put in place to ensure monitoring of soil erosion is at minimal. This impact will be moderate (value of 2) in view of the gentle nature of the landscape through which the road will pass.

6.4.8 Loss of Vegetation Cover and Biodiversity

During the construction phase of the project, there will be clearance of vegetation along the corridor, however minimal, to pave way for workers' camps, borrow pits and dams. This will lead to the negative impacts to the environment. There will also be alteration of habitats owing to the few acacia tree species observed along the road corridor.

The clearance of vegetation (Plate 6-2) will also affect the scenic beauty and ecological functioning of sensitive areas. Also, the project will require huge quantities of materials such as ballast, murram, stones, sand, gravel, and soil, among others. In addition, the contractors will install several material batching plants and work stations that will impacts on the environment, especially with smothering vegetation species around the camp sites. This impact will be high due to the need to clear vegetation existing in the road reserve and hence we allocate a value of 3.

Plate 6-2: Acacia tree species and *Terminalia orbi* observed along the road corridor (Source: AWEMAC)

6.4.9 Loss of Agricultural Land and Crops

The proposed road will lead to loss of some agricultural parcels of land in some areas like Sala (Plate 6-3) which is located adjacent to the road reserve. This will affect crop production in that region which is known for frequent droughts and famine. The

project proponent would therefore need to fully compensate the affected farmers along the corridor so that they can purchase land elsewhere**.** This impact will be moderate hence value of 2.

Plate 6-3: Farmland observed along the road corridor in Sala Village (Source: AWEMAC)

6.4.10 Possible Land Contamination

Oil spills, tar and other chemicals used might find their way to productive land or agriculturally productive land. Contaminated lands may involve surficial soils or subsurface soils that, through leaching and transport, may affect groundwater, surface water, and adjacent sites. Where subsurface contaminant sources include volatile substances, soil vapor may also become a transport and exposure medium, and create potential for contaminant infiltration of indoor air spaces of buildings. Land is considered contaminated when it contains hazardous materials or oil concentrations above background or naturally occurring levels.
Contaminated land is a concern because of the potential risks to human health and ecology (e.g.risk of cancer or other human health effects, loss of ecology) and the liability that it may pose to the polluter or affected nearby properties.

6.4.11 Disruption and Loss of Businesses along the road reserve

During the field survey, it was noted that squatters have established small-scale businesses on the road reserves in Rhamu town (Plate 6-4). These squatters will need to be evicted from the road reserve in order to paver way for the construction of the road (if the road will pass through the town). Some hotel owners and food vendors who depend on squatters operating businesses on the road reserves expressed concern that there would be loss of livelihood. The table 6-2 below summarizes the number of structures and their cost estimates observed along the Rhamu town. The assumption was that the road reserve is 25m.

Table 6-2: Cost Estimates of the Business Structures along Rhamu Town

Nature	Number	Approx. Cost (Kshs)	Total (Kshs)
Permanent Structures	3	800,000	2,400,000
Semi – Permanent Structures	33	250,000	8,250,000
Temporary Structures	88	100,000	8,800,000
Grand Total	**124**		**19,450,000**

Plate 6-4: Structures and businesses observed along the road reserve in Rhamu Town (Source: AWEMAC)

The proposed realignment of the road to bypass Rhamu town will ensure safety and minimal disturbance of the businesses. The proposed realignment corridor outside Rhamu town will also provide the adequate/needed road reserve. On the other hand, the road along the town will be provided with a tarmacked bituminous layer. This impact will be high if the road will pass through Rhamu town hence value of 3.

6.4.12 Increased in the spread of STD, HIV and AIDS

The residents along the proposed road corridor expressed concern that there would be an increased in incidences of sexually transmitted diseases including HIV and AIDS especially during construction of the road as a result of population influx. The project proponent/contractor will need to work jointly with the Mandera County and National Government Public Health Agencies in order to come with a comprehensive STD, HIV and AIDs control programme during the construction and operational phases of the project. This impact will be high due to increased truck drivers hence value assigned to this impact is 3.

6.4.13 Cultural changes

The road traverses land inhabited by Somalis who are mainly Muslims. The Muslims have conserved their culture from time immemorial. The Muslims have established social organization systems. The upgrading of the road is likely to increase the attractiveness of the area, which may result in the following:

- Degradation of the cultural values and norms in the area;
- Increase in the levels of crime within the area;
- Increase in undesirable sexual and social interaction in the area.

Recommendations are made to the contractor to ensure the traditions, cultures and sites regarded important to the locals are properly preserved. This can be achieved through incorporating views from elders along the road corridor.

6.4.14 Disturbance to Wildlife

There was also concern that wildlife will be disturbed considering they will not have freedom of movement from one side to the other side of the road since they will only be forced to use the underpasses. Among the wildlife that exists within the project area include warthogs, hyenas, antelopes and few giraffe. The influx of many people working at the project may also cause change in animal behavior. Reduced movement of wild animals may lead to concentration in specific areas leading to overgrazing, damage to natural vegetation and general loss of ecological integrity of the ASAL ecosystem along the road project. There would also be visual and auditory disturbance due to the presence of machinery, construction workers, and associated equipment. This impact will be moderate hence value of 2.

6.4.15 Delays in transportation and possible accidents

During construction phase, the road traffic will be controlled and in some cases complete road closure will be necessary especially at river crossings. This will entail disruption to traffic flows resulting in delay to transport of people and goods. There will be also delays caused by diversion during construction. Recommendations are made to the contractor to communicate possible delays in advance through the local media.
Dry weather will favor the project as the seasonal rivers will be dry hence permitting vehicles to cross much easily. The rainy season might be accompanied by possible vehicular accidents during the crossing of the rivers.

6.4.16 Social-Political Disputes

There is a likelihood of political and social conflicts related to the compensation of people along the road reserve in Rhamu town who own businesses. Politicians may also incite local communities against agreeing on the terms of compensation, thus resulting in protracted disputes between the contractors and the local communities. This impact will be low hence value of 1.

6.4.17 Gender and equality biases

Gender and equality biases in road projects may be the basis of differential treatment of persons based on their sex roles, ethnicity, status, religion, race, age, beliefs and disability among other attributes. The proponent/contractor should put measures in place to address issues of gender equality and freedom from discrimination among all Kenyans that will be involved in the project with a focus on Special Interest Groups, namely; women, youth, children, persons with disabilities (PWDs), the elderly and minority and marginalized groups and communities. The proponent is expected to roll out programs and activities in various sectors including health, education, housing, employment and social support and justice among others. The

overall goal will be the reduction of gender inequalities and the discrimination against all interest groups during the project cycle.

6.4.18 Possible Inter-clan conflicts in Rhamu due to new road alignment

The local community in Rhamu town expressed their concerns over re-alignment of the road to bypass the town towards the airport area (Figure 6-1). The local community takes this re-alignment as favoring one clan and leaving out the other clan. The proponent should consider this in the design to alleviate any rivalry between the clan as to which side the road passes.

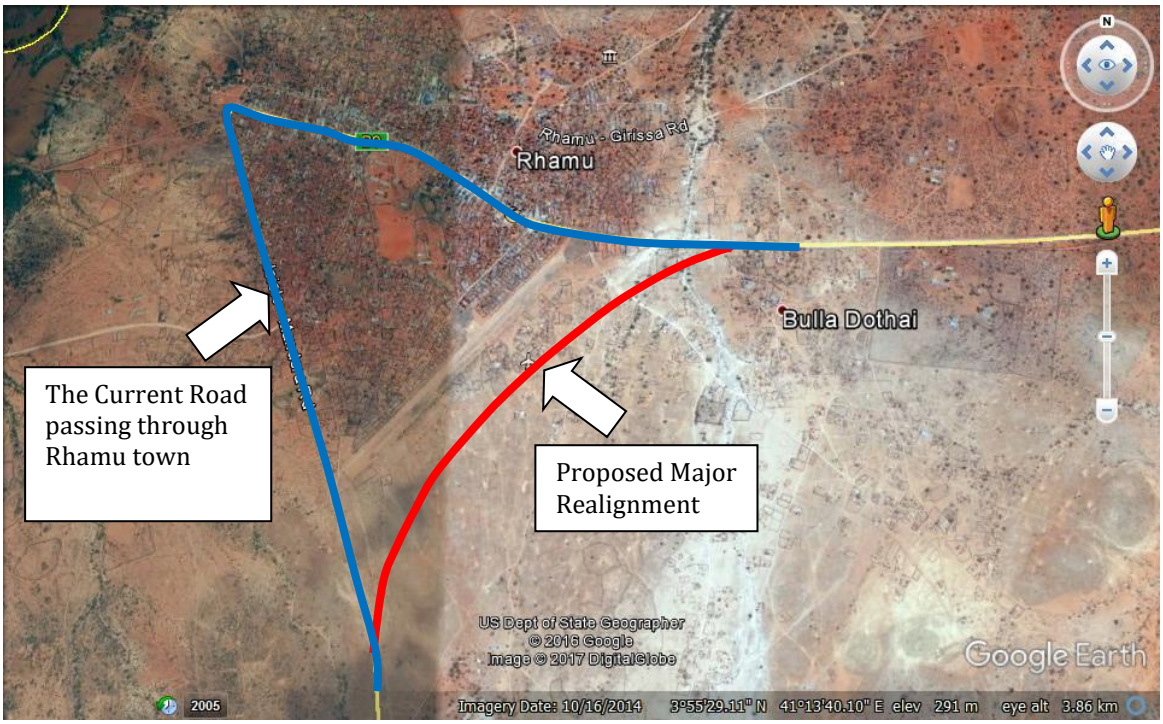


Figure 6-1: Proposed Major Realignment in Rhamu town (Source: Google Earth) (Not drawn to scale)

6.4.19 Occupational health and safety

The Occupational health and safety issues associated with the construction of the proposed road project will include the physical hazards, chemical hazards and biological hazards. Chemical hazards in road construction activities will principally be associated with exposures to dust during construction; exhaust emissions from heavy equipment and motor vehicles during all construction activities (including during work in tunnels). Road construction and maintenance personnel can be exposed to a variety of physical hazards from operating machinery and moving vehicles but also working at elevation on bridges and overpasses. Other physical hazards include exposure to weather elements, noise, work in confined spaces, trenching, contact with overhead energized power lines (electrical), welding/hot works, eye hazards, ergonomics, manual handling, working at a height, falls from machinery or structures, and risk of falling objects. There is also a possibility of accidents when transporting workers to the construction sites.

The chemical hazard represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic, corrosive, sensitizing or oxidative

substances. Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure.
It is also highly recommended that the contractor forms an Occupational Health and Safety Committee as per the Safety and Health Committee Rules, 2004 to meet and conduct business as provided in the rules.
This impact will however be low and hence we allocate it a value of 1.

6.4.20 Public health

The contractor will be required to prepare a waste management plan for the work sites and camps at the start of the project. For the general health of laborers in the work camps, a central canteen is recommended as kitchen waste can be disposed of in an organized manner and at the same time hygiene can be monitored. The contractor will need to abide by the waste management regulations and rules described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006.

The prevention of major outbreaks of disease related to immigrants to the new road project working area will be accomplished through a comprehensive health awareness campaign, carried out in conjunction with the road project team. Successful awareness programs will include preventive measures such as immunizing the vulnerable population, and educating people about diseases and how they are contracted, and how to avoid them by using treated water and keeping living areas cleaner. Treating affected local and migrant populations will also be used in controlling the movement of disease vectors (through contaminated water and between people).

Drinking water sources, whether public or private, should at all times be protected so that they meet or exceed applicable national acceptability standards or in their absence the current edition of WHO Guidelines for Drinking-Water Quality

6.4.21 Community Health and Safety

Community health and safety issues will emerge during the construction of roads particularly at large construction sites. The impacts will include dust, noise, and vibration from construction vehicle transit, life and fire safety and communicable disease associated with the influx of temporary construction labor. Significant community health and safety issues associated with the proposed road project will include livestock safety, pedestrian safety, traffic safety, and emergency preparedness.

Livestock, pedestrians and motor cyclists are at greatest risk of serious injury from collisions with moving vehicles. Children will generally be the most vulnerable due to lack of experience and knowledge of traffic related hazards, their behavior while at play, and their small size making them less visible to motorists. The local community around the project site utilize the current Rhamu – Mandera murrum road to transport their livestock along the road by foot. Collisions and accidents can also involve a single or multiple vehicles, pedestrians or motor cyclists and animals. Many factors contribute to traffic accidents. Some are associated with the behavior of the driver or the quality of the vehicle, while others are linked to the road design, or construction and maintenance issues. Emergency situations most commonly

associated with road operations include accidents involving single or multiple vehicles, pedestrians, and/or the release of oil or hazardous materials.
The night glare from vehicles will cause disturbances to local communities at night and interfere with their sleep. This problem is however likely to be greater in the future during the operation phase as vehicular traffic is set to increase several fold. The impact scale is however considered to be significant during the construction phase hence it is allocated value of 1.

6.5 Resettlement Action Plan

A preliminary census of structures likely to be affected was conducted to ensure adherence to set guidelines and procedures in mitigating the adverse impacts that might occur during the project implementation. This Resettlement Action Plan brief was prepared to highlight the losses that will be incurred by the Project Affected Persons (PAPs) within the proposed project corridor and how they will be addressed. In addition, the PAPs will be assisted to develop their social and economic potential. This will enable them to restore or improve their pre-project living standards and income. RAP primarily ensures that the affected people are not worse off than they were before the project came into existence and while consideration is given to all affected people, emphasis is put on women, vulnerable groups, the disabled and children who are usually the most affected in such situations. For this RAP to comply with international best practices for resettlement of the affected people, KeNHA shall bind itself to the World Bank principles (OP 4.12) and the local legislation on compulsory acquisition and resettlement.

An estimated **124** structures would be affected along the project corridor from Rhamu to Mandera town, if the road will pass though the Rhamu town. These structures were mainly found to be located in Rhamu town. The estimated cost for these structures is **19,450,000.00 KES** as presented in table 6-2 above**.** In Mandera town there will be no structures to be affected, since there is already an ongoing road project that covers the area where physical structures are potentially affected. The proposed project road stretch therefore ends at the outskirts of Mandera town.

Within the road corridor are public utilities such as electricity lines, communication infrastructure and solar street lighting among others within the 60m road reserve that might be affected especially in Rhamu town.

An ***Abbreviated RAP (A-RAP)*** **report is recommended** for the proposed Rhamu – Mandera road project in order to capture more comprehensive details on PAPs and their entitlements. As per the World Bank OP 4.12 – Involuntary Resettlement paragraph 25 which states that:

"A draft resettlement plan that conforms to this policy (OP 4.12) is a condition of appraisal for projects referred to in paragraph 17(a). However, where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an ***abbreviated resettlement plan*** *may be agreed with the borrower. The information disclosure procedures set forth in paragraph. 22 of the policy apply.*

Drawing from the Project Agreement between Kenya National Highways Authority (KeNHA) and the Consortium undertaking the road construction and maintenance works, the Consortium will get access to an encumbered road corridor as referenced under the clauses stated herein:

"*Clause **4.1.5***

As a condition precedent, the Contracting Authority shall have delivered to the service provider the following

(a) vacant access to the site and rights of way necessary for the project networks as detailed in Annex I to Schedule A below.

"Annex-I Schedule A item 2"

Observes that all land in the project area is trust land except few parcels in main commercial centers. Bulk of the area is livestock zone and the community live a nomadic way of life. A 60m reserve is available for the greatest length of the road, Rhamu and Mandera centers having restricted 25m and 21m reserves respectively.

" Clause 10.2.2

In consideration of this Agreement and the covenants and warranties on the part of the Service Provider herein contained but subject to Clause 4(Conditions precedent), the Contracting authority, in ccordance with the tems and conditions set forth herein, hereby grants to the Service Provider, commencing from the Appointed Date, leave and licence rights of all the land (along with any buildinds,constructions or immovable assets, if any, thereon) comprising the site which is described, delineated and shown in Shedule A (the Licensed Site) free of any encumbrances, to develop, operate and maintain the said Licensed site, together with all singular rights, liberties, privilages, easements and appurtenancis whatsoeverto the said Licenced Sites, hereditaments or premises or any part thereto or enjoyed therewith, for the duration of the Project Team and, for th purposes permitted under this Agreement, and for no other purpse whatsoever.

Further note: Updated and approved detailed geometric design output that has with it plan and profiles would ideally guide on the exact location of plots to be affected. Valuation of the same would be undertaken and verified by a registered valuer. There being no detailed engineering design output, establishment of the affected plots as presented above is only indicative.

Summarily design options that will lead to minimal acquisition or none at all, will be explored along the project area extents.

The plates 6-5 and 6-6 below show the towns and structures within the Right of Way of the proposed project road that will potentially be affected.

Plate 6-5: Temporary business structures along the proposed RoW in Rhamu town

Plate 6-6: Electrical and solar lighting installations in Rhamu town

6.6 Positive Environmental and Social Impacts during Operation Phase

6.5.1 Creation of employment opportunities

Both direct and indirect employment opportunities will emerge during the operation phase. For the direct employment, people will be employed for the normal and continuous road maintenance. For the indirect, vehicular traffic will increase hence providing employment to the drivers and turn boys. Road side businesses will also grow ranging from small shops to big petroleum filling stations and garages along the road. This will in turn create indirect employment opportunities to the locals.

6.5.2 Improved local socio-economy

Respondents who were interviewed acknowledged that the project road will contribute immensely to the development of business at the trading centres along the road and the following socio-economic benefits:

- Increased business opportunities at the market centres due to the presence of the increased vehicular traffic along the route for instance petrol filling station, garages, shops etc,
- Employment of local workers during the operation phase of the project;
- Strengthening of local economy through the establishment of micro-enterprises such as foodstuff sales points.

The implementation of the project will result in the improvement of the living conditions of population living along the road thus contributing to poverty reduction.

6.5.3 Increased security

The area where the road traverses over the years has been known for insecurity, cattle rustling and ''shiftas''. Better road communication would result in an improvement of security by increasing easier movement by security agents. Any improvement in security from the current levels would be a major benefit to the community living along the proposed road.

6.5.4 Provision of a cheaper and faster means of transport

The respondents were positive that the proposed Rhamu – Mandera road project will provide a faster and cheaper means of transport for cargo trucks, passengers and personal cars, from between the two towns and beyond. This will considerably reduce additional travelling and transportation costs being incurred currently and improve the current transport situation along the road. The numerous river crossings along the road makes transportation costly as flush floods are washed hence making navigation of the rivers difficult. With the coming of the project, bridges and associated road infrastructure will be constructed which will enhance transportation. This impact will be very high hence value of 4.

6.5.5 Gain to the County and National Economy through transportation

The main mode of transportation in the area is road transport. There are no other affordable options for transport in the project area. Generally, the project road plays an important role in the area by transportation of passengers to the various town centers along the project road.

With improved road conditions, it is expected that there will be improved transport within the region. This is likely to benefit the local and regional economy in the short term and the national economy in the long term. There will also be easier access to the essential services offered in the neighbouring Counties.

6.5.6 Reduction in particulate matter emissions (Dust)

The current carriage way is made of earthen material. Dust is a major concern as vehicles plying the route makes the area along the road quite dusty. Considering the

locality is in an arid area, the rainfall amount is quite less. With the paving of the road surface with bitumen, dusty conditions will be eliminated and villages located along the road will not experience dusty conditions.

6.5.7 Improved Road safety

Road projects can lead to reduction in accidents when they involve significant improvements in vertical and horizontal alignments, improved carriageway width, junction layout or greater separation of pedestrians, non-motorized traffic and motor vehicles. The improvement of the project road may lead to significantly increased running speeds and is likely to induce significant generated traffic. This will shorten the travelling time and transportation cost.

The proposed project design will contribute to improving road safety and the comfort of road users in several ways such as:

- Sight distance and visibility especially at approaches to bridges will be improved;
- Road signs (both warning and directional) and road markings will be included in the design;
- Adequate shoulders will be designed throughout its road corridor.

6.5.8 Assessment on gender impacts

The current road being used is made of murrum and makes travelling very uncomfortable more especially for pregnant women. With the poor road conditions, the average time for travelling from Rhamu – Mandera is relatively high. With the coming of the project, it will impact positively by making the road transportation relatively comfortable and takes less time to travel. Transportation of trading commodities will also be enhanced.

6.7 Negative Environmental and Social Impacts during Operation phase

6.6.1 Possible risks of accidents on the road

With the tarmacking of the road, vehicles will be travelling at a design speed of 100km/h. The local community use the road on a daily basis for their various activities. Considering the above mentioned speed, there is a likelihood of possible accidents along the road, and more especially near villages. Road bumps and signage needs to be provided throughout the road length to reduce these incidences. This impact will be moderate hence value of 2.

6.6.2 Noise pollution and Excessive Vibrations

The public also feared that there would be noise during operation stage of the project due to high speed and raving of motor vehicles along the road since its design speed is 100km/hr. This impact will be moderate hence value of 2.

6.6.3 Increased Generation of Solid Waste

Solid waste generation during operation and maintenance activities will include road litter, illegally dumped waste, or general solid waste from villages; vegetation waste from the clearance of road reserves; and sediment and sludge from storm water

drainage system. The proponent would need to ensure that all solid wastes are collected and disposed appropriately in order to promote a clean and healthy environment along the transport corridor**.** This impact will be moderate hence value of 1.

6.6.4 Increased Energy Consumption

The construction of the proposed Rhamu – Mandera road project is expected to lead to an increase in traffic movement between Rhamu – Mandera and beyond. Also, most of the traffic will be flowing faster. It is thus expected that this will lead to increased consumption of fossil fuel particularly petrol and diesel. It is also expected that there will be high consumption of fossil fuels due to high number of construction machineries and trucks that will be deployed in the project. This impact will be moderate in view of the measures that will be put in place to reduce consumption of fossil fuels.

6.6.5 Increased movement of storm water and impact on drainage

Construction of sealed roads (tarmacked road) increases the amount of impermeable surface area, which increases the rate of surface water runoff flow. The project will also impact on the drainage during the construction and operational phases of the road. There will be increased generation of surface runoff on the road. The increased or excess runoff could overwhelm local drainage system including streams with potential for increasing downstream flooding, damage to properties. Good drainage design and construction in the development of roads is critical to the success of road construction. Also, ***s***torm water generated on the road may be contaminated with oil and grease, metals (e.g. lead, zinc, copper, cadmium, chromium, and nickel), particulate matter and other pollutants released by vehicles on the road

6.6.6 Soil Quality Degradation due to oil spills

With the coming of the proposed road project, several businesses will also emerge. Among them are the fueling and service stations. Waste oil from these facilities if not well managed can easily find their way to the nearby land, surface water and soil. With time, this will degrade soil quality.

6.7 Positive Environmental and Social Impacts during Decommissioning phase

Some of the anticipated impacts during the decommissioning phase of the proposed project include;

6.7.1 Rehabilitation and restoration of the site to its original status

Upon decommissioning of the project, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil and re-vegetation which will lead to improved visual quality of the area.

6.7.2 Employment Opportunities

Several employment opportunities will be created for the demolition staff.

6.7.3 Recovery of recyclable materials

Materials used to construct bridges and the associated facilities in camps can be re used elsewhere in other projects

6.8 Negative Environmental and Social Impacts during Decommissioning phase

6.8.1 Solid waste generation

Decommissioning of the road project and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including tar, concrete, metal, wood, paints, adhesives, sealants and fasteners. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality

6.8.2 Dust emission

Large quantities of dust will be generated during decommissioning works. This will affect the workers as well as the local community

6.8.3 Noise and Vibration

The decommissioning works will lead to significant deterioration of the acoustic environment along the project site and corridor and the local community.

CHAPTER SEVEN: MITIGATION MEASURES

7.1 Introduction

The construction of the proposed Rhamu – Mandera road will have a wide range of impacts on the biophysical environment, health and safety of employees and members of the public, and socio economic well-being of the local communities and households. It is usually impossible to mitigate all the expected negative environmental and social impacts. Thus, in this chapter, an attempt was made to formulate mitigation measures for the most significant negative environmental and socio-economic impacts. The aim is to ensure that the most significant negative impacts are minimized as much as possible while maximizing on the positive benefits of the project. The mitigation measures will be presented in the environmental management and monitoring plan that is intended to assist the proponent in the management of the adverse environmental impacts associated with the life cycle of the project.

7.2 Mitigation Measures during the Construction Phase

The following section provides a discussion on the mitigation measures that will be undertaken during the construction of the project. It is important to note that a special focus has been given to the negative impacts that are considered significant and that warrant intervention to reduce the level of impact to the local communities and the environment.

7.2.1 Mitigating Noise Pollution and Excessive Vibrations

Noise pollution and excessive vibrations should be mitigated as follows:

i. Sensitize drivers of construction vehicles and machinery operators to switch off engines or machinery that are not being used.
ii. Ensure that all vehicles and construction machinery are kept in good condition all the time to avoid excessive noise generation.
iii. Ensure that all workers wear ear muffs and other personal protective gear/equipment when working in noisy sections.
iv. Undertake loud noise and vibration level activities during off-peak hours during the day (i.e. between 8.00 am and 5.00 pm).
v. Acquire Noise and Excessive Vibrations Pollution Control Permit and comply with conditions provided by EMCA 1999 Noise and Excessive Vibrations Pollution Control Regulations 2009.
vi. Support facilities such as hard rock quarries should carry out controlled blasting and observe relevant explosives use and blasting permits provided by the Inspector of Mines and Geology
vii. Blasting activities along the road corridor and associated quarries should be done during the day and the public should be properly informed of the activity in time.

7.2.2 Mitigating Air Pollution due to Dust Generation and Air Emissions

This negative impact of dust should be mitigated as follows:

i. Sprinkling of water on dry and dusty surfaces regularly including the access roads and diversion tracks.
ii. Add suitable soil stabilizers on access roads or pave access roads to control dust
iii. Erection of dust screens all over the building under construction especially at the workers' camps. Dust control measures should be adopted at concrete batching plants, providing adequate PPE to staffs, canopying loading points and erecting dust screens around the plant.
iv. Use of waste water (storm water) to sprinkle at the construction site so as to reduce excessive dust.
v. Adherence to personal protective clothing such as dust masks.
vi. Harvesting storm water and use in dust suppression at the construction site and the all-weather access roads if volumes stored are sufficient.
vii. Enforce onsite speed limit regulations.
viii. Re-vegetating exposed areas during the operation phase of the project.
ix. Sprinkling water water along the diversion routes or earth along the road section.
x. Slowing the speed of traffic by using bumps and/ or clearly marked road signs may contribute to reducing dust levels.
xi. Haulage routes will need to be identified and maintained by watering to minimize the impact of dust.
xii. Dust control mechanisms at the gravel borrow sites through extraction in wet conditions and transport in covered trucks
xiii. Implement dust control measures at the quarry sites and aggregate crushing sites
xiv. Covering heaps and berms of soil.
xv. Adhere to the Environmental Management and Co-ordination (Air Quality) Regulations, 2014.

To mitigate exhaust emissions it will be mandatory to:

i. Procure machines, equipment and vehicles which are environmental friendly
ii. Ensure machines and vehicles are properly and regularly maintained.
iii. Discourage plant operators and drivers of construction vehicles from unnecessary revving and idling
iv. Limit construction traffic movement and operations to the most necessary activities through adequate planning.
v. Sensitize construction drivers and machinery operators to switch off engines when not being used.
vi. Ensuring that the construction vehicles have the requisite inspection certificate
vii. Control the speed of the traffic movement by having adequate policing
viii. Adhere to the Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations, 2006.

7.2.3 Minimizing Generation of Solid Waste

This should be mitigated as follows:

i. Maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base;
ii. Incorporating recyclable materials (e.g. glass, scrap tires, certain types of slag and ashes) to reduce the volume and cost of new asphalt and concrete mixes.

iii. Collecting road litter or illegally dumped waste and managing it according to the recommendations in the General EHS Guidelines and Waste Management Regulations, 2006.
iv. Provision of bottle and can trash disposal receptacles at parking lots to avoid littering along the road;
v. Obsolete products should be managed as a hazardous waste as described in the General EHS Guidelines;
vi. Collecting animal carcasses in a timely manner and disposing them through prompt burial or other environmentally safe methods; ·
vii. Composting of vegetation waste for reuse as a landscaping fertilizer;
viii. Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardous or non-hazardous waste based on an assessment of its characteristics.
ix. Management of all removed paint materials suspected or confirmed of containing lead as a hazardous waste;
x. Grinding of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses. Old, removed asphalt may contain tar and polycyclic aromatic hydrocarbons and may require management as a hazardous waste.
xi. Develop and implement a Construction Waste Management Plan during construction
xii. Sub-contract a licensed waste handling firm to collect solid wastes on regular basis and dispose off in an approved dumping site.
xiii. Drainage outfalls should be properly constructed to reduce the erosion from surface runoff and storm water.
xiv. Comply with Environmental Management and Co-ordination (Waste Management) Regulations, 2006.

7.2.4 Minimizing Energy Consumption

This should be mitigated as follows:

i. Promote the use of solar energy and energy efficient bulbs in workers base camps and for street lights in towns and villages situated along the road.
ii. Install automatic control street lights with Light Dependent Resistor (LDR) sensors.
iii. Switch off lights when not in use.
iv. Install electricity meters to monitor the consumption of electricity in workers camps.
v. Ensure construction machineries and trucks are well maintained.
vi. Use energy-efficient construction machineries and trucks during construction phase of the project.
vii. Avoid routing the road on very steep sections.
viii. Carry out Energy Audits for evaluation and improvement of energy consumption and saving practices adopted by all parties involved.
ix. Ensure compliance with Energy Management Regulations of 2012.

7.2.5 Mitigating Discharge of Wastewater, Sewage and Degradation of Water Quality

This should be mitigated as follows:

i. Construct a standard septic tank/bio-digester linked to a constructed wetland system.
ii. Promote recycling of wastewater and storm water.
iii. Install meters in workers' camps to control and monitor consumption rates of water.
iv. Ensure regular maintenance of plumbing system and septic tanks to avoid spillage of raw sewage.
v. Comply with the Environmental Management and Co-ordination (Water Quality) Regulations, 2006.

7.2.6 Minimizing Excessive Water Abstraction and Consumption

This should be mitigated as follows:

i. Install water conserving automatic taps and toilets in the various workers' camps
ii. Install gutters on the roof of the workers' camps to harvest rain water.
iii. Construct underground reservoir for storage of harvested rainy water.
iv. Drilling of a borehole along the road corridor for use to reduce over reliance on water from Daua River.
v. Harvest surface runoff in dams and borrow pits for use to suppress dust
vi. Comply with Water and Resources Management Authority Requirements as stipulated in the Water Act, 2016

7.2.7 Mitigation of impacts on Natural resources

a. Water supply

Water sources are unlikely to be sufficient for the construction works, livestock and community domestic use. The contractor will therefore need to develop independent construction water sources. There is potential to abstract water from groundwater resources. With perennial water problem in the area drilling of boreholes is ideal as it will also support the locals after the road construction. The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006 and Water Act 2016.

b. Sand Harvesting

The contractor is expected to follow the sand harvesting regulations published by NEMA and the County Governments.

c. Control of water and soil contamination

The contractor should construct machinery and vehicle maintenance areas as well as sealed areas for the storage of pollutants so as to avoid any accidental discharge that would pollute water resources. Measures should be taken to ensure proper storage of fuel, oil and bitumen. Oil-water interceptors or sumps should be constructed to capture discharge of oils, fats and other polluting liquids from maintenance workshops, vehicle and equipment washing bays and kitchen drains.
At the work sites the contractor will be expected to maintain strict surveillance particularly when working within the vicinity of water supply points and the rivers within

the project area. A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up. Oil pollution should be prevented by ensuring proper storage, handling and disposal of oil and oil wastes.
The Contractor must adhere to Water Quality Regulations, 2006

7.2.8 Modification of hydrology of ASALs

This could be mitigated as follows:

i. Control excessive abstraction of water from Daua River and boreholes.
ii. Avoid complete blockage of river channels during construction of bridges and culverts by providing diversion channels for the rivers.
iii. Re-open all blocked river channels after construction of bridges/culverts.
iv. Quarries and pits for extraction of road construction materials to be used as water harvesting sites after reclamation.
v. Surface runoff on the sides of the road should be channeled to areas with gentle slopes to avoid excessive erosion of the road slopes.
vi. Construct over passes and bridges in areas occupied by rivers and wetlands.

7.2.9 Minimizing generation and movement of storm water and impact on drainage

This should be mitigated through the following:

i. Use of storm water management practices that slow peak runoff flow, reduce sediment load, and increase infiltration.
ii. Use of vegetated swales (planted with salt-resistant vegetation); filter strips; terracing; check dams; detention ponds or basins; infiltration trenches; and infiltration basins.
iii. Regular inspection and maintenance of permanent erosion and runoff control features.
iv. Paving in dry weather to minimize runoff of asphalt or cement materials.
v. Develop a comprehensive Storm Water Management Plan for use during heavy storm especially during construction phase of the proposed project.

7.2.10 Minimizing Soil Erosion Risk and Soil Quality Degradation

This should be mitigated as follows:

i. Ensure surface runoff generated on impervious surface is not channeled directly to steep slopes.
ii. Construct flow breaks on roadside drainage channels.
iii. Promote harvesting of surface runoff.

7.2.11 Minimizing Loss of Vegetation Cover and Biodiversity

This should be mitigated as follows:

i. Siting roads and support facilities (camps etc) to avoid critical terrestrial habitat (e.g. forests, tree cover) by utilizing existing transport corridors whenever possible.
ii. Design and construction of wildlife access to avoid or minimize habitat fragmentation.
iii. Minimize clearing and disruption of riparian vegetation.

iv. Provide adequate protection against scour and erosion; and give consideration to the onset of the rainy season with respect to construction schedules.
v. Minimize clearing of indigenous plant species, and replanting of indigenous plant species in disturbed areas.
vi. Explore opportunities for habitat enhancement through such practices as the placement of nesting boxes in rights of-way, bat boxes underneath bridges, and reduced clearance to conserve or restore native species.
vii. Employ vegetation rehabilitation techniques to recover lost plant cover such as Reforestation and Afforestation

7.2.12 Mitigating Loss of Agricultural Land and Crops near Sala Village

This should be mitigated as follows

i. Provide full compensation to farmers whose land will be taken over by the proposed road.
ii. Develop a comprehensive Resettlement Action Plan.
iii. Promote alternative sources of income among local communities.
iv. Restore livelihoods for the agricultural lands through:
    - Assistance in acquiring or accessing replacement land, including access to grazing land, fallow land, forest, fuel and water resources;
    - Physical preparation of farm land (e.g., clearing, leveling, access routes and soil stabilization);
    - Agricultural inputs (e.g., seeds, seedlings, fertilizer, irrigation);
    - Provision of veterinary care;
    - Provision of small-scale credit, including crop banks, cattle banks and cash loans;
    - Access to markets (e.g., through transportation means and improved access to information about market opportunities).

7.2.13 Mitigating Disruption and Loss of Businesses in Rhamu Town

This should be mitigated as follows:

i. Provide support to squatters to establish small-scale businesses in other suitable locations in affected town.
ii. Educate squatters on the need to maintain free road reserve.
iii. Provide comprehensive health and safety education to squatters in affected town.
iv. Promote other sources of livelihood among the local communities.
v. Provision of subsistence of transitional allowance to squatters.
vi. Provision of employment in the project for the squatters where possible.

7.2.14 Minimizing Loss of Human and Animal Life due to Road Accidents

This should be mitigated as follows:

i. Construct pedestrian and animal crossing points with foot bridges in certain key areas.
ii. Provide a clear and graded road side animal track to run parallel to the main road demarcated for use by the locals when transporting livestock from Rhamu to Mandera.
iii. Create livestock holding pens at strategic locations along the road.

iv. Create parking areas for truck and bus stops in every village and town.
v. Inclusion of road bumps in towns and villages and speed breakers at intersections
vi. Adopt strict policing to ensure that there is no over speeding along the road,

7.2.15 Minimizing Spread of STD, HIV and AIDS

This should be mitigated as follows:

i. Develop a comprehensive STDS, HIV and AIDs control and awareness programme such as provision of condoms to workers both male and female
ii. Provision of STDs, HIV and AIDS prevention measures to workers.
iii. Creation of awareness of STDs, HIV/AIDS in workers camps through trainings and installation of posters.
iv. Adhere to and implement the Sexual Offences Act, 2006 and its amendment 2012

7.2.16 Minimizing Security Risk and Wildlife-Human Conflicts

This should be mitigated as follows:

i. Thoroughly screen workers, suppliers and distributors.
ii. Ensure 24-hour surveillance by engaging the Administration Police services during the day and night.
iii. Install CCTV cameras in strategic locations in workers' camps,
iv. Ensure close liaison with the local Police Department.

7.2.17 Minimizing Disturbance to Wildlife

This will be mitigated as follows:

i. Review existing information on species and habitats in the project area. Contact appropriate agencies early in the planning process to identify potentially sensitive ecological resources that may be present in the project area.
ii. Conduct pre-disturbance surveys in order to locate site facilities away from important ecological resources (e.g. wetlands, important upland habitats, sensitive species populations).
iii. Ensure activities pose minimal impacts to downstream flora and fauna.
iv. Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance.
v. Use existing facilities and disturbed areas (e.g. access roads, graded areas) to the extent possible to minimize the amount of new disturbance. Configure new access roads and rights-of-way (ROWs) to avoid high-quality habitats and minimize habitat fragmentation.
vi. Bury electrical supply lines in a manner that minimizes additional surface disturbance. Use overhead lines in cases where the burial of lines would result in further habitat disturbance.
vii. Develop a site and ROW reclamation plan that addresses both interim and final reclamation requirements and that identifies vegetation, soil stabilization, and erosion reduction measures.
viii. Ensure that interim reclamation of disturbed areas is conducted as soon as possible following facility construction.

ix. Explore opportunities for habitat enhancement through such practices as the placement of nesting boxes in rights of-way, bat boxes underneath bridges, and reduced clearance to conserve or restore native species.
x. Develop a plan for control of noxious weeds and invasive plants that could occur as a result of new surface-disturbing activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulch. Prohibit the use of fill materials from areas with known invasive vegetation problems.
xi. Develop a spill management plan.
xii. Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices.
xiii. Minimize the number of stream crossings when locating access roads. When stream crossings cannot be avoided, use fill ramps rather than stream bank cutting. Design stream crossings to provide in-stream conditions that allow for and maintain movement and safe passage of fish.
xiv. Develop site fencing in conjunction with appropriate natural resource agencies to either allow or prevent site access by wildlife species.
xv. Minimizing clearing and disruption of riparian vegetation.
xvi. Minimize removal of indigenous plant species, and replanting of indigenous plant species in disturbed areas.
xvii. Comply with the provisions of the Wildlife Conservation and Management Act 2013

7.2.18 Mitigation of impacts on livestock and wildlife

The Supervising Road Engineer and Environmental Social Officer will liaise with the Kenya Wildlife Service to identify the exact known wildlife crossing areas and ensure that appropriate safety signage is placed alongside the road warning motorists of ''dangers a head''. At important crossing points, animal tunnels or bridges may be used to reduce collision rates, especially for protected or endangered species. This measure is expensive and will be used only at a few locations where it is both justified (by the importance of the animal population and the crossing route as recommended by KWS) and affordable (relative to the cost of the project and the funds available). It will also be important that the Supervising Engineer in liaison with the local administration take care of areas with high population of livestock so that appropriate signage is placed along the road warning motorists.

7.2.19 Minimizing Social-Political Disputes

This should be mitigated as follows:

i. Ensure all stakeholders and the public are involved in the planning process.
ii. Ensure proper identification and compensation of all persons who will lose businesses and land.
iii. Obtain necessary permissions and approvals from the County Governments.
iv. Ensure EIAs are conducted for specific project activities such as sand harvesting, borrow pit and quarrying sites.
v. Largely involve the community in the project through their leaders, take keen in timely addressing their grievances and ensure a good percentage of the local community members are employees in the project

7.2.20 Gender Equality

To ensure gender equality, the proponent should apply the following approaches:-

i. Apply gender Kenya constitutional requirements throughout the project
ii. Apply all guidelines under the National Gender and Equality Commission Act, 2011
iii. Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages
iv. Adhere to Gender Strategy (FY16-23).
v. Incorporate best practices in gender mainstreaming from project partners

7.2.21 Minimizing Occupational Health and Safety Impacts

This should be mitigated as follows:

i. Development and enforce a fleet transportation management plan for road construction that includes measures to ensure work zone safety for construction workers and the travelling public.
ii. Establishment of work zones to separate pedestrians and livestock travelling by foot from vehicular traffic and equipment by routing of traffic to alternative roads when where possible.
iii. Use protective barriers to shield livestock and pedestrians from traffic vehicles, regulation of traffic flow by warning lights, avoiding the use of flaggers if possible, design of the work space to eliminate or decrease blind spots, and ensure reduction of maximum vehicle speeds in work zones. Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles.
iv. Ensure safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists).
v. Barricade the area around which elevated work is taking place to prevent unauthorized access. Working under personnel on elevated structures should be avoided.
vi. Hoisting and lifting equipment should be rated and properly maintained, and operators trained in their use.
vii. Elevating platforms should be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings).
viii. Use of the correct asphalt product for each specific application, and ensuring application at the correct temperature to reduce the fuming of bitumen during normal handling.
ix. Maintenance of work vehicles and machinery to minimize air emissions;
x. Reduction of engine idling time in construction sites; Use of extenders or other means to direct diesel exhaust away from the operator; Ventilation of indoor areas where vehicles or engines are operated, or use of exhaust extractor hose attachments to divert exhaust outside;

7.2.22 Minimizing Negative Community Health and Safety Impacts

Community health and safety issues during the construction of the proposed road can be mitigated as follows:

i. Implement pedestrian safety management strategies such as provision of safe corridors/ side road along the road alignment and construction areas, including

tunnels and bridges (e.g. paths separated from the roadway which can be used by both pedestrians and livestock), and safe crossings (preferably over or under the roadway) both during construction and operation.

ii. Installation of barriers (e.g. guardrails, fencing, plantings) to deter pedestrian and livestock access to the roadway except at designated crossing points
iii. Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas.
iv. Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways.
v. Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions.
vi. Construction of roadside rest areas and bus stops at strategic locations to minimize driver fatigue. Installation of measures to reduce collisions between animals and vehicles (e.g. use of signs to alert drivers on road segments where animals frequently cross; construction of animal crossing structures; installation of fencing along the roadway to direct animals toward crossing structures; and use of reflectors along the roadside to deter animal crossings at night when vehicles are approaching.
vii. Targeting elimination of accidents rail crossings by use of a real-time warning system with signage to warn drivers of congestion, accidents, adverse weather or road conditions, and other potential hazards ahead.
viii. Prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders to provide timely first aid response in the event of accidents and hazardous materials response in the event of spills.
ix. Ensure there is adequate wastewater disposal system to avoid breeding of malaria parasite transmitting mosquitos. Proper disposal of wastewater to minimize contamination of water supplies with typhoid causing organisms.
x. Ensure health and safety measures as proposed in the ESMP apply to the letter for quarrying and earth borrowing activities.

7.3 Mitigation Measures during the Operation Phase

The following mitigation measures are applicable during the operation phase of the proposed project to mitigate the negative project impacts.

7.3.1 Mitigating Noise Pollution and Excessive Vibrations

- Enforcement of Traffic Act regulations to ensure that all vehicles using the road are in good condition all the time to avoid excessive noise generation
- Install speed control measures such as bumps and ramble strips in the villages and towns where the road traverses.
- Install no hooting signs in sensitive areas such as near hospitals, schools, etc

7.3.2 Mitigating Air Pollution due to Dust Generation and Air Emissions

The recommended mitigation measures are similar as those presented in section 7.2.2 above

7.3.3 Mitigation of impacts on livestock and wildlife

The Supervising Road Engineer and Environmental Social Officer will liaise with the Kenya Wildlife Service to identify the exact known wildlife crossing areas and ensure that appropriate safety signage is placed alongside the road warning motorists of ''dangers a head''. At important crossing points, animal tunnels or bridges may be used to reduce collision rates, especially for protected or endangered species. This measure is expensive and will be used only at a few locations where it is both justified (by the importance of the animal population and the crossing route as recommended by KWS) and affordable (relative to the cost of the project and the funds available). It will also be important that the Supervising Engineer in liaison with the local administration take care of areas with high population of livestock so that appropriate signage is placed along the road warning motorists.

7.3.4 Minimizing Energy Consumption

- Design an energy efficient road in terms of terrain, avoiding steep slopes and sharp bends which cumulatively influence fuel consumption levels per journey.
- Installation and use of sensor solar lighting along the road corridor.
- Regular road maintenance will also ensure that movement of vehicles is not interfered with. This as a result will minimize consumption of fossil fuels due to unnecessary stopping along the road.

7.3.5 Minimizing run-off

The proposed mitigation measure include:

- Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration.
- Regular inspection and maintenance of permanent erosion and runoff control features

7.3.6 Minimizing Loss of Human Life and Livestock due to Road Accidents

- Provide a side road parallel to the proposed tarmacked road for use by locals during transportation of livestock from Rhamu – Mandera and vice-versa.
- Maintain pedestrian and livestock crossing points with foot bridges in certain key areas for instance near the villages and towns.
- Maintain under passes for livestock and wild animals at strategic locations along the road
- Maintain parking areas and bus stops for trucks

7.3.7 Minimizing Negative Community Health and Safety impacts

The proposed mitigation measures include:

- Implement pedestrian and livestock safety management strategies such as provision of safe corridors (side roads) along the road alignment and construction areas, including tunnels and bridges and safe crossings for pedestrians and livestock,

- Installation of barriers (e.g. guardrails, fencing, plantings) to deter pedestrian and animals access to the tarmacked roadway except at designated crossing points,
- Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas such as bumps, ramble strips in all the villages along Rhamu – Mandera road,
- Installation and maintenance of all road signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian, wildlife or livestock
- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions
- Installation of measures to reduce collisions between animals and vehicles (e.g. use of signs to alert drivers on road segments where animals frequently cross).

7.4 Mitigation Measures during the Decommissioning Phase

7.4.1 Efficient solid waste management

Solid waste resulting from demolition or dismantling works will be managed as described in Section 8.2.3

7.4.2 Reduction of Dust Concentration

High levels of dust concentration resulting from demolition or dismantling works will be minimized as described in Section 8.2.2

7.4.3 Minimization of Noise and Vibration

Significant impacts on the acoustic environment will be mitigated as described in Section 8.2.1

7.4.4 Minimize Health and Safety Impacts to both the workers and local community

Incidences of health and safety will be mitigated as described in Section 8.3.7

7.5 Environmental Risks to the Project

In any project, there are risks associated with it during the project cycle. For the proposed Rhamu – Mandera road project, the following environmental risks were identified and some recommendations to reduce their occurrence are outlined

7.5.1 Flush Floods along the road corridor

The project area is characterised by seasonal rivers which drain the nearby hills. The seasonal rivers drain their water to Daua River which originates from Ethiopia. The seasonal rivers are usually impassable during heavy downpour especially from upstream. The rivers could be a risk to the project especially during construction and operation phases as they could lead to loss of properties, roads and even lives.

It will be prudent for the proponent to consider the highest recorded flood levels of these rivers and include the data in the design of the various river crossings. During

construction, it will also be prudent for the contractor to ensure measures have been put in place to provide adequate warning before flooding. This will ensure adequate evacuation is done prior to the floods. A Storm Water Management Plan will also be requisite to state the measures to be taken during the flooding periods.

7.5.2 Transport of Dangerous Goods

Dangerous goods are frequently transported in bulk presenting a potential risk of release to the environment in the event of accidents. Additionally, there is a potential for the release of diesel during fuelling operations. The recommended measures to prevent minimize, and control releases of hazardous materials during road transportation and use include the following:

- Use of tank cars and other rolling stock that meet national and international standards (e.g. thermal protection and puncture resistance) appropriate for the cargo being carried, and implementing a preventive maintenance program;
- Preparation of spill prevention and control, and emergency preparedness and response plans, based on an analysis of hazards, including the nature, consequence, and probability of accidents.

Based on result of the hazard analysis, implementation of prevention and control measures which may include: -

- Routing and timing of hazardous materials transport to minimize risk to the community (e.g. restricting transport of hazardous materials in certain hours)
- Limiting the general speed of vehicles in developed areas
- Construction of protective barriers and other technical measures (e.g. guardrails) at sensitive locations (e.g. water resources and settlements)
- Dissemination of emergency preparedness and response information to the potentially affected communities (e.g. emergency notification systems and evacuation procedures);
- Implementation of a hazardous material security plan and security awareness training, including provisions for personnel security, prevention of unauthorized access, and measures to reduce risks during storage and transport of hazardous materials;
- Use of standardized fuel spill prevention system

7.5.3 Fire

If vegetation growth is left unchecked or slash from routine maintenance is left to accumulate within the right-of-way, sufficient fuel can accumulate that may promote forest fires. Recommended measures to prevent and control risk of forest fire include:

- Monitoring of right-of-way vegetation according to fire risk;
- Removal of blow down and other high-hazard fuel accumulations;
- Trimming, slashing, and other maintenance activities to avoid seasons when the risk of forest fires is high;
- Removal of maintenance slash or management by controlled burning. Controlled burning should adhere to applicable burning regulations, fire suppression equipment requirements, and typically should be monitored;

- Planting and management of fire-resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way.

7.5.4 Terrorism

The issue of terrorism cannot be completely be ruled out of the project, owing to the fact that the proposed project is located near the Somali boarder. Several cases of terrorism have been reported in the past of terrorism where lives have been lost.
It will be prudent for the County Government to provide adequate security both during construction and operation phase of the proposed project. This will ensure that terrorism activities have been minimized.

7.5.5 Socio – Political Conflicts

The construction of the proposed road project can spur inter-clan conflicts leading to paralyzing the transportation in some sections where major realignment has been proposed. This is for instance the realignment in Rhamu town where the realignment passes outside town due to safety issues.

7.6 Environmental risk management

The failure of environmental mitigation can result in serious impacts such as erosion, increased road accidents and disruption of the community lifestyles. Construction of a road also involves occupational health and safety risks to road workers, primarily in the areas of storage and handling of dangerous materials, and operation of heavy machinery close to traffic, slopes and watercourses. The anticipated risks in this project include:

- Exposure to excessive dust particles or toxic fumes from bitumen and other chemicals used in road works;
- Potential for collapse of trenches;
- Risk of accidents involving passing traffic;
- Risk of bush fires during dry seasons;
- Risk of rock falls during blasting;
- Risk of fuel spills and therefore contaminating soil and groundwater.

The above risks can be mitigated to some extent through:

- Strengthening staff skills and training in environmental management;
- Monitoring environmental actions and responsibilities and making provision for remedial actions;
- Planning for remedial measures in case initial planned actions are not successful;
- Limiting time of exposure to dust particles, chemicals and noise;
- Provision of Personal Protective Equipment (PPE);
- Establishing safety and inspection procedures in materials handling, operating heavy equipment and constructing trenches;
- Safe handling of toxic materials, explosives and other hazardous substances.

CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

8.1 Introduction

This section analyses the project alternatives in terms of site, transport alternatives, materials and technology scale, solid waste and wastewater management options and shall involve studying design alternatives and analysing them based the environmental costs and benefits this shall involve studying the technology, design, capital investments, operation and maintenance requirements among others

8.2 "Without the project" scenario

Rhamu and Mandera town are already connected by a continuous gravel surface road, therefore there is no standard ''no project'' scenario if the strategic objectives of the Government of Kenya in connecting the two towns still exist. There is no other macro-transport alternative like water and overland rail which can be applicable to connect these two towns. The possible alternative is air transport but this is not adequate and affordable to the local communities in Mandera and Rhamu towns.

This is defined as maintaining the road in passable condition. Intermittent repairs are undertaken from time to time. "Without-the-project "scenario is therefore to assume that similar interventions will continue in the future and that the maintenance strategy will be to ensure that the road remains passable. The maintenance strategy may involve any of the following options:

- Heavy routine maintenance. This would involve clearing blocked drains and culverts and treatment of the road surface;
- Periodic maintenance. This would spot repairs to failed sections of the road surface and measures to restore drainage to good condition;
- Timely routine maintenance. This would involve keeping drains in good shape and cutting back vegetation and weeds.
- The "Without-the-project "alternative is expensive in the long term and would involve periodic extraction of material from borrow sites. This will necessitate further development of borrow pits resulting in the following negative environmental impacts:
    - Landscape scarring creating unpleasant changes in scenery when a gaping hole is left behind due to the excavation;
    - Incidences of malaria in the vicinity of pits where drainage was not possible;
    - Open un-protected water bodies which pose a potential drowning hazard, particularly for young children;
    - Increased flow of surface run-off, particularly in areas where the vegetation is removed and is not re-vegetated.

8.3 Analysis of Alternative Route/Realignment

Owing to the fact that the current road is usable and only tarmacking is required to improve its standards, there was no alternative route which could be constructed economically. Two alternatives however for road alignment in Rhamu town are depicted

in figure 6-1. The realignment at Rhamu is for safety reasons in the town. This was also attributed to the displacement of businesses and structures to accommodate the 60m road reserve required for the construction of the road. Although some clan members were seriously opposed to the realignment, their concerns about bypassing the town were addressed by providing a bituminised loop through the town. This major realignment has been included in Appendix.

8.4 Alternative mode of transportation

There are no viable alternatives to this road that fulfil the functions of providing relatively fast, cheap land transportation. Air, rail, and water transport are unlikely to either complement or to substitute for roads or highways in this region. There is no railway transport system close to the project area connecting the two towns and no water body that can be used as a mode of transportation in the project area. The only possible means is air transport but, this is a rather expensive alternative and cannot be used as an alternative to the road.

The road is the most important link between Nairobi and Mandera and serves the entire North Eastern region.

The proposed project road is an existing gravel road and its upgrading will not involve any major horizontal or vertical realignment except at Rhamu and Mandera towns as will be discussed in detail in the final Detailed Engineering Design report.

CHAPTER NINE: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

9.1 Environmental and Social Management Plan

This chapter presents the Environmental and Social Management Plan (ESMP) that will need to be implemented by the proponent to prevent or reduce significant negative impacts to acceptable levels. All the project components support infrastructure are all considered when this ESMP was developed. Environmental and Social Management plans for the project covers the following phases: -

- Design and construction Phase
- Operation Phase
- Decommissioning

These tables capture on key ESMP issues to be addressed during construction, operational and decommissioning phases of the proposed road project. ESM prerequisites have been captured in detail, providing all the necessary mitigation measures and persons responsible for implementing and monitoring such measures. The tables should be used as checklist on site. Due to the magnitude of the project, compliance with the ESMP must be monitored on a daily basis and reports done on a monthly basis during the construction phase and immediately following completion of construction as required in EMCA 1999 and amendment Act 2015, the Equator Principles and the IFC Performance Standards which provide a baseline of performance in the management of environmental and social issues. In this respect, the Performance Standards shall be seen to overlap and inter-relate with legal standards addressing the same topic areas.

Upon final completion of the project's construction phase, the proponent shall commit to carrying out Annual Environmental Audits as provided in the EIA/EA Regulations 2003.

9.2 Cost of Implementation the ESMPs

For effective implementation of the ESMPs, the project must establish an environment, health and safety (EHS) unit that will be responsible for *Project Environmental Monitoring and Evaluation to ensure compliance to NEMA and international standards and practices.* The project proponent will be required to produce monthly reports on project environment monitoring to be sent to the concerned agencies for information and supervision. The project proponent will be responsible for all costs of implementing the project's EIA licence conditions, including the ESMPs and the actual costs of public involvement in the ESIA process.

Hence all costs proposed in the ESMPs below will be incurred by the project proponent who may transfer all to the contractor/ concessionaire except those of land acquisition and resettlement (Resettlement Action Plan Resettlement Implementation budget). The costs outlined are current costs mainly for project environmental monitoring and evaluation to ensure compliance to NEMA and international standards and practices. To estimate future costs, an increase to cover annual inflation should be applied. The costs for actual activities should be included in the main bill of quantities of the project.

Table 9-1: Environmental Management Plan- Construction Phase

POSSIBLE IMPACTS	MITIGATION MEASURES	RESPONSIBLE PARTY	IMPLEMENTATION PERIOD	BUDGET (KSHS)
Noise Pollution and Excessive Vibrations	• Sensitize drivers of construction vehicles and machinery operators to switch off engines or machinery that are not being used. • Ensure that all vehicles and construction machinery are kept in good condition all the time to avoid excessive noise generation. • Ensure that all workers wear ear muffs and other personal protective gear/equipment when working in noisy sections. • Ensure machines are switched off when not in use. • Undertake loud noise and vibration level activities during off-peak hours during the day (i.e. between 8.00 am and 5.00 pm). • Acquire Noise and Excessive Vibrations Pollution Control Permit and comply with conditions provided by EMCA 1999 Noise and Excessive Vibrations Pollution Control Regulations 2009. • Support facilities such as hard rock quarries should carry out controlled blasting and observe relevant explosives use and blasting permits provided by the Inspector of Mines and Geology.	Contractor/KeNHA	Monthly	200,000

Air Pollution due to Dust Generation and Air Emissions	• Consideration of design options for the reduction of traffic congestion. • Sprinkling of water on dry and dusty surfaces regularly including the access roads. • Add suitable soil stabilizers on access roads to control dust. • Provision of adequate personal protective clothing such as dust masks. • Enforce on and off site speed limit regulations to help control fugitive dust. • Ensure machines and vehicles are properly and regularly maintained. • Adhere to EMCA 1999 Air Quality Regulations.	Contractor/KeNHA	Monthly	250,000

Increased Generation of Solid Waste	• Maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base; • Incorporating recyclable materials to reduce the volume and cost of new asphalt and concrete mixes. • Collecting road litter or illegally dumped waste and managing it according to the recommendations in the General EHS Guidelines. • Provision of trash disposal receptacles at parking lots and bus stops and stations to avoid littering along the road. • Collecting animal carcasses in a timely manner and disposing them through prompt burial or other environmentally safe methods. • Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardous or non-hazardous waste based on an assessment of its characteristics. • Management of all removed paint materials suspected or confirmed of containing lead as a hazardous waste; • Grinding of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses. • Develop a Construction Waste Management Plan • Comply with EMCA 1999 Waste Management Regulations 2006. • Use a licensed waste collector to collect and dispose construction waste in approved sites.	Contractor/KeNHA	Monthly	150,000

Increased Energy Consumption	• Promote the use of solar energy and energy efficient bulbs and water heaters in workers base camps and for street lights in towns situated along the highway. • Switch off lights when not in use. • Install sensor automatic street lights. • Install electricity meters to monitor the consumption of electricity in workers camps. • Ensure construction machineries and trucks are well maintained. • Use energy-efficient construction machineries and trucks during construction phase of the project. • Avoid routing the highway on very steep sections.	Contractor/KeNHA	Monthly	250,000
Discharge of Wastewater, Sewage and Degradation of Water Quality	• Construct standard septic tanks linked to a constructed wetland system. • Promote recycling of wastewater. • Install meters in premises to control consumption of water. • Ensure wastewater is channeled and treated in sewerage plants. • Ensure regular maintenance of plumbing system to avoid leakage of wastewater. • Discharge of partially treated sewage into the sewerage system. • Ensure regular maintenance of plumbing system and septic tanks to avoid spillage of raw sewage. • Comply with EMCA 1999 Waste Management and Water Quality Regulations 2006.	Contractor/KeNHA	Monthly	200,000

Excessive Water Abstraction and Consumption	• Install water conserving taps and toilets. • Install gutters on the roof of houses in workers camps to harvest rain water. • Construct underground reservoir for storage of harvested rainy water. • Drilling of a borehole to supplement water supplied by water companies. • Harvest surface runoff and use it for landscaping purposes. • Comply with Water and Resources Management Authority Requirements.	Contractor/KeNHA	Monthly	200,000
Modification of hydrology of ASALs	• Control excessive abstraction of water from rivers and wetlands. • Avoid complete blockage of river channels during construction of bridges and culverts. • Re-open all blocked river channels after construction of bridges. • Quarries and pits for extraction of road construction materials to be used as water harvesting sites. • Surface runoff on the sides of the highway should be channeled in areas with gentle slopes to prevent erosion of the road sides. • Construct over passes and bridges in areas occupied by rivers and wetlands.	Contractor/KeNHA	Monthly	200,000
Increased generation of storm water and impact on drainage	• Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration. • Use of vegetated swales, filter strips, terracing, check dams, detention ponds or basins, infiltration trenches and infiltration basins. • Regular inspection and maintenance of permanent erosion and runoff control features. • Paving in dry weather to prevent runoff of asphalt or cement materials.	Contractor/KeNHA	Monthly	200,000

Increased Soil Erosion Risk	• Ensure surface runoff generated on impervious surface is not channeled directly to steep slopes. • Provide grassed water ways along the access roads. • Construct flow breaks on roadside drainage channels. • Promote harvesting of surface runoff for landscaping purposes.	Contractor/KeNHA	Monthly	200,000
Loss of Vegetation Cover and Biodiversity	• Select roads and support facility sites to avoid critical terrestrial habitat by utilizing existing transport corridors. • Design and construct wildlife migration channels to avoid or minimize habitat fragmentation. • Minimize clearing and disruption of riparian vegetation. • Provide adequate protection against scour and erosion and give consideration to the onset of the rainy season with respect to construction schedules. • Minimize removal of indigenous plant species and replant indigenous plant species in disturbed areas. • Explore opportunities for habitat enhancement through placement of nesting boxes in rights of-way, bat boxes underneath bridges. • Employ vegetation rehabilitation techniques to recover lost plant cover such as Reforestation and Afforestation.	Contractor/KeNHA/KFS	Monthly	200,000

Loss of Agricultural Land and Crops	• Provide full compensation to farmers whose land will be taken over by the proposed highway. • Develop a comprehensive Resettlement Action Plan. • Promote alternative sources of income among local communities.	Contractor/KeNHA/County Governments	Monthly	250,000
Displacement of Local Communities, Loss of Properties and Businesses	• The affected communities will be compensated appropriately according to existing best practices. • The proponent will need to ensure that the final designs of the highway will be realigned to ensure that displacements are minimized as much as possible. • Ensure that the Resettlement Action Plan is done appropriately and professionally.	Contractor/KeNHA	Monthly	150,000
Disruption and Loss of Businesses	• Provide support to squatters to establish small-scale businesses in other suitable locations in affected towns. • Educate squatters on the need to maintain free road reserve. • Provide comprehensive health and safety education to squatters in affected towns. • Promote other sources of livelihood among the local communities.	Contractor/KeNHA	Monthly	250,000
Increased Loss of Human Life due to Road Accidents	• Construct pedestrian crossing points with foot bridges in certain key areas. • Create under passes for livestock and wild animals at strategic locations along the highway. • Create parking areas for trucks. • Create bunks in towns.	Contractor/KeNHA/KWS	Monthly	200,000

Increased Spread of STD, HIV and AIDS	• Develop a comprehensive STDS, HIV and AIDs control programme. • Control of prostitution in main towns situated along the highway in collaboration with the Police and County Governments. • Provision of STDs, HIV and AIDS prevention measures to workers. • Creation of awareness of STDs, HIV/AIDS in workers' camps.	Contractor/KeNHA/County Governments	Monthly	350,000
Interference of Existing Development Infrastructure	• Compensate for the relocation of other infrastructural public utilities already existing along the proposed road corridor. • Undertake an integrated system of planning for infrastructure development along the corridor for future developments. • Ensure effective stakeholder participation in the design of the highway.	Contractor/KeNHA/NLC	Monthly	250,000
Increased Security Risk and Wildlife-Human Conflicts	• Thoroughly screen workers, suppliers and distributors. • Ensure 24-hour surveillance by engaging the services of day and night guards. • Accord the local people the first priority in employment. • Ensure close liaison with the local Police Department.	Contractor/KeNHA/KWS	Monthly	250,000

Disturbance to Wildlife	• Utilize existing transport corridors for the new road project and its support facilities to avoid critical terrestrial and aquatic habitat disturbance. • Design and construction of wildlife migration channels to avoid or minimize habitat fragmentation. • Avoidance or modification of construction activities during the breeding season and other sensitive seasons or times of day to account for potentially negative effects. • Minimize clearance and disruption of riparian vegetation. • Minimize removal of indigenous plant species, and replant indigenous plant species in disturbed areas. • Explore opportunities for habitat enhancement through reduced clearance to conserve or restore native species. • Comply with Wildlife Conservation and Management Act 2007.	Contractor/KeNHA/KWS/KFS	Monthly	200,000
Social-Political Disputes	• Ensure all stakeholders and the public are involved in the planning process. • Ensure proper identification and compensation of all persons who will lose businesses and land. • Obtain necessary permissions and approvals from the County Governments. • Ensure EIAs are conducted for specific project activities such as sand harvesting, quarrying and earth borrowing sites.	Contractor/KeNHA/NLC	Monthly	200,000
Land Acquisition and Involuntary Resettlement of Affected Person	• Ensure proper compensation of the affected persons. • The Resettlement Action Plan should ensure all the affected persons are properly identified and duly compensated according to best practices.	Contractor/KeNHA/NLC	Monthly	200,000

Occupational Health and Safety	• Development of a Fleet Management Plan for road construction that includes measures to ensure work zone safety. • Establishment of work zones to separate workers on foot from traffic and equipment by routing of traffic to alternative roads. • Use protective barriers to shield workers from traffic vehicles, regulation of traffic flow by warning lights, design of the work space to eliminate or decrease blind spots, and ensure reduction of maximum vehicle speeds in work zones. • Training of workers in safety issues related to their activities. • Ensure safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space. • Barricade the area around which elevated work is taking place to prevent unauthorized access. • Hoisting and lifting equipment should be rated and properly maintained, and operators trained in their use. • Lifting equipment among other machines used in the project should be authorized and examined by the relevant statutory bodies. • Elevating platforms should be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings). • Use of the correct asphalt product for each specific application, and ensuring application at the correct temperature to reduce the fuming of bitumen during normal handling. • Maintenance of work vehicles and machinery to minimize air emissions.	Contractor/KeNHA	Monthly	250,000

Community Health and Safety	• Implement pedestrian safety management strategies such as provision of safe corridors along the road alignment and construction areas, including tunnels and bridges and safe crossings for pedestrians and cyclists. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points. Installation and maintenance of traffic and speed control installations at pedestrian crossing areas. • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways. • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions. • Construction of roadside rest areas at strategic locations to minimize driver fatigue. • Installation of measures to reduce collisions between animals and vehicles (e.g. use of signs to alert drivers on road segments where animals frequently cross). • Prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders. • Register all work stations under the project as work places as provided in OSHA 2007. • Comply with all requirements of the Certificate of Registration of Workplace. • Put in place an Occupational Safety and Health Committee and meet as systematically provided in the OSHA 2007 regulations. • Carry out Fire Safety trainings and drills to ensure fire safety at base camps. • Comply with the OSHA 2007 (First Aid Rules 1977). • Acquire an Incident Register from DOSH for reporting major, minor to near miss incidences in the project. • Adhere to conditions provided by the Work Injury Benefits Administration. • Comply with all statutory requirements set in OSHA 2007 regulations.	Contractor/KeNHA	Monthly	200,000

Gender Discrimination	• Apply gender Kenya constitutional requirements throughout the project • Apply all guidelines under the National Gender and Equality Commission Act, 2011 • Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages • Incorporate best practices in gender mainstreaming from project partners	Contractor/KeNHA	Monthly	150,000

Table 9-2: Environmental and Social Management Plan- Operational Phase

POSSIBLE IMPACT	MITIGATION MEASURES	RESPONSIBLE PARTY	IMPLEMENTATION PERIOD	BUDGET (KSHS)
Noise Pollution and Excessive Vibrations	• Enforcement of Traffic Act regulations to ensure that all vehicles using the highway are in good condition all the time to avoid excessive noise generation. • Install speed control measures in urban areas such as bumps and ramble strips. • Install no hooting signs in sensitive areas such as near hospitals, schools, etc.	Contractor/KeNHA	Monthly	150,000
Air Pollution due to Dust Generation and Air Emissions	• Reduction of traffic congestion in urban areas. • Enforcement of Traffic Act regulations to ensure that all vehicles using the highway are kept in good condition all the time to avoid excessive emissions.	Contractor/KeNHA	Monthly	150,000
Increased Generation of Solid Waste	• Maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base; • Incorporating recyclable materials to reduce the volume and cost of new asphalt and concrete mixes. • Collecting road litter or illegally	Contractor/KeNHA	Monthly	200,000

	dumped waste and managing it according to the recommendations in the General EHS Guidelines. • Provision of bottle and can recycling and trash disposal receptacles at parking lots, bus stops and bus stations to avoid littering along the road. • Collecting animal carcasses in a timely manner and disposing them through prompt burial or other environmentally safe methods. • Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardous or non-hazardous waste based on an assessment of its characteristics. • Management of all removed paint materials suspected or confirmed of containing lead as hazardous waste. • Grinding of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses. • Ensure implementation of the projects Construction Waste Management Plan. • Comply with EMCA 1999 Waste Management Regulations.			

Increased Energy Consumption	• Promote the use of solar energy and energy efficient bulbs for street lights in towns situated along the highway. • Install automatic light sensor streetlights to conserve energy. • Install electricity meters to monitor the consumption of electricity in streetlights. • Carry out an Energy Audit	Contractor/KeNHA	Monthly	250,000
Increased generation of storm water	• Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration. • Use of vegetated swales, filter strips, terracing, check dams, detention ponds or basins, infiltration trenches and infiltration basins. • Regular inspection and maintenance of permanent erosion and runoff control features. • Paving in dry weather to prevent runoff of asphalt or cement materials.	Contractor/KeNHA	Monthly	150,000
Increased Soil Erosion Risk	• Ensure surface runoff generated on impervious surface is not channeled directly to steep slopes. • Provide grassed water ways along the access roads. • Maintain flow breaks on roadside drainage channels. • Ensure roadside slope management to reduce soil erosion and storm water runoff speeds.	Contractor/KeNHA	Monthly	150,000

Loss of Vegetation Cover and Biodiversity	• Minimize removal of indigenous plant species and replant indigenous plant species in disturbed areas. • Explore opportunities for habitat enhancement through placement of nesting boxes in rights of-way, bat boxes underneath bridges. • Develop and implement a vegetative restoration plan which includes both forest and various vegetative forms.	Contractor/KeNHA/KFS	Monthly	150,000
Increased Loss of Human Life due to Road Accidents	• Maintain pedestrian crossing points with foot bridges in certain key areas. • Maintain under passes for livestock and wild animals at strategic locations along the highway. • Maintain parking areas for trucks. • Create bunks in towns. • Carry out Risk Assessment to identify risk areas and provide appropriate prevention measures.	Contractor/KeNHA	Monthly	200,000
Increased Spread of STD, HIV and AIDS	• Develop a comprehensive STDS, HIV and AIDs control programme. • Control of prostitution in main towns situated along the highway in collaboration with the Police and County Governments. • Provision of STDs, HIV and AIDS prevention measures to workers. • Creation of awareness of STDs, HIV/AIDS in workers camps.	Contractor/KeNHA/County Governments	Monthly	150,000

Disturbance to Wildlife	• Minimize clearance and disruption of riparian vegetation when maintaining the road. • Replant indigenous plant species, and replant indigenous plant species in disturbed areas. • Implement projects for habitat enhancement through reduced clearance to conserve or restore native species. • Evaluate Wildlife Management measures incorporated into the design to determine feasibility and ensure their efficiency in functionalism.	Contractor/KeNHA	Monthly	150,000
Occupational Health and Safety	• When undertaking road repairs, use protective barriers to shield workers from traffic vehicles, regulation of traffic flow by warning lights, design of the work space to eliminate or decrease blind spots, and ensure reduction of maximum vehicle speeds in work zones. • Training of workers in safety issues related to road maintenance activities. • When undertaking road repairs, ensure safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination. • When repairing the highway, use asphalt product of appropriate	Contractor/KeNHA	Monthly	250,000

	specification and ensure application at the correct temperature to reduce the fuming of bitumen during normal handling. • Maintenance of work vehicles and machinery to minimize air emissions. • Reduction of engine idling time in construction sites; Use of extenders or other means to direct diesel exhaust away from the operator. • Ventilation of indoor areas where vehicles or engines are operated, or use of exhaust extractor hose attachments to divert exhaust outside. • Carry out Safety Audits. • Implement DOSHS improvement orders.			
Community Health and Safety	• Implement pedestrian safety management strategies such as provision of safe corridors along the road alignment and construction areas, including tunnels and bridges and safe crossings for pedestrians and cyclists. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points. • Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas. • Installation and maintenance of all signs, signals, markings, and other	Contractor/KeNHA	Monthly	250,000

	devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways. • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions. • Construction of roadside rest areas at strategic locations to minimize driver fatigue. • Installation of measures to reduce collisions between animals and vehicles (e.g. use of signs to alert drivers on road segments where animals frequently cross). • Prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders. • Comply with OSHA 2007 requirements, they include; - Carrying out Safety Audits. - Implementing DOSHS improvement orders. - Carrying out EHS Risk Assessments. • Involve all the relevant stakeholders during the audit so as to incorporate suggested EHS measures into the report.			

Gender Discrimination	• Apply gender Kenya constitutional requirements throughout the project • Apply all guidelines under the National Gender and Equality Commission Act, 2011, • Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages, • Incorporate best practices in gender mainstreaming from project partners.	Contractor/KeNHA/ The National Gender and Equality Commission	Monthly	150,000

9.3 Environmental Monitoring Plan

Environmental monitoring is an essential component of project implementation. An Environmental Monitoring Plan (EMP) provides mechanism of monitoring environmental impacts of a project during its execution in order to reduce their negative effects and to introduce standards of good practice to be adopted for all project works. The EMP facilitates and ensures the follow-up of the implementation of the proposed mitigation measures proposed in the ESMP. The parameters of the proposed Rhamu - Mandera road project that were identified for monitoring include: water quality, air quality, solid waste generation, Occupational Health and Safety risks, wildlife/livestock/human accidents, HIV/AIDS incidences, soil erosion, storm water drainage, livelihood and environmental risks. These are presented in the table below.

Table 9-3: Environmental Monitoring Plan for the proposed Rhamu - Mandera B9 road

Environmental **Component**	Parameters to be monitored	Points to be monitored	Frequency of monitoring	Lab Materials and Equipment/Other Requirements	Responsibility	Cost **Kshs.**
Water Quality	**pH, Total Suspended Solids (TSS) and Total Dissolved Solids(TDS), heavy metals, oils and grease**	**Daua River at the following points: Rhamu town, Sala, Qumbiso, Sarohindi, Farey, Caro, Garbaqoley and Mandera town** **Water pans and boreholes**	**Quarterly**	**Sampling bottles, cooler box, Access to a NEMA accredited laboratory**	**Contractor and KeNHA**	**32,000 per quarter**
Air Quality	**TSP, NO_x, SO_2, CO, Dust particles, particulate matter etc.**	**Construction site, towns and villages along the road corridor**	**Continuous**	**Air sampling equipment**	**Contractor and KeNHA**	**20,000** per month
Solid Waste Generation	**Slag, domestic refuse, metallic scraps, sludge, waste composition, treatment methods**	**Construction sites, campsites**	**Monthly**	**Waste sampling bins, plastic bags, boxes, weighing machine**	**Contractor and KeNHA**	**20,000 per month**
Occupational Health and Safety risks	**Safety training for workers, accident reports and records, number and types of accidents, hazards**	**Construction sites, camp sites**	**Continuous**	**Incidents log-book**	**Contractor and KeNHA**	**50,000 per month**

Human Accidents	**Total number of human accidents, categories of humans knocked, accident locations**	**Towns, Villages, water points**	**Continuous**	**Accident recording book, camera, field patrol vehicle, GIS machine**	**Contractor and KeNHA**	**20,000 per month**
Wildlife Accidents	**Total number of wildlife accidents, types of animals knocked, accident locations**	**Along the road and near the water points**	**Continuous**	**Accident recording book, camera, field patrol vehicle, GIS machine**	**Contractor and KeNHA**	**20,000 per month**
Livestock Accidents	**Total number of livestock accidents, types of animals knocked, accident locations**	**Along the road, near villages and water points, livestock crossing points**	**Continuous**	**Accident recording book, camera, field patrol vehicle, GIS machine**	**Contractor and KeNHA**	**20,000 per month**
HIV/AIDS Incidences	**Training programmes, number of incidences, number of condoms distributed, seminars, and participants trained etc.**	**Campsites, construction sites, towns, villages,**	**Quarterly**	**Office and Testing Medical Supplies**	**Contractor and KeNHA**	**50,000 per quarter**
Soil Erosion	**Soils eroded, Turbidity in storm water and other water sources, sources and causes**	**Excavated areas, sloppy areas along the road**	**Continuous**	**Camera, field vehicle**	**Contractor and KeNHA**	**15,000 per month**
Storm Water	**Rainfall volume,**	**Flood prone areas,**	**Continuous**	**Rain-gauge, field**	**Contractor**	**20,000 per**

Drainage	**topography**	**culverts, water ways, low lying areas**		**survey maps**	**and KeNHA**	**month**
Environmental Risks	**Fire outbreak, floods etc.**	**Possible hazardous areas only**	**Continuous during operation stage**	**Field inspections and information from lead agencies**	**KeNHA**	**45,000 per month**

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

The ESIA study has established that the proposed development project by KeNHA is a worthy investment by the proponent and broadly with no doubt will contribute significantly to the economic development of the country. This will be achieved through the prior discussed positive impacts namely; growth of the economy, boosting of the informal sector during the construction phase, provision of market for supply of building materials, employment opportunities, increase in government revenue and optimal use of land among others. The studies conducted on the proposed Lot 3 Annuity Road Project for Rhamu – Mandera Road (75km) shows that indeed the project will pioneer development in the Kenyan Horn.

However, the ESIA study has established that the proposed project will also come along with some negative impacts. The negative environmental impacts that will result from establishment of the proposed project which include possible livestock-vehicular accidents, hydrology and water quality degradation, noise pollution, dust emissions, solid waste generation, increased water demand, increased energy consumption, generation of exhaust emissions, workers accidents and hazards during construction, possible exposure of workers to diseases, increased storm water among others can however be sufficiently mitigated.

The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the Environmental Management and Monitoring Plan as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects in Kenya. More emphasis should also be put on complying with the 10 Equator Principles and IFC World Bank Guidelines discussed in the report. It is expected that the positive impacts that emanate from such project shall be maximized as much as possible as exhaustively outlined within the report.

Considering the positive socio-economic and environmental benefits which will accrue as a result of the proposed development and the ESIA study having found no major impacts to arise from the development, it is our recommendation that the project be allowed to proceed on the understanding that the proponent will adhere to the mitigation measures recommended herein and will further still implement the proposed Environmental Management and Monitoring Plan to the letter. Kenya as a country has a big shortage of such road project developments especially in the Northern side of the country, hence the construction of the proposed project goes a long way in solving part of the road transportation sector.

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APPENDICES

A. HASS Consortium GVR Infra Ltd Certificate of Incorporation;
B. Proposed road preliminary design;
C. The Kenyan roads map;
D. Major Road Alignment in Rhamu Town
E. Water Analysis Results
F. Minutes of public meetings;
G. Sample public participation questionnaire;
H. List of participants in the public consultation;
I. AWEMAC 2017 Practicing License.