# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT OF THE PROPOSED LOT 3 ANNUITY ROAD PROJECT FOR MODOGASHE-HABASWEINI-SAMATAR ROAD (68KM) LOCATED IN ISIOLO AND WAJIR COUNTIES, KENYA

**PREPARED FOR APPROVAL BY:**
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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 Study Report for the **Proposed Lot 3 Annuity Road Project for Modogashe-Habasweini-Samatar (68km) Road Located in Isiolo and Wajir Counties, 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.<br><br>Signed at **NAIROBI** on this **__8th_____**of **June2017**<br><br>Signature and stamp:<br><br>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 Study Report for the **Proposed Lot 3 Annuity Road Project for Modogashe-Habasweini-Samatar (68km) Road Located in Isiolo and Wajir Counties, 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.<br><br>Signed at **NAIROBI** on this……day of **June 2017**<br><br>Signature and stamp: …….. |

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED LOT 3 ANNUITY ROAD PROJECT FOR MODOGASHE-HABASWEINI-SAMATAR (68 KM) ROAD LOCATED IN ISIOLO AND WAJIR COUNTIES, KENYA**

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## ACRONYMS

| | |
|---|---|
| Asl | Above Sea Level |
| A-RAP | Abbreviated Resettlement Action Plan |
| ASALs | Arid and Semi-Arid Lands |
| AWEMAC | Africa Waste and Environment Management Center |
| CBOs | Community Based Organizations |
| CBD | Convention on Biological Diversity |
| 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 |
| EA | Environmental Audit |
| EHS | Environmental Health and Safety |
| EIA | Environmental Impact Assessment |
| EMCA | Environmental Management and Co-ordination Act |
| EMP | Environmental Management/Monitoring Plan |
| EPFI | Equator Principles Financial Institutions |
| ESMP | Environmental and Social Management Plan |
| ESMS | Environmental and Social Management System |
| FGDs | Focused Group Discussions |
| FI | Financial Intermediaries |
| GDP | Gross Domestic Product |
| GHG | Greenhouse gases |
| GMM | Grievance Management Mechanisms |
| GOK | Government of Kenya |
| GRC | Grievance Redress Committee |
| IFC | International Finance Corporation |
| ILO | International Labor Organization |
| KBS | Kenya Bureau of Standards |
| KeNHA | Kenya National Highways Authority |
| KeRRA | Kenya Rural Roads Authority |
| KFS | Kenya Forest Service |
| KWS | Kenya Wildlife Service |
| LHS | Left Hand Side |
| LDP | Local Development Plan |
| 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 |
| PPE | Personal Protective Equipment |
| PPPU | Public Private Partnership Unit |
| PVC | Polyvinylchloride |
| RAP | Resettlement Action Plan |
| RC | Reinforced Concrete |
| RHS | Right Hand Side |
| SHE | Safety Health and Environment |
| 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 |
| 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 |
| $m^3$ | Cubic metre |
| mm | Millimetres |
| Ppm | Parts Per Million |

## 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;

**"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

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 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 the 68 km class B road from Modogashe town through Habasweini town to Samatar. Upon completion, the Modogashe-Habasweini-Samatar road will lead to opening up of the North-Eastern part of Kenya. The project will give create a linkage of Garissa, Isiolo and Wajir counties leading to improved transport network and growth of businesses.

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.

This study report was conducted in accordance to the requirements as stipulated in the EMCA, 1999, EIA/EA Regulations 2003, and the Equator Principles. *According to Principle 1 of Equator principles this project is classified as a Category B project; 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. Principle 2 of the Equator principles necessitates the need of the client to conduct an Assessment Process to address the relevant environmental and social risks and impacts of the proposed Project.*

The purpose of the study as provided in the terms of references (TORs) is to identify the negative and positive impacts that would be generated by the proposed road project. Means to mitigate the identified negative impacts and enhance the positive ones are dwelt with as appropriately as possible.

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.

The key findings from the study were:

An estimated **125** structures will be affected along the entire project corridor. These structures are found within the towns of Modogashe and Habasweini. The estimated cost for these structures is **30,800,000 KES.** In Samatar the structures are not situated close to the proposed project road and therefore do not lie within the proposed Right of Way (RoW).

| **Town** | **Number of Structures** | **Total Approx. Cost (Kshs)** |
|---|---|---|
| Modogashe | 60 | 12,750,000 |
| Habasweini | 65 | 18,050,000 |
| **Grand Total** | **125** | **30,800,000** |

An estimated **7** electricity poles will be affected in Habasweini town carrying low voltage electricity lines.

In order to capture more comprehensive details on PAPs and their entitlements, an abbreviated RAP report is recommended for the proposed Modogashe-Habasweini-Samatar (68km) road project since the possible PAPs affected are less than 200. 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, minor re-alignments effected appropriately. 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 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) ……..and*

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

***" 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 accordance 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 buildings,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 whatsoever to the said Licenced Sites, hereditaments or premises or any part thereto or enjoyed therewith, for the duration of the Project Team and, for the 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 centres. 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, Modogashe and Habasweini centres having a restricted 25m reserve.*

Additionally, 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.

**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 Modogashe-Habasweini-Samatar 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:

The description of the proposed road project.

i. 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.
ii. The project objectives.
iii. The employed technology, procedures, and processes for the implementation of the project.
iv. The materials to be used in the construction and implementation of the project.
v. The products, by-products and waste to be generated by the project.
vi. A description of the potentially affected environment.

vii. 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.
viii. Recommendation of a specific and environmentally sound and affordable waste management system.
ix. Analysis of alternatives for the: project site, design and technologies.
x. 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.
xi. A monitoring plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.
xii. 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.
xiii. Identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
xiv. Economic and social analysis of the project.
xv. 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 Modogashe-Habasweini-Samatar located in Isiolo and Wajir Counties, 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 Modogashe-Habasweini-Samatar 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 within Isiolo and Wajir counties.
- 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 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.<br>• 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.<br>• Cultivable lands will not be used as borrow pit sites for excavation of construction materials, unless other sites have been exhausted.<br>• Siting of quarries far from communal settlements, providing adequate buffer zones and adopting best available and safest controlled blasting techniques.<br>• Separate EIAs should be conducted for quarries, borrow pits, water pans and campsites.<br>• 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 refuelling will be carried out on paved surfaces so that spilled materials do not seep into the soil.<br>• Fuel storage and refilling areas will be located at least 300 m from drainage structures and important water bodies (rivers, water pans etc).<br>• Fuel storage and refuelling areas, if located in agricultural land or areas supporting vegetation, will have topsoil stripped, stockpiled, and returned after completion of refuelling/construction activities.<br>• 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.<br>• 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 murram roads and diversions.<br>• All precautions to be taken for reduction in dust emissions from batching and/or hot mix plants and crushers, etc.<br>• Adherence to personal protective clothing such as the use dust masks and respiratory masks by workers.<br>• Enforce onsite speed limit regulations.<br>• Ensure machines and vehicles are properly and regularly maintained.<br>• Installing dust nets around batching plants. |
| ***Noise Pollution and Excessive Vibrations during*** | • Ensure that all vehicles and construction machinery are kept in good condition all the time to avoid excessive noise generation. |

| | |
|---|---|
| ***construction*** | • Ensure that all workers wear ear muffs and other personal protective gear/equipment when working in noisy sections.<br>• Ensure machines are switched off when not in use.<br>• Undertake loud noise and vibration level activities during off-peak hours during the day (i.e. between 8.00 am and 5.00 pm).<br>• Ensure the World Health Organization (WHO) bare minimum noise level is maintained for the eight working hours i.e. 85 dB. |
| ***Possible Displacement and disruption of Businesses located along Modogashe and Habasweini town*** | • The affected community members should be informed early enough.<br>• The affected businesses will be compensated appropriately according to existing best practices on current market rates or mutually agreed rates.<br>• Explore the alternative of by-passing the road outside the Modogashe and Habasweini towns to avoid displacement,<br>• 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.<br>• Ensure that the Resettlement Action Plan is done appropriately and professionally as per the laid Equator Principles and the World Bank guidelines.<br>• Provide support to squatters to establish small-scale businesses in other suitable locations of the two towns.<br>• Provide comprehensive environmental health and safety education to squatters along the road.<br>• Promote other sources of livelihood among the local communities. |
| ***Water Abstraction and Consumption*** | • Install water conserving taps and toilets where possible e.g. in the base camps.<br>• Construct water pans and for storage of harvested storm water in conjunction with the local community members.<br>• Drilling of boreholes to supplement water obtained from other sources.<br>• It would be a noble arrangement to enhance community water supply by handing over the project's boreholes to the community after construction.<br>• Install gutters on the roof of houses in workers camps to harvest rain water. |
| ***Solid Waste generation*** | • 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.<br>• 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.<br>• Provision of temporary waste handling facilities (litter bins) both during construction and operation |

| | |
|---|---|
| | phase. |
| ***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.<br>• Switch off lights when not in use.<br>• Install electricity meters to monitor the consumption of electricity in workers camps.<br>• Ensure construction machineries and trucks are well maintained.<br>• 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.<br>• Explore the use of bio-digester in treatment of sewage in the workers camps.<br>• Promote recycling of wastewater especially storm water for dust suppression.<br>• Install meters in base camps to control and monitor consumption of water.<br>• Ensure regular maintenance of the plumbing system and septic tanks to avoid leakage or spillage of wastewater. |
| ***Storm water*** | • Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration.<br>• Use of vegetated swales, filter strips, terracing, check dams, detention ponds or basins, infiltration trenches and infiltration basins.<br>• Regular inspection and maintenance of permanent erosion and runoff control features.<br>• Paving in dry weather to prevent runoff of asphalt or cement materials. |
| ***Loss of Vegetation Cover and Biodiversity*** | • Ensure separate EIAs are conducted for campsites, borrow pits and dams.<br>• Minimize clearing and disruption of riparian vegetation.<br>• Minimize removal of indigenous plant species and replant indigenous plant species in disturbed areas,<br>• Restoring the vegetative cover through properly designed afforestation and reforestation practices, whose success can be appreciated through vigilant monitoring and evaluation after planting. |

| | |
|---|---|
| ***Disturbance to Wildlife*** | • Minimize clearance and disruption of riparian vegetation.<br>• Avoid critical terrestrial and aquatic habitats when siting roads and support facilities by utilizing existing transport corridors.<br>• Design and construct wildlife migration routes to avoid or minimize habitat fragmentation.<br>• Minimize removal of indigenous plant species, and replant indigenous plant species in disturbed areas.<br>• Explore opportunities for habitat enhancement through reduced clearance to conserve or restore native species. |

## Conclusions

The studies conducted on the proposed Lot 3 Annuity Road Project for Modogashe-Habasweini-Samatar (68km) road 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) together with the Environmental Monitoring Plan (EMP) to the later. 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 Introduction

The Environmental and Social Impact Assessment (ESIA) Study was carried out with the aim of identifying both the negative and positive impacts of the road project and formulate a sustainable Environmental and Social Management Plan (ESMP) . This would guide the decision and policy makers on appropriate ways to handle the pertinent environmental issues that may arise during the project life and afterwards. Myriad adverse impacts, ranging from wildlife habitat destruction, changes in ecological setup, human displacement, and environmental pollution to cultural disorientation need keen appraisal so as to achieve fairly less retrogressive impacts from such development.

Economic benefits from the road would aid in the realization of the national development goals, hence alleviate poverty in the long run. The project area has high potential for livestock production and tourism attraction which can play pivotal role in improving the levels of livelihood of a large cross-section of the rural poor and marginalized communities. This can only be realized through efforts to have a reliable road network in the counties.

## 1.2 Project Background

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

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 68 km road from Modogashe town through Habasweini town to Samatar.

## 1.3 ESIA Objectives

The main objective of the ESIA study is to predict, assess, and analyse the possible positive and negative environmental and social impacts that are expected during the construction, operation and decommissioning phases of the project. This was done with the aim of proposing the possible mitigation measures for the highlighted negative impacts. This is in line with ensuring that the development does not impact negatively on the environment in terms of social, health, economic and physical (soil, water, plant and animals) state of the project site. The exercise was carried out in accordance with the National Environment Management Authority (NEMA) of Kenya Environmental Impact Assessment and Audit Regulations of 2003 and EMCA, 1999, IFC Environmental and Social Performance Standards and Equator Principles.

The specific objectives are:

- Prediction and evaluation of potential environmental impacts of the project, and propose workable mitigation measures for the significant negative impacts of the project on the environment.
- Facilitation of consultative public participation and incorporate expressed views into the study report.
- Preparation of a detailed Environmental Monitoring Plan for the proposed project.
- Preparation of a detailed Environmental and Social Management Plan (ESMP) for the proposed project.

## 1.4 Purpose and Terms of Reference

The purpose and terms of reference developed for this study will be to assess the impacts that may result during the construction, operational and decommissioning phase of the proposed Modogashe-Habasweini-Samatar 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.

## 1.5 Project Objectives

The Proposed Road Project is expected to meet the following objectives and service needs both during construction and operation phases of the project:

- Improve the region's road network,
- Reduce travel time along and across the roads,
- Enhance the operational efficiency of the road,
- Promote economic growth within the region,
- Improve safety and reliability for all road users,
- Attract diverted traffic that will foster regional growth,
- Provide employment opportunities to local inhabitants, among other benefits.

## 1.6 Scope of the Project

In order to identify the potential environmental and social impacts, and to come up with the proper mitigation measures for the proposed Modogashe-Habasweini-Samatar road, the consultant used both conventional and participatory approaches.

In conducting this exercise, the consultant undertook:

- The reviewing of preliminary designs for the proposed project to get acquainted with environmental issues in the project site vicinity.
- The planning and preparing of a time schedule for the activities to be undertaken for the ESIA.

- Visiting the project site, and widely consulting with the local communities, local leaders and other relevant key stakeholders.
- Carrying out a comprehensive assessment ensuring all environmental concerns and views of all parties/persons likely to be affected by the project are taken into consideration.
- Developing an environmental management plan with mechanisms for monitoring and evaluating the compliance and environmental performance, which include the cost of mitigation measures and the timeframe of implementing the measures.
- Publicizing the project and its anticipated effects by posters in strategic places, publishing a notice in both official and local languages in the Kenyan Gazette and one of the local dailies.
- Liaising with NEMA for compliance with all mandatory and regulatory requirements relating to the ESIA.

## 1.7 Data Collection Methods and Procedures

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.

As stated earlier, the ESIA Study was carried out in compliance with the government of Kenya's Environment Management and Coordination Act of 1999 and 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:

- Environment 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 area and surrounding areas
- ESIA Public participation via the use of questionnaires/ interviews/ meetings / focused group discussion
- Data analysis and
- Report preparation.

### 1.7.1 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 was 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***, this project is 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.

### 1.7.2 Environmental Scoping

The scoping process, through an ESIA scoping checklist, was conducted to help 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.

### 1.7.3 Desktop Study

Desktop study 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. The key documents reviewed included the following:-

- The Final Report of the preliminary engineering design of Garissa-Modogashe-Wajir Road (B9) prepared by East Africa Engineering Consultants (EAEC) commissioned on 8th March 2005 by the Ministry of Roads and Public Works.
- Kenya National and County Laws
- IFC Standards and guidelines
- Equator Principles
- Applicable MEAs
- Previous ESIA reports for the project

### 1.7.4 Site Assessment

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

### 1.7.5 Public Participation

Public participation meetings were conducted at Modogashe and Habasweini towns. House to house surveys and Focused Group Discussions (FGDs) were conducted in the smaller villagers located along the road corridor i.e. Skanska, Samatar, Legdima and Kanjara. 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 the ESIA Study Report. The consultant incorporated the concerns and views of all stakeholders and the affected people.

### 1.7.6 Data Analysis, Reporting and Documentation

Data was quantitatively and qualitatively analysed in terms of themes. The Environmental Social Impact Assessment Study Report was compiled from the findings in accordance with the guidelines issued by NEMA 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 are part of the Appendices.

## 1.8 ESIA Organization and Structure

Based on the existing information, the ESIA study was carried out to full completion within a period of 45 days and processing is 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 are to be directed to NEMA through the proponent.

# CHAPTER TWO: PROJECT DESCRIPTION

## 2.1 Introduction

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. As such, the government of Kenya (GOK) through its road agency, Kenya National Roads Authority (KeNHA) has embarked on a pivotal infrastructure project to improve the 68km Modogashe-Habasweini-Samatar road to bitumen standard. The project is located in Isiolo and Wajir Counties and is under the LOT 3 annuity project. The Modogashe-Habasweini-Samatar road is a 68km 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. The road starts at Modogashe town ($00^0$43.807' N, $039^0$10.394' E) with an elevation of 264M above sea level and navigates from South West to North East along Isiolo and Wajir Counties terminating at Samatar ($01^0$11.693' N, $039^0$43.604' E) with an elevation of 241M above sea level. The existing road is gravel surfaced and in a poor condition. 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 below gives the Google Earth view of the proposed road.


**Figure 1: Google Earth View of Modogashe-Habasweini-Samatar road**

The Modogashe – Habaswein road section measures 50km and was improved to gravel standard in the year 1999/ 2000. It is mostly straight and undulating with a uniform width

of 7.0 meters. The ride quality is quite low with international roughness index (IRI) of at least 13.0. Road washouts are numerous. Additionally, the Habaswein – Samatar section measures 18 km and is characterized by gentle bends and undulating terrain. It has a poor loose earth surface with varying carriage way width of between 6.0m and 7m. The road is maintained through spot improvement and general grading.

The project area is predominantly plain with no hills and mountains, however there are scattered hills in Northern Wajir along the Ethiopian border. The altitude is generally low ranging between 100m to the south and 800m in Bute and Gurar hills in Wajir County.

### 2.1.1 Road Categories in the Project Road Alignment

The roads along the project alignment are as outlined below:

**Class A:** These are international trunk roads linking international boundaries e.g. Garissa – Dadaab – Liboi Road and Isiolo-Modogashe-Wajir-Mandera Road. The Isiolo-Mandera road previously classified as road B9 was recently re-classified and reads road A13

**Class B:** These are national trunk roads linking counties and centres of national importance.

**Class C:** These are primary roads linking Sub-County headquarters to each other or to higher class roads e.g. Garissa – Modogashe section.

**Class D:** Secondary roads linking locally important centers to each other or to higher class roads.

**Class E:** Minor roads linking minor centers.

The figure below shows the classes and distribution of roads in Kenya.

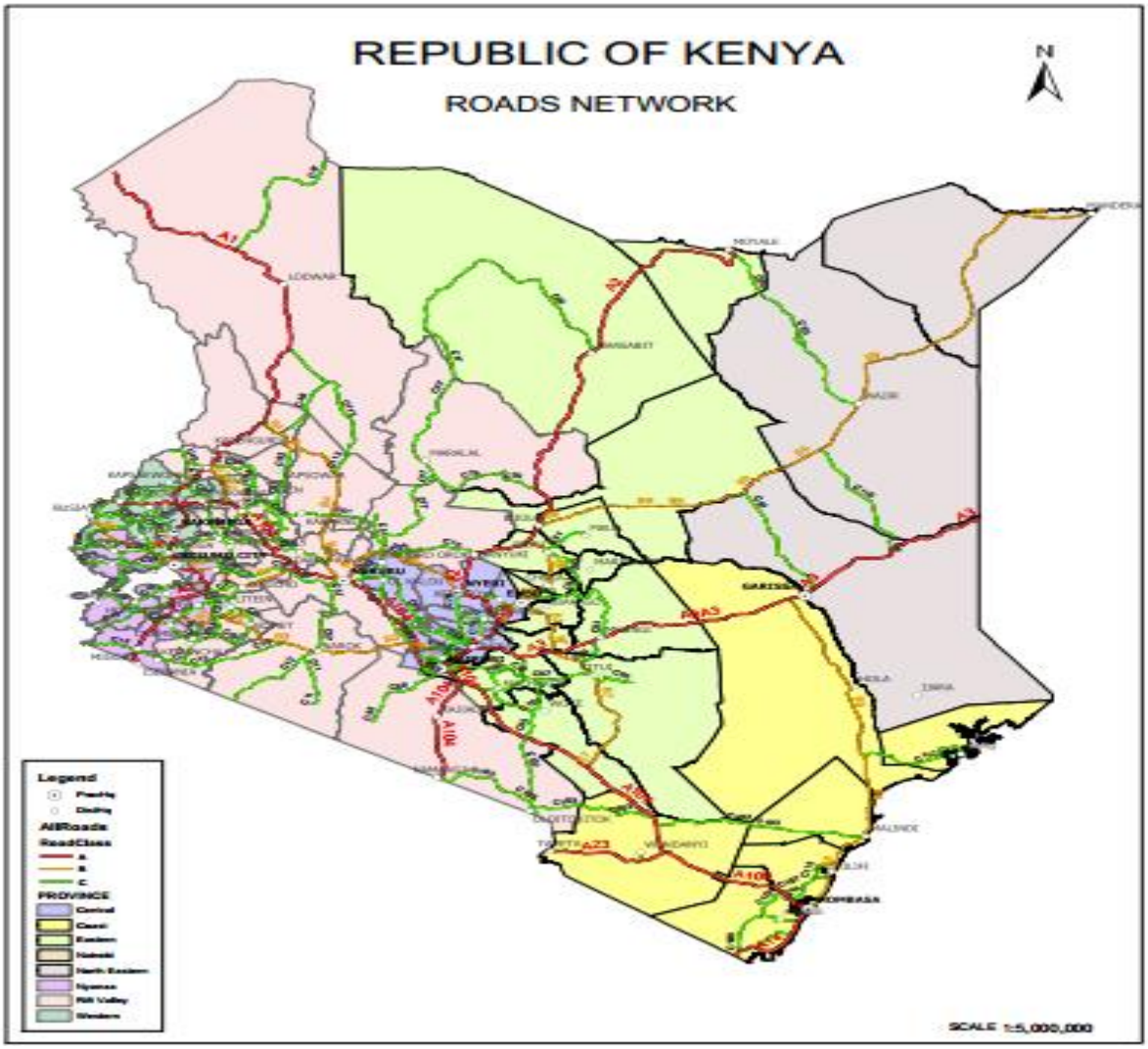


**Figure 2: Kenya Roads Network Map**

### 2.1.2 Direction

The road starts at Modogashe town (00$^0$43.807' N, 039$^0$10.394' E) with an elevation of 264M above sea level and navigates from South West to North East along Isiolo and Wajir Counties terminating at Samatar (01$^0$11.693' N, 039$^0$43.604' E) with an elevation of 241M above sea level.

## 2.2 Project Conceptual Design

### 2.2.1 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 the insecurity in the project areas, traffic had not changed significantly since the last survey. Traffic Class T3

was adopted for conceptual design. The Consortium shall carry out a comprehensive traffic study to ascertain present and future traffic.

### 2.2.3 Geometric Design

Horizontal and vertical design was guided by standards as contained in the Ministry of Roads and Infrastructure Road Design Manuals (Part 1 &3) and Manual for Traffic Signs in Kenya (Part 1 & 2): construction specifications are in accordance with the Ministry of Roads and Infrastructure 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.

### 2.2.4 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.

### 2.2.5 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.

### 2.2.6 Sand

Sand for concrete is readily available on the Modogashe river bed and at various locations along the project road.

### 2.2.7 Water

Water is available from boreholes at Habasweini and Modogashe. However, yields from the existing boreholes are not sufficient for road construction purposes. It is expected that water pans and additional boreholes along the project road will be required during construction.

### 2.2.8 Stone Sources

On the Modogashe- Habasweini –Samatar road, feasible quarries for hard stone suitable for chippings and concrete aggregates were explored. Hard stone quarries were noted in Modogashe and Samatar centers

## 2.3 Project activities and processes

### Existing road alignment

The road alignment follows a gentle rolling terrain between Modogashe and Wajir. The road crosses the Ewaso Nyiro flood plain (Lorian Swamp) to Habaswein town and then moves North-East to Samatar.

The project has **4** major phases:

1. Pre-construction (planning and design) phase
2. Construction phase
3. Operational phase
4. Decommissioning phase

### 2.3.1 Planning and design phase

This is the initial phase of the whole road construction project. It involves the following activities:

#### a) Preliminary design

The preliminary design entails the following:

i. Review of the existing data on the proposed road project and social and economic activities in the project area.
ii. Collection of social, environmental and physical data that is necessary to assist in the design of the project road.
iii. Preliminary engineering survey and design work for the optimum alignment and design standards .These includes;
    - Topographical surveys
    - Hydrological and hydraulic studies
    - Sub surface soil exploration
    - Material surveys (borrow sites, quarries and water sources) and
    - Field and laboratory soils and materials investigations

iv. To carry out an Environmental Impact Assessment of the project area in relation to the proposed project.

v. Traffic analysis was also done for the project road.

#### b) Detailed design

The detailed design of the proposed project will include:

i. Comprehensive field surveys
ii. Soils and material investigation
iii. Drainage and bridge site investigation.
iv. Geometric designs

**c) Public consultation and disclosure**

During the collection of the data for the engineering design and EIA the stakeholders were met and the intention of the project promulgated to them. This consisted of public Barazas and formal and informal discussions with the heads of governmental and non-governmental departments.

### 2.3.2 Construction Phase

#### *2.3.2.1 Setting out*

The construction works shall start with setting out the alignment of the road. Reference pegs shall be 50mm in section 600mm long driven into ground and painted white above the ground. The offset from the centerline shall be indicated by small nail 20mm to 25mm long with its head driven flush with the top of the peg. Chainages, off-set and reference elevation would be indicated to the sides of the peg to the satisfaction of the proponent. After cutting of benches and prior to of earthworks or sub-grade works, Contractor shall take commencement cross-sections again and submit the copy of the same to proponent for agreement. These cross-sections shall then be used as basis of measurement for all subsequent layers, unless otherwise stated.

#### *2.3.2.2 Clearance of the alignment and creation of diversions*

This will involve clearance of the site on road reserve including removal of trees, hedges and other vegetation and any deleterious materials, grub up roots, backfilling and compaction to 100% MDD (AASHTOT99) with approved material. It would also involve removal of topsoil to a maximum depth of 200mm. When instructed by the Engineer, the Contractor shall demolish or remove structure and any other obstruction from the road reserve.

#### *2.3.2.3 Earthworks*

Earthworks will involve:

- Filling in soft material including benching of embankments and compaction to 95% MDD (AASHTO T99 ) in layers not exceeding 150mm
- Filling in hard material ( rock fill in selected sections)
- Cutting to spoil hard material
- Cutting to spoil soft material
- Landscaping and grassing.

Specifically this stage would involve:

**a. Preparation Prior to Forming Embankment**

Where benching is required for existing pavement to accommodate earthworks sub-grade or sub- base for widening the road, the rate for compaction of existing ground shall be deemed to cover this activity.

Excavation in the pavement of the existing road shall be kept dry. In the event of water penetrating the underlying layer, construction of the subsequent layers shall be postponed until the underlying layers are dry enough to accommodate the construction plant without deforming or otherwise showing distress.

Step construction shall be carried out per layer at the joint where excavating, both vertically and perpendicular to the direction of the travel. The step shall be 500mm perpendicular to the direction of the travel and 150mm vertical unless otherwise instructed by the Engineer.

**b. Construction of Embankments**

Only material approved by the Engineer shall be used for fill in embankments.

Material with high swelling characteristics or high organic matter content and any other undesirable material shall not be used, unless specifically directed by the Engineer.

Unsuitable material shall include:

- All material containing more than 5% by weight or organic matter (such topsoil, material from swamps, mud, logs, stumps and other perishable material)
- All material with a swell of more than 3% (such as black cotton soil) All clay of plasticity index exceeding 50.
- All material having moisture content greater than 105% of optimum moisture content (Standard Compaction)

**c. Embankment Repair**

Where directed by the Engineer, any localized filling in soft, hard or natural; selected material requirements shall be executed.

**d. Compaction of Earthworks**

At pipe culverts, all fill above ground level around the culverts shall be compacted to density of 100% MDD (AASHTO T.99) up to the level of the top of the pipes or top of the surround(s), if any and for a width equal to the internal diameter of the pipe on either side of the pipe(s) or surround(s) as applicable.

At locations adjacent to structures, all fill above ground level up to the underside of the sub-grade shall be compacted to density of 105% MDD (AASHTO T.99). In case of fill around box culverts this should be carried out for the full width of the fill and for a length bounded by the vertical plane passing through the ends of the wing walls.

Compaction of sub-grade material (i.e. material immediately below formation) in cut areas shall not be carried out by the contractor in areas where the formation is formed in hard material, unless specific instructions to the contrary are issued by the Engineer.

Where improved sub-grade material shall be required, this shall be compacted and finished to the same standards and tolerances as those required for normal sub-grade and clauses in the specifications applying to normal sub-grade shall also apply.

**e. Mass-Haul Diagram**

No Mass-Haul diagram has been provided with the Documents. The Contractor shall be responsible for locating suitable materials for constructing earthworks along the alignment and elsewhere.

**f. Borrow Pits**

Fill material which is required in addition to that provided by excavation shall be obtained from borrow pits to be located and provided by the Contractor but to the approval of the Engineer.

**g. Top soiling and Grassing**

The embankment slopes, cut faces and guiding dams of the Standard Specification are synonymous with fill slopes and cut slopes of clause 110 (c) and earth dams of clause 817 of the Standard Specifications respectively.

**h. Sub-Grade**

Sub-grade shall mean upper 300mm of earthworks either in-situ or in fill and sub-grade shall be provided, as part of earthwork operation and payment shall be made as 'fill'. The material for sub- grade shall have a CBR of not less than 8% measured after a 4-day soak on a laboratory mix compacted to a dry density of 100% MDD (AASHTO T99) and swell less than 1%.

#### *2.3.2.4 Excavations and filling for structures*

The major activities would be:

- Excavations and backfilling for gabions in soft material
- Excavation in soft materials for culverts and foundations for piers and abutments
- Placement for gabions and mattresses as directed by the engineer
- Rock-filing gabions
- Placement of 200mm thick pitching including grouting to aprons upstream/downstream of bridges, culverts and drains.

#### *2.3.2.5 Culverts and drainage works*

The construction of culverts and drains would involve the following activities:

- Excavations in both soft and hard material for pipe culverts, headwalls, wing walls aprons, toe walls and drop inlets.
- Placement of class 20(20) concrete to headwalls, wing walls, aprons, inlets and outlets to pipe culverts including formwork.
- Excavations for side drains, mitre, drains cut-off drains and outfall drains

The Contractor shall excavate and remove all existing blocked or collapsed culvert pipes of 450mm, 600mm and 900mm diameter including concrete surround, bedding, and inlet and outlet structure. The void left after removal of culvert pipes shall be widened as necessary to accommodate new concrete bedding, pipe and hunching.

#### *2.3.2.6 Storm water management plan*

Storm water management plan will address storm water quantity and quality and how to protect ecological, social/cultural and economic values. The plan will be used to aid decision making to ensure that remedial measures (structural and non-structural) are undertaken in a cost-effective, integrated and coordinated manner and that the decisions made with regard to the project take into full account implications for storm water impacts.

#### *2.3.2.7 Construction of deviations for traffic*

The contractor would construct deviations roads, minimum width 6mm thickness of gravel 150mm minimum CBR 20. The construction would also involve erection and maintenance of signage and barriers along the route.

#### *2.3.2.8 Transportation and Treatment of Construction Materials*

Some of the major materials to be used in the construction of the road include:

- Natural gravel
- Water
- Ordinary Portland cement and lime
- bitumen
- kerosene
- Wrought Shuttering Timber
- Mild Steel

A materials data schedule will be maintained and updated as necessary highlighting source, quantities and date of receipt of materials and in the converse materials going out, where utilized and date utilized.

### *2.3.2.9 Concrete works*

All concrete works would be done according to the specifications as provided in the engineering design.

**A. Formwork for Culvert Walls and Slabs**

This work shall consist of all temporary moulds for forming the concrete for culvert walls and slabs together with all temporary construction for their support. Unless otherwise directed by the Engineer all formworks shall be removed required on completion of the walls and slabs.

**a) Materials**

Forms shall be made of wood or metal and shall conform to the shape, lines and dimensions shown on the Drawings.

All timber shall be free from holes, loose material, knots, cracks, splits and warps or other defects affecting the strength or appearance of the finished structure.

Release Agents – Release agents shall be either neat oils containing a surface activating agent, cream emulsions, or chemical agents to be approved by the Engineer.

**b) Construction Method**

**i) Formworks**

Formworks shall be designed to carry the maximum loads that may be imposed, and so be rigidly constructed as to prevent deformation due to load, drying and wetting, vibration and other causes. After forms have been set in correct location, they shall be inspected and approved by the Engineer before the concrete is placed.

If requested, the contractor shall submit to the Engineer working drawings of the forms and also, if requested, calculations to certify the rigidity of the forms.

Unless otherwise described in the Contract, all form joints for exposed surfaces of concrete shall form a regular pattern with horizontal and vertical lines continuous throughout each structure and all construction joints shall coincide with these horizontal and vertical lines. PVC pipes of 50mm diameter for weep holes shall be arranged as shown on the Drawings.

Unless otherwise specified, formwork shall be designed to form chamfers at all external corners whether or not such chamfers are shown on the Drawings to prevent cracks and other damage from arising.

The inside surface of forms shall be cleaned and coated with a releasing agent to prevent adhesion of the concrete. Release agents shall be applied strictly in accordance with the manufacturer's detailed instructions. The release agent shall be applied to the formwork

prior to erection. Release agent must not come into contact with reinforcement. Immediately before concrete is placed, the forms shall be thoroughly cleaned and freed from sawdust, shavings, dust, mud or other debris by hosing with water. Temporary openings shall be provided in the forms to drain away the water and rubbish.

**ii) Scaffolding**

All scaffolding required to support the forms shall be designed and constructed to provide necessary rigidity and support the loads without appreciable deflection or deformation.

Details, plans and structural and flexural calculations for scaffolding shall be submitted to the Engineer for approval, but in no case shall the contractor be relieved of his responsibility for the results obtained by use of these plans, etc.

**iii) Removal of formwork**

The time at which the formwork is truck shall be the Contractor's responsibility and the forms shall not be removed until the concrete strength has reached 20 $N/mm^2$.

**B. Concrete Works (Class 25/20) of Culvert Walls and Slabs**

This work shall consist of furnishing, mixing, delivering and placing of the concrete for the construction of culvert walls and slabs, in accordance with these Specifications and in conformity with the requirements shown on the Drawings.

Concrete class 25/20 shall be used for culvert walls and slabs. The requirements of this class of concrete are provided as follows unless otherwise the Engineer will designate any alteration:

Design compressive strength (28 days) : $25N/mm^2$

Maximum size of coarse aggregates : 20mm

Maximum water/cement ratio of 45% with slump of 80mm

**i. Concrete Materials.**

**a. Cement.**

Cement shall be of Ordinary Portland Cement type and shall conform to the requirements of K.S. 02-21 or equivalent.

The contractor shall select only one type or brand of cement or others. Changing of type or brand of cement will not be permitted without a new mix design approved by the Engineer. All cement is subject to the Engineer's approval; however, approval of cement by the Engineer shall not relieve the Contractor of the responsibility to furnish concrete of the specified compressive strength.

Conveyance of cement by jute bags shall not be permitted. Storage in the Contractor's silo or storehouse shall not exceed more than two (2) months, and age of cement after manufacture at mill shall not exceed more than four (4) months. The Contractor shall submit to the Engineer for his approval the result of quality certificate done prepared by the manufacturer.

Whenever it is found out that cement have been stored too long, moist, or caked, the cement shall be rejected and removed from the project.

### b. Aggregates

Fine and coarse aggregates must be clean, hard, strong and durable, and free from absorbed chemicals, clay coating, or materials in amounts that could affect hydration, bonding, strength and durability of concrete.

Grading of aggregates shall conform to the following requirements (Table 2 and 3):

**Table 2 : Grading of Fine Aggregates**

| Sieve Size (mm) | Percentage by Weight Passing |
|---|---|
| | |
| 5.00 | 89-100 |
| 2.50 | 60-100 |
| 1.20 | 30-100 |
| 0.60 | 15- 54 |
| 0.30 | 5- 40 |

**Table 3: Grading of Course Aggregates**

| Size of Coarse Aggregate | Amounts finer than each standard Sieve percentage by weight | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 40 | 30 | 25 | 20 | 15 | 10 | 5 | 2.5 |
| | 100 | - | - | 90-100 | - | 30-69 | 0-10 | - |

Other requirements for aggregates are as follows:

***Fine Aggregates***

| | | |
|---|---|---|
| 1. | Fitness Modulus, AASHTO M-6: | 2.3 – 3.1 |
| 2. | Sodium Sulphate Soundness, AASHTO T104: | Max. 10% loss |
| 3. | Content of Friable Particles AASHTO 112 : | Max 1% by weight |
| 4. | Sand Equivalent, AASHTO T176: | Min. 75 |

***Coarse Aggregate***

| | | |
|---|---|---|
| 1. | Abrasion, AASHTO T96: | Max. 40% loss |
| 2. | Soft Fragment and shale, AASHTO M80: | Max. 5% by weight |
| 3. | Thin and elongated Pieces, AASHTO M80: | Max. 15% |

**c. Water**

All sources of water to be used with cement shall be approved by the Engineer. Water shall be free from injurious quantities of oil, alkali, vegetable matter and salt as determined by the Engineer.

**d. Admixture**

Only admixture, which have been tested and approved in the site laboratory through trial mixing for design proportion shall be used.

Before selection of admixture, the Contractor shall submit to the Engineer the specific information or guarantees prepared by the admixture supplier.

The contractor shall not exclude the admixture from concrete proportions.

**e. Proportioning Concrete**

The Contractor shall consult with the Engineer as to mix proportions at least thirty (30) days prior to beginning the concrete work. The actual mix proportions of cement, aggregates, water and admixture shall be determined by the Contractor under supervision of the Engineer in the site laboratory.

The Contractor shall prepare the design proportions which has 120% of the strength requirement specified for the designated class of concrete.

No class of concrete shall be prepared or placed until its job-mix proportions have been approved by the Engineer.

**C. Concrete Work**

**(i) Batching**

Batching shall be done by weight with accuracy of:

1) Cement : ½ percent

2) Aggregate: ½ percent
3) Water and Admixture: 1 percent.

Equipment should be capable of measuring quantities within these tolerances for the smartest batch regularly used, as well as for larger batches.

The accuracy of batching equipment should be checked every month in the presence of the Engineer and adjusted when necessary.

**(ii) Mixing and delivery**

Slump of mixed concrete shall be checked and approved at an accuracy of +25mm against designated slump in these specifications.

**(iii) Concreting at night**

No concrete shall be mixed, placed or finished when natural light is insufficient, unless an adequate approved artificial lighting system is operated, such night work is subject to approval by the engineer.

**(iv) Placing**

In preparation of the placing of concrete, the interior space of forms shall be cleaned and approved by the engineer prior to placing concrete. All temporary members except tie bars to support forms shall be removed entirely from the forms and not buried in the concrete. The use of open and vertical chute shall not be permitted unless otherwise directed by the engineer. The contractor would provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms.

### *2.3.2.10 Road furniture*

This would involve the erection of concrete posts and flex-beam guardrails complete with spacers at 3810mm intervals. The contractor will also be required to provide and erect permanent road signs where instructed by the resident engineer and in accordance to special specifications. They will include:

- Warning signs
- Priority, prohibitory and mandatory signs
- Standard informatory signs
- Non-standard informatory signs

Along with the physical signs the contractor would be required to provide and deliver air tight corrosion resistant 20 liters containers approved white paints and yellow (reflectorised) and mark the road as directed by the engineer. The works would also involve provisions of road studs both unidirectional and bidirectional of stimsonite nature or similar.

**a) Edge Marker Posts**

Edge marker posts shall be provided as directed by the Engineer and in compliance with standard Specification Clause 2003.

**b) 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. Old signs to be reused should also be tested.

**c) Existing Road Signs**

Where directed by the Engineer, the Contractor shall take down road signs including all posts, nuts, bolts and fittings, and remove and dispose of the concrete foundation and backfill the post holes. The signs shall be stored at the Contractor's store and they shall become the property of the proponent who shall remove them prior to the expiry of the maintenance period. Measurement and payment for taking down road signs shall be made by the number of signs of any type and size taken down, cleaned and stored as directed.

Where a salvaged existing sign complies with the requirements of new road signs, the Engineer may instruct the Contractor to remove the sign for safe storage, and re-erect it.

Measurement and payment shall be made by the number of road signs re-erected as directed and the rate shall include for excavation, concrete foundations and backfilling around posts and removal of surplus material to spoil.

**d) Road marking**

Paint for road marking shall be internally reflectorised 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 reflectorised paint inclusive of the Ballotini beads.

**e) Guardrails**

Guardrail posts shall be 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.

**f) Kerbs**

**g) 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.

**h) 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.

**i) Kilometer Marker Posts**

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

**j) 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

***2.3.2.11 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

***2.3.2.12 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. 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.

#### *2.3.2.13 Safety and Public Health Requirements*

This is an integral part of the project especially during the construction phase. Warning and advisory notices, drugs and condoms would be provided for throughout the project duration. The contractor shall allow for qualified professionals to conduct lectures to the workers regarding the spread of HIV/Aids.

#### *2.3.2.14 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 kerbstones 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.

### 2.3.3 Operation Phase Activities

This is the phase when the road is actually in use. 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.

### 2.3.4 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.

### 2.3.5 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.

Table 4 below shows the various type of products, by products and waste that will be generated during the project's cycle.

***Table 4:*** **The** ***Products, by Products and Waste generated During Project Cycle***

| Project Activities | Material /Equipment to be used | Waste/by products generated | Disposal Method |
|---|---|---|---|
| **1 Planning and Design Phase** – No anticipated physical activities or processes | | | |
| | | | |

| | | | |
|---|---|---|---|
| Clearing the site | -Power Saws<br>-Caterpillars | -Cut vegetation<br>-Rock debris<br>-Noise (by power saw) | -Soil to be used for backfilling<br>-Wood would be used in the construction of workers houses.<br>-Good maintenance of |
| Excavation/Earthworks including removal of topsoil | -Excavation equipment's including caterpillars, haulers | - Soil<br>-Roots<br>-Noise | - Soil to be used for backfilling and landscaping |
| Transportation of materials & maintenance of equipment's | Trucks<br>Fuel, spare parts and lubricants oil | -Air fumes<br>-Used oil , and other lubricants | -Used oil/grease to be reused for lubricating movable parts of equipment |
| Construction/Building Materials | -Machine cut stones<br>-Steel<br>-Cement<br>- Soils<br>-Paving slabs<br>-Timber<br>-Nails,galvanized iron sheets<br>-Gravel, sand<br>-Glasses<br>-Bitumen<br>-Oil<br>-Water<br>-Packaging Materials<br>- Pipes(Gi And Pvc)<br>-Oil And Grease<br>-Storage | -Stone /Rock Debris<br>- Timber Splits<br>- Broken Glass<br>- Nails And Iron Sheets Cuts<br>- Piping Remains<br>- Plastic Waste<br>- Oil And Greases Spills<br>- Waste Water<br>- Used Containers | -Soil and rock debris would be used for landscaping & back filling the reserves<br>-Timber splits would be used for firewood and burning of tar etc.<br>-Plastic waste should be resold to waste collectors or dumped in appropriate designated sites.<br>-Metallic containers can be reused in storage of other materials or be sold to dealers.<br>-Metallic wastes can be recycled or be sold to dealers<br>-Waste water can be |

| | | | |
|---|---|---|---|
| Human Consumables | -Stationeries<br>- Computers<br>- Photocopiers<br>- Clothing Materials<br>- Vehicles<br>- Medicines<br>- Reagents<br>-Food And Water | -Used paper<br>-Obsolete/ spoilt clothing, computers, photocopiers and vehicle parts<br>-Human waste<br>Expired drugs and reagents | -Sell waste paper to dealers<br>-All obsolete materials should be carefully sorted, stored and sold to dealers.<br>- septic tanks should be provided in all the workmen's camps and disposed of appropriately in designated sites |

**Post Constructions and Operations Phase**

| Project Activities | Material /Equipment to be used | Waste/by products generated | Disposal Method |
|---|---|---|---|
| Workmen's Camps | All Associated Building Materials | Unusable materials e.g. broken timber, glass | Should be removed and disposed in accordance to waste categories |
| Constructio n Machinery | All Machines | | Should be sold to dealers or be used in others projects |
| Road repairs due to accidents, old age breakdowns etc. | Bitumen<br>Oil And Greases<br>Sand And Gravel | Removed materials or road cover including the base materials | Should be transported to designated municipal sites. |

| | | | |
|---|---|---|---|
| Vehicles involved in accidents | | Vehicle wreckages | Should be towed away garages or other regulatory recommended areas |

## 2.4 Project Cost

The construction of the proposed road project is estimated to cost 5,404,000,000.00-KES.

# CHAPTER THREE: BASELINE INFORMATION OF THE PROJECT AREA

## 3.1 Introduction

This chapter examines the baseline environmental, socio-economic and cultural characteristics of the route through which the proposed Modogashe-Habasweini-Samatar 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.

## 3.2 Physical Environment

### 3.2.1 Project Physical Location

The project road is located in Isiolo and Wajir Counties in the North Eastern part of Kenya. The road starts at Modogashe ($00^0$43.807' N, $039^0$10.394' E) with an elevation of 264M Above sea level. Here, the road for a few kilometers follows the borderline of Isiolo and Garissa Counties. The road then traverses a distance of 34km in the North-East direction to Habasweini town ($01^0$00990' N, $039^0$29.570' E) where it narrowly descends to an elevation of 214M above sea level. The proposed road will end at Samatar village ($01^0$11.693' N, $039^0$43.604' E) with an elevation of 241M above sea level. The major trading centers along the road are, Modogashe and Habasweini. The figures below show the exact location of the proposed road in Kenya and also the Google Earth view of the road.

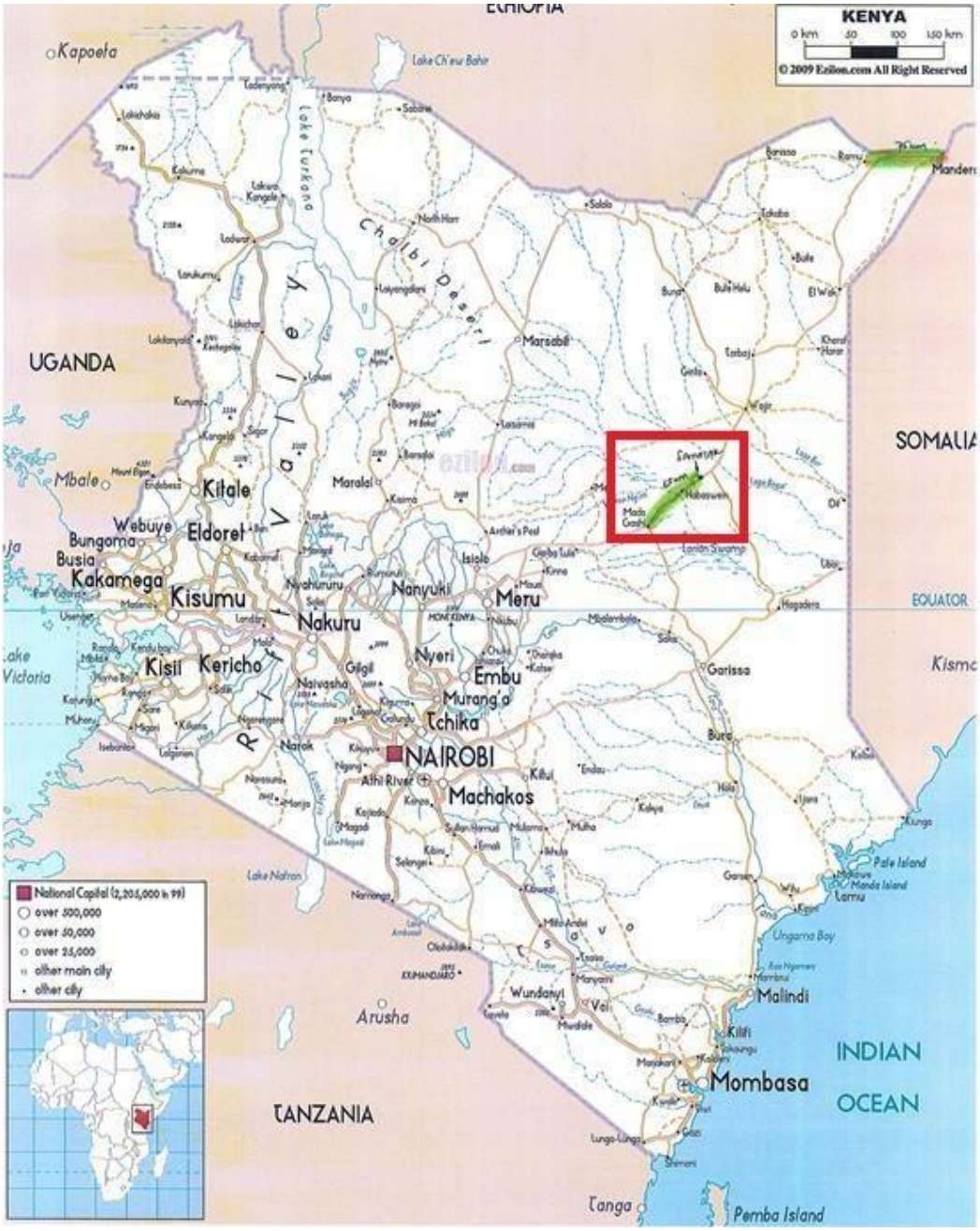


**Figure 3: Map of Kenya showing the Modogashe-Habasweini-Samatar Road**


**Figure 4: Google Earth View of Modogashe-Habasweini-Samatar road**

**(*Source: Google Earth)***

### *3.2.1.1 Isiolo County*

Isiolo County is one of the counties in the lower eastern region of Kenya. It borders Marsabit County to the North, Samburu and Laikipia Counties to the West, Garissa County to the South East, Wajir County to the North East, Tana River and Kitui Counties to the south and Meru and Tharaka Nithi Counties to the south West. The county covers an area of approximately 25,700 $km^2$

### *3.2.1.2 Wajir County*

Wajir County is located in the North Eastern region of Kenya. The county lies between latitudes $3^0$ N 60'N and $0^0$ 20'N and Longitudes $39^0$ E and $41^0$ E and covers an area of 56,685.9 $Km^2$. It borders Somalia to the East, Ethiopia to the North, Mandera County to the Northeast, Isiolo County to the South West, Marsabit County to the West and Garissa County to the South. Its Altitude is 244 m (801 ft.). The plain rises gently from the south and east towards the north rising to 200 meters at Buna and 460 meters at Bute and Gurar at the foothills of Ethiopian highlands.

### 3.2.2 Topography

Most of the land in Isiolo County is flat low lying plain resulting from weathering and sedimentation. The plains rise gradually from an altitude of about 200 M above sea level

at Lorian swamp (Habaswein) in the northern part of the county to about 300M above sea level at Merti Plateau.

Wajir County is a featureless plain and lies between 150 meters and 460 meters above sea level. Its Altitude is 244 m (801 ft.). The plain rises gently from the south and east towards the north rising to 200 meters at Buna and 460 meters at Bute and Gurar at the foothills of Ethiopian highlands.

The project area is basically flat with no hills and mountains with the highest point being 460 meters above the sea level and the lowest being only 70 meters above the sea level. It is a featureless plain that is prone to flooding during the rainy seasons, which in most cases makes the roads impassable

### 3.2.3 Hydrology

Modogashe – Habasweini - Samatar (project area) falls under Garrisa, Wajir and Isiolo counties although much of the project is in Wajir County. The region is highly marginalized geographically due to poor road conditions resulting in a complete cut-off from the rest of the country during the rainy season. The project area is categorized as an arid region because it has no water catchment areas and experiences frequent droughts. There are no permanent surface water sources as most of the water sources are subsurface such as boreholes, shallow wells and pans. The main seasonal rivers in the project area include Ewaso Ngiro North with its catchment area in the Aberdare ranges and Mount Kenya. Rivers Likiundu and Liliaba originate from Nyambene hills and drain into River Ewaso Ngiro North. Average altitude ranges from 265 to 400 m asl, with a bi-modal rainfall 350- 600 mm per annum. The project area is a vast flat/plain prone to flooding during the rainy seasons.

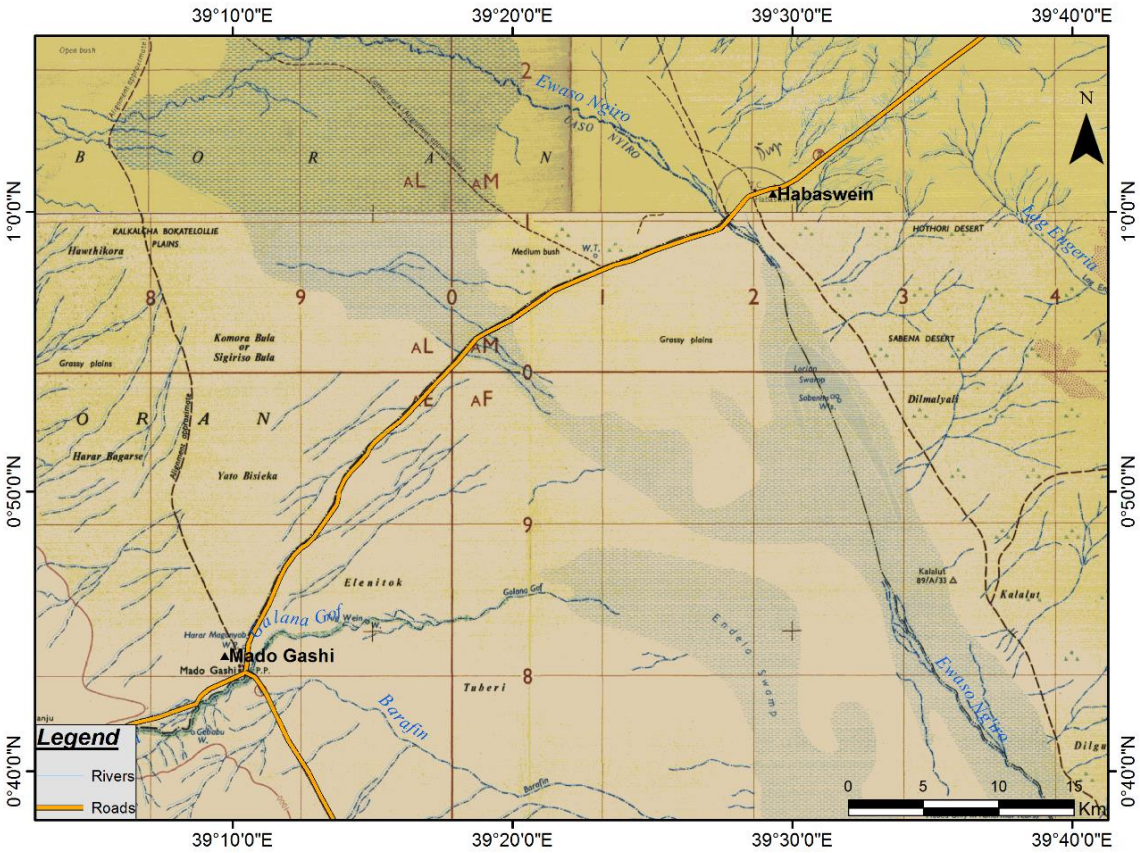


**Figure 5: Hydrological map of the study area showing the major seasonal rivers and swamps**

***Plate 1: Road crossing at River Ewaso Ngiro (dry riverbed) and River Galana Gof at Modogashe***

The urban centres and other settlements in the project area like Modogashe, Skanska, Habasweini, Lagdima, Kanjara and Guticha receive their water mainly from rivers Ewaso Ngiro, River Galana Gof, fresh water laghas, boreholes, water pans and water boozers (see Table 5). The county has a lot of ground water potential with some parts having fresh water resources while others saline water. Many seasonal swamps exist with the major ones being the Boji swamp in Lagh Boghol areas and the Lorian swamp near Habasweini (Fig 5). These swamps and drainage serve as dry season grazing zones which allow some cultivation during the rainy season. 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. During the rainy season water collects in the earth dams forming water points for the people and their livestock.

#### *3.2.3.1 Flood Plain Ecology*

In the Lorian swamp and other flood plains around the project area, different species of wild animals such as warthogs, dikdiks, antelopes, zebras and giraffes share the grazing fields with livestock. Wild birds such as ostriches, guinea fowls, smaller flamingoes, humming birds and several others use the flood plain as their foraging grounds as it is an areas of high productivity and more efficient nutrient cycles. Disadvantages associated with flood plain areas include emergency of diseases such as typhoid, malaria, cholera, amoebic dysentery and bilharzias. Besides, several people may be displaced by floods and turned into internal refugees. Other environmental risks associated with flooding include damage to water and sanitation facilities, damage to health facilities leading to disruption of the delivery of quality health care services. Siltation of dams and pans along the project area during the flooding season show that siltation is an expensive problem than can be shown. Disruption of road communication during flooding events result in increased cost of living.

**Table 5: Some of the water resources and points along the project area**

| Site | Longitudes (E) | Latitudes (N) | Description |
|---|---|---|---|
| Modogashe | 039$^0$10.567’ | 00$^0$43.957’ | Galana Gof River, seasonal and dry river bed, broken bridge |
| Skanska | 039$^0$17.978’ | 00$^0$54.570’ | Dry water pan, borehole and pumping station |
| Habasweini | 039$^0$29.570’ | 01$^0$00.990’ | Boreholes and water pans, flood plain (Lorian Swamp) nearby |
| Lagdima | 039$^0$33.009’ | 01$^0$03.576’ | Dry water pans but rely on borehole water |
| Kanjara | 039$^0$39.422’ | 01$^0$08.461’ | Several dry water pans, 3 boreholes around |
| Guticha | 039$^0$44.591’ | 01$^0$12.545’ | Water pans present and flood plain area |

### *3.2.3.2 Water quality*

Environmental baseline survey of the proposed project area was undertaken in April to May 2017. Water quality samples were collected to provide data that will act as a reference for monitoring of the water resources in the project area in future (Appendix F). The concentration levels of the analyzed parameters were compared with the first schedule on quality standards for sources of domestic water (GOK 2006). Thirteen water quality parameters were determined and analyzed from five sampling points along the project area (Table 6). The water quality parameters analyzed showed that there were variations although generally within the NEMA standards/guideline values and World Health Organization standards (WHO). In particular, the pH range was within the acceptable levels in the sampled points. Stagnant waters such as found at Galana Gof can have slightly alkaline waters and high nutrients values such as nitrites and total phosphorus although well below the NEMA guideline values (Table 6).

These nutrients can trigger algal blooms if their concentrations pass a given threshold, the values observed in these samples are relatively high and ordinarily can result a water body being classified as eutrophic. Turbidity (170.2 NTU) and total suspended solids (160 mg/l) concentrations were found to be above the guideline values. Typically, water flowing in a river may have high concentrations of these parameters when coupled with flooding and erosion events. Since the stagnant water serves as a source of drinking water for the livestock, such values can then be viewed as normal because of the high disturbance rates. The other parameters and water resources along the proposed project, such as skanska, Kanjara and Samarta depicted ranges that were within the NEMA guideline values (Table 6). Heavy metal concentrations of lead were found to be below the detection limit and well below the NEMA standards.

**Table 6: Concentration of water quality indicators in the proposed project area (sampled 09 - 11 May 2017) viewed against WHO Standards and NEMA guideline values (1st Schedule).**

| Sampling point/Parameter | Galana Gof Bridge | Galana Gof Riverbed | Skanska | Kanjara | Samarta | WHO | NEMA Guideline values |
|---|---|---|---|---|---|---|---|
| GPS- Coordinates | $00^0$43.760'S 39$^0$10.565'E | $00^0$43.957' S 39$^0$10.567' E | $00^0$54.570'S 39$^0$17.978'E | $01^0$08.461'S 39$^0$39.422'E | $01^0$11.151'S 39$^0$42.916'E | | |
| Ph | 8.21 | 7.98 | | | 7.77 | 6.5 - 8.5 | 6.5 - 8.5 |
| Turbidity (NTU) | 170.2 | 8.5 | 44.8 | 47.4 | 323.6 | < 5 | |
| Conductivity ($\mu Scm^{-1}$) | 488 | 453 | 17220 | 340 | 339 | < 2500 | - |
| COD ($mgO_2l^{-1}$) | 45.1 | 15 | | 30.1 | 150 | | |
| TDS ($mgl^{-1}$) | 302.56 | 280.8 | 10676.4 | 210 | 210.18 | <1500 | 1200 |
| TSS ($mgl^{-1}$) | 160 | 20 | | 100 | 460 | | 30 |
| T. alkalinity ($mgl^{-1}$) | 196 | 142 | | 124 | 124 | < 500 | |
| T. hardness ($mgl^{-1}$) | 184 | 116 | 20 | 134 | 112 | < 500 | |
| Lead ($mgl^{-1}$) | ND | ND | ND | ND | ND | | 0.05 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Nitrates ($mgl^{-1}$) | < 0.01 | 5.31 | | < 0.01 | < 0.01 | | 10 |
| Nitrites ($mgl^{-1}$) | 0.19 | < 0.01 | <0.01 | < 0.01 | < 0.01 | < 0.1 | 3 |
| T Phosphorus ($mgl^{-1}$) | 0.47 | 0.0602 | 0.093 | 0.355 | 0.407 | | - |
| Sulphate ($mgl^{-1}$) | < 0.3 | 43.6 | 689.3 | 5 | 1.94 | < 450 | 1.5 |

### 3.2.4 Soils and Geology

Isiolo County has a combination of metamorphic rocks and other superficial rock deposits. Tertiary rocks (Olive Basalt) are found in the northern parts of the county, where oil exploration has been going on. The areas covered with tertiary marine sediments that have a high potential for ground water harvesting. On the other hand, Wajir 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.

### 3.2.5 Climate

The project area lies in the Sahelian climatic region, which is characterized by long dry spells and short rainy seasons mainly due to continentality.

It has got two rain seasons, where long rains are experienced in March to April and short rains in October to December. Also, short periodic torrential downpour is experienced in different times of the year.

Isiolo County is hot and dry in most months in the year with two rainy seasons. The short rains season occurs in October and November while the long rain occurs between March and May. The rainfall received in the County is usually scarce and unreliable posting an annual average of 580.2 mm. The wettest months are November with an average of 143 mm of rainfall and April with an average of 149 mm of rainfall.

Wajir County experiences annual average relative humidity of 61.8 per cent which ranges from 56 per cent in February to 68 per cent in June. The county does not experience frost conditions.

### 3.2.6 Rainfall and Temperature

The county receives an average of 240 mm precipitation annually or 20 mm each month. There are 24 days annually in which greater than 0.1 mm of precipitation (rain,

sleet, snow or hail). June is the driest month with an average of 1 mm of rain across zero days while April is the wettest month with an average of 68 mm of rain, sleet, hail or snow across 6 days. The higher areas of Bute and Gurar receive higher rainfall of between 500mm and 700mm.

The project area experiences high temperatures as a result of continentality and its low altitude. In Isiolo County, the temperatures range from 20 degrees to 38 degrees. High temperatures are recorded throughout the year, with variations in some places due to differences in altitude. The mean annual temperature in the county is 29 degrees Celsius.

The average temperature in Wajir County is 27.9 °C. The range of average monthly temperatures is 3.5°C. The warmest months are February & March with an average of 36°C while the coolest months are June, July, August & September with an average low

## 3.3 Ecological Environment

### 3.3.1 Flora

Due to limited amount of rainfall, the project area has scanty vegetation. The main vegetation cover is acacia (*Salvadora Persica*) and (*Acacia Segal*)-Plate 3 with pockets of drought resistant shrubs and grassland stretching along the road corridor. *Prosopsis Juriflora* (Mathenge) an invasive and poisonous shrub is becoming prominent in the project area although measures to combat it are underway (Plate 2).

Isiolo County is classified into three ecological zones namely Semi-Arid, Arid and the very Arid. Semi-Arid zone covers part of Wabera Ward, Bulla Pesa Ward and some parts of Burat Ward in Isiolo North Constituency. It also covers some Southern part of Kinna Ward in Isiolo South Constituency. The vegetation in this zone is mainly thorny bush with short grass. Arid zone covers Oldo/Nyiro, Ngare Mara and some parts of Burat Wards in Isiolo North Constituency and whole of Garbatulla Ward and northern part of Kinna Ward in Isiolo South Constituency. The zone covers 30 percent of the total area of the county. Rainfall received here ranges between 300 mm and 350 mm annually and supports grassland and few shrubs.

Wajir County is a semi-arid area falling in the ecological zone V-VI. Zone V receives rainfall between 300-600mm annually, has low trees, grass and shrubs.

**Plate 2: *Prosopsis Juliflora* 'Mathenge' along the road stretch**

**Plate 3: *Acacia Segal* trees along the proposed road**

### 3.3.2 Fauna

The project area has no National Reserves or Parks. However, there are different species of wild animals ranging from different species of birds, ostriches, warthogs, dikdiks, gerenuk, antelopes, giraffes, foxes among others which move freely within the area. Fish and crocodiles are prevalent in River Ewaso Nyiro. KWS is present in Wajir to

ensure safety and protection of animals. The photos below show wildlife (giraffes, gazelles and ostriches, guinea fowls and gerenuks) that were observed along the project area during the field survey.

**Plate 4: Giraffes grazing along the road**

**Plate 5: An ostrich sited near Skanska along the road**

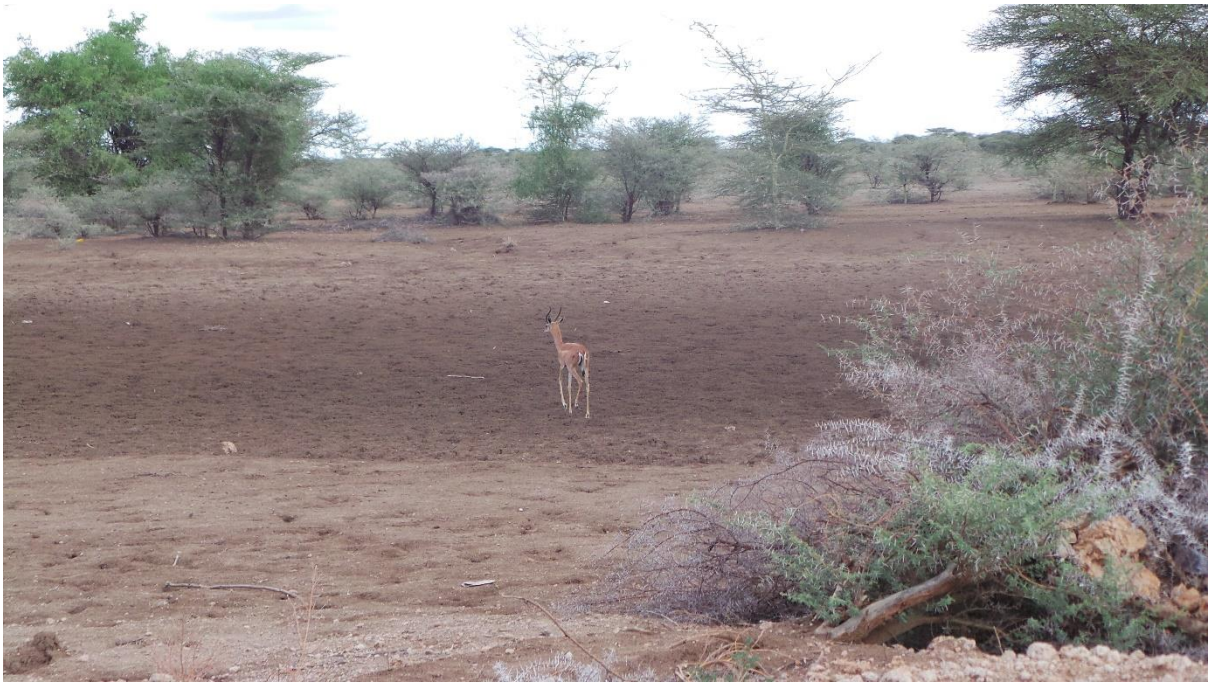

**Plate 6: Gazelle along the road**

**Plate 7: Gazelles, Gerenuks and Ostriches grazing along the road**

**Plate 8: Guinea fowls along the road**

## 3.4 Socio-Economic Environment

### 3.4.1 Population

Isiolo County's population stood at 143,294 as per the 2009 Population census comprising of 73,694 males and 69,600 females. The population was projected to rise to 159,797 by the end of 2012 and 191,627 by 2017. The population consists largely of Cushite communities (Oromo- speaking Boran and Sakuye) and Turkana, Samburu, Meru, Somali and other immigrant communities from other parts of the country. The population density of the county is 8 inhabitants per $Km^2$.

Projections from the Kenya 2009 Population and Housing census indicate that Wajir County has a total population of 727,965 which is projected to rise to 852,963 in 2017. Males comprise 55 per cent of the population whereas female population account for 45 per cent. The County has an inter-censual growth rate of 3.22 per cent which is higher than the national population growth rate of 3.0 per cent.

The county's population is summarized in the tables below.

**Table 7: Population Distribution and Density by Sub County-Isiolo County**

| Sub-County | Area ($Km^2$) | 2009 (Census) | | 2012 (Projections) | | 2015(Projections) | | 2017(Projections) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Population | Density ($Km^2$) | Population | Density (Km2) | Population | Density ($Km^2$) | Population | Density ($Km^2$) |
| Isiolo North | 15,881 | 100,176 | 6 | 111,712 | 7 | 124,577 | 8 | 133,966 | 8 |
| Isiolo South | 9,819 | 43,118 | 4 | 48,083 | 5 | 53,621 | 5 | 57,662 | 6 |

***Source: Isiolo County Integrated Development Plan (2013-2017)***

**Table 8: Population Distribution and Density by Constituency/Sub-County-Wajir County**

| Constituency | 2009 (Census) | | 2012 (Projections) | | 2015 (Projections) | | 2017 (Projections) | |
|---|---|---|---|---|---|---|---|---|
| | Population | Density ($Km^2$) | Population | Density ($Km^2$) | Population | Density ($Km^2$) | Population | Density ($Km^2$) |
| Wajir South | 130,070 | 6 | 143,044 | 7 | 157,311 | 7 | 167,605 | 8 |
| Wajir North | 135,505 | 16 | 149,021 | 17 | 163,885 | 19 | 174,609 | 20 |
| Wajir East | 112,572 | 28 | 123,800 | 31 | 136,149 | 34 | 149,729 | 37 |
| Tarbaj | 111,846 | 12 | 123,001 | 13 | 135,271 | 14 | 148,763 | 16 |
| Wajir West | 91,143 | 9 | 100,233 | 10 | 110,232 | 11 | 121,227 | 12 |
| Eldas | 80,805 | 27 | 88,864 | 29 | 97,729 | 32 | 107,476 | 35 |
| Total | 661,941 | 12 | 727,966 | 13 | 800,576 | 14 | 852,963 | 15 |

***Source: Wajir County Integrated Development Plan***

### 3.4.2 Religion

Over 90% of the populations in the project area are Muslims. The rest are Christians who migrated to the area under employment by the government or International Non-governmental Organizations. Small segment of the Christian population carry out trading activities within Isiolo and Wajir town.

### 3.4.3 Infrastructure

The project area is very vast with poor road network, this renders most of the areas not accessible hence low development levels. Most of the roads in the area are graveled and unearthen unclassified roads.

Isiolo County has a road network of 975.5 km, out of which only 34 km are bituminised. Gravel and earth surfaced roads account for 22 percent and 75 percent of the total road surface respectively. All the earth surface roads are impassable during the wet season and there is an urgent need for continuous upgrading of these roads to all weather road standards. The County has 5 Airstrips.

Wajir County has a total of 440 Km graveled roads, out of 5,280 Km road network. The rest of the roads are earthen and unclassified. The county has no tarmac road or rail network. However, the county has an international airport in Wajir and 7 airstrips (Habaswein, Khorof Harar, Wagalla, Buna, Bute, Tarbaj, and Diff).

The communication network is also undeveloped in the area. Around 8% (2,090 km2) of Isiolo County have mobile network coverage leaving about 92 percent of the County without mobile phone network coverage while there are three mobile service providers namely Safaricom, Airtel and Orange in Wajir County connection is only 20% which is mainly limited to main settlement areas. The county has two post offices at Wajir and Habaswein and 1 sub-post office at Griftu.

### 3.4.4 Land Use

Due to harsh climatic conditions in the project area, and the traditional practice of pastoralism by the local occur during the rainy season. Large tracts of land lie bare due to lack of rain for most part of the year. Much of the land (80%) is communally owned and is under the trusteeship of the county government. Government land constitutes 10 % of total land and includes land for schools, administration, army barracks, and health facilities. The remaining 10% of the land is under private ownership and was alienated for private investment in housing, industrial and commercial purposes. Over 80 percent of the land cannot support crop farming and is used as grazing land by the pastoralists. In some wards areas such Kinna, agro-pastoralism is practised with the inhabitants engaging in both livestock and crop farming. The photo below shows a manyatta at Samatar.

**Plate 9: A Local House (Manyatta) within the Project Area**

### 3.4.5 Economic Activities

#### *3.4.5.1 Livestock Keeping*

The main economic activity in the project area is livestock rearing, the area is a leading producer of livestock products in the country. The main animals reared include cattle, camel and goats. Livestock keeping is the mainstay of Wajir's economy. 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.

The project area has very high potential for livestock rearing. It's the leading producer of livestock products in the country .The main animals kept in the project area include, cattle, camel and goats (Plate 10 and 11). The backbone of Isiolo County's economy is Livestock production with over 80 percent of the inhabitants relying on livestock for their livelihoods. Nomadic pastoralism is the more prominent in the county and defines the lifestyle of most of the county's inhabitants. It has had a negative impact on the environment due to the tendency of overgrazing caused by overstocking.

The main livestock cattle breeds are Zebu and Boran which are drought resistance breeds mainly for beef production. Goat breeds include the Galla (main), the Small East African and Saanen. A few farmers also keep dairy breeds like the toggenburg and the Swiss Alpine and many crosses of local and exotic breeds. The Black Head Persian breed is the dominant sheep breed in the county. The major breeds of camels found in the county are the Somali, the Turkana and the Rendille. The market for the county's livestock is mainly in Nairobi and other neighboring counties.

### *3.4.5.2 Agriculture*

Due to the aridity of the counties, food production is limited and contributes little to food security. Most people rely on livestock products like milk and meat which is their staple food. Livestock production activities are practised county wide. Poultry keeping is more pronounced in Wajir town. Livestock population density in the county is low due to the low land-carrying capacity of the rangeland. Droughts, livestock diseases and pests adversely affect livestock development in the county.

Agriculture is majorly practised in depressions and along drainage lines where there is more moisture due to seasonal flooding. Irrigation using underground water is limited in areas with permanent shallow wells. The major planted crops include sorghum, drought resistant maize, beans, melons, cowpeas, green grams and horticultural crops like kales, spinach, tomatoes, sweet and hot peppers. These agricultural activities are undertaken in small scale.

**Plate 10: A herd of camels grazing along the road**

**Plate 11: A shepherd with a flock of sheep and goats along the road**

### *3.4.5.3 Other Economic Activities*

The area residents carry out other forms of economic activities such as hotel, retail shops, butcheries and miraa (Khat) stalls.

# CHAPTER FOUR: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

## 4.1 Introduction

The Republic of Kenya has a policy, 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. Projects subject to this requirement are specified in the Second Schedule of the EMCA, 1999.

The financing institutions (The World Bank through its IFC branch) have also developed a policy on social and environmental sustainability that calls for positive development outcomes in the public and private sector. In order to achieve this, the World Bank has set up performance standards on environmental and social sustainability as well as general and industry specific environmental, health and safety guidelines against which projects are reviewed. The thrust of the standards is to ensure that projects financed by the bank are developed in a manner that is socially responsible and reflect sound environmental management practices.

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 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, 2009. 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 Republic of Kenya has a policy, legal and administrative framework for environmental management. 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 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.

### 4.2.2 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 realised 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 counties were also formulated thus forming part of the building block to the NEAP.

### 4.2.3 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 road will create an enabling environment that will contribute immensely in the enhancement of economic growth in Kenya. The proposed project would also impact businesses, agricultural and tourism related activities that have great relevancy to poverty eradication in the country.

### 4.2.4 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 realisation 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.

### 4.2.5 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.

### 4.2.6 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 e.g. the Lorian swamp.

### 4.2.7 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.

The Kenyan constitution also gives prominence to public participation; as a general national value in environmental protection. Article 69(1) states that the State shall encourage public participation in the management, protection, and conservation of the environment.

### 4.2.8 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 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.

### 4.2.9 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.

### 4.2.10 Forestry Policy (2014)

This policy of the government is intended 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 the Kenya's forest policy. Where clearance of forests or sections of forests is envisaged, it would be important to put in place appropriate mitigation measures such as those specified in the preliminary environmental management plan of this ESIA report.

### 4.2.11 Wildlife Policy of 2011

The wildlife poverty 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 road, appropriate mitigation measures must be implemented to minimize disturbance to wildlife.

### 4.2.12 Wetlands Policy of 2013

The wetlands policy is intended to promote protection of wetlands in Kenya. The policy sets out strategic measures for the protection of existing wetlands in Kenya. The proposed road has potential of impacting several wetlands such as Ewaso Nyiro wetlands. It would be important to undertake appropriate mitigation measures in order to minimize or avoid degradation of wetlands.

### 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 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 preliminary environmental management provides mitigation measures that can be undertaken to ensure compliance with the requirements of this policy.

### 4.2.16 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 projects of such as scale, HIV/AIDS has been considered as one of the proposed impacts but adequate mitigation measures have also been proposed to that effect.

### 4.2.17 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.

### 4.2.18 The Kenya National Climate Change Response Strategy of 2010

This strategy provides measures that the Government of Kenya is taking to address issues related to the impact of climate change on various sectors of the economy. The proposed road will need to take onboard the effects of changing climate in the country,

and apply applied climate change mitigation measures. This is important because climate change will in future affect the operation of the road.

## 4.3 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.

### 4.3.1 Environmental Management and Coordination Act No 8 of 1999

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.

#### *4.3.1.1Environmental Management and Co-ordination (Environmental Impact Assessment and Audit) Regulations, 2003*

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.

#### *4.3.1.2 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.

#### *4.3.1.3 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 depend on 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.

#### *4.3.1.4 Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006*

The EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 provides that no person shall engage in any activity that may have an adverse impact on any ecosystem; may lead to the introduction of any exotic species or to unsustainable use of natural resources, without an Environmental Impact Assessment License issued by the Authority under the Act.

The regulation requires NEMA in consultation with the relevant lead agencies, to impose bans, restrictions or similar measures on the access and use of any threatened species in order to ensure its regeneration and maximum sustainable yield. The proposed road traverses areas with diverse ecosystems which will need to be protected as per the requirements of this regulation.

#### *4.3.1.5 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.

#### *4.3.1.6 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.

#### *4.3.1.7 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 the Ewaso Nyiro wetland, among others, which are valuable wetlands and water resources along the route. The contractor will need to employ measures for the preservation and conservation of these wetlands and river systems.

#### *4.3.1.8 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 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. 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.

### 4.3.2 The Wildlife and Conservation Act 2013

The Wildlife and Conservation 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.

The proposed road traverses important wildlife areas. The road construction will need to create a barrier for the free passage of wildlife. Passage provisions will need to be integrated into the design of the road. The contractor will also need to provide free wildlife passages so that the road project does not affect wildlife negatively.

### 4.3.3 The Forest Act, 2005

This is law was enacted by Parliament in 2005 to provide for the establishment, development and sustainable management including conservation and rational

utilization of forest resources for the socio-economic development of the country. Parts of the project area consist of indigenous forests. Section 8 of the Act requires all indigenous forests and woodlands to be managed on a sustainable basis for the purposes inter alia of conservation of water, soil and biodiversity, riparian and shoreline protection, sustainable production of wood and non-wood products. Community participation as provided for under Section 46 of the Act should be encouraged. The most appropriate would be initiation of participatory forest management in these forest reserves so that the local community and organization can have a significant input with Kenya Forest Service (KFS) office playing a coordination role.

### 4.3.4 The Water Act 2007

The Act stipulates that a permit shall be required in all cases of proposed diversion, abstraction, obstruction, storage or use of water, with minor exceptions relating to use for domestic purposes (Section.36). Under the Water Act (General) Rules, it is stated that any rights acquired under the permit are subject to the Public Health Act and the Malaria Prevention Act, in addition to the Water Act itself. The Public Health Act has wide-ranging provisions on pollutant discharges, which are set out below.

The Water Act (General) Rules make provision for discharges in a number of respects, as follows:

Effluent shall not be returned to any body of water unless it has been purified. Further, it must not contain poisonous or injurious matter or excess silt, gravel or boulders.

Water used for pulping, mulling or washing of coffee shall be efficiently screened.

The regulating authority may determine the potential prejudicial effects of the pollutant discharges and order the removal already made.

It is an offence to allow effluent discharges, either domestic or industrial, if this would harm fish, and a fish warden may order its removal. Plans for rendering such effluent innocuous shall be submitted to and approved by the enforcing authority.

Additionally the applicant for a water permit is required to outline the methods to be used for treating effluent before discharge (Form WAB 13, question 18). The permit would only be issued subject to satisfactory provision being made for the treatment of effluent. The Water Act, apart from the Rules, makes only limited provision for controlling water pollution. The provision is limited to the pollution of drinking water.

Under section 145, the water undertaker may make regulations to control polluting activities, which may threaten its source of water. It may itself construct the necessary works for intercepting, treating or disposing of foul water (s.149). Section 158 makes it an offence to pollute such waters. Similarly, under section 169, it is an offence to throw or convey polluting matter into a body of water.

### 4.3.5 The Agriculture, Fisheries and Food Authority Act of 2013

Agriculture, Fisheries and Food Authority Act, 2013 (No. 13 of 2013) provides for the establishment of the Agriculture, Fisheries and Food Authority, the administration of matters of agriculture and the preservation, utilization and development of agricultural land and related matters. "Agriculture" in this Act means cultivation of land and the use of land and water for any purpose of husbandry, aquaculture and food production and includes cultivation of crops and horticultural practice, breeding of aquatic animals and plants, the use of land, fish harvesting and (e) the use of land for agroforestry.

The Act requires the Authority in consultation with the county governments to among others promote best practices. The Cabinet Secretary is required under the Act with the advice of the Authority, and in consultation with the National Land Commission, to provide general guidelines applicable in respect of any category of agricultural land. These land development guidelines are to be implemented by the county governments. In a like manner, the Cabinet Secretary is given powers to make general rules for the preservation, utilization and development of agricultural land and aquatic resources and prescribe national guidelines for soil conservation. Each county government is required to keep a register of land development orders and land preservation orders, which they may issue under this Act. The Act also provides for participation by farmersNatural 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 provide 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.

### 4.3.6 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. This Act is relevant to the proposed road project due to the need to relocate some of the petrol stations situated along the route.

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.

### 4.3.7 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 requires that proper marking and maintenance of boundaries. 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.

### 4.3.8 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.

### 4.3.9 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.

### 4.3.10 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.

### 4.3.11 The County Governments Act.

This is an Act of parliament to give effect to Chapter Eleven of the Kenyan Constitution; to provide for County government's powers, functions and responsibilities to deliver services and for connected purposes. Section 113 of the Act makes public participation in County planning processes compulsory

### 4.3.12 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. This project is conducted under the PPP initiative

### 4.3.13 Occupational Safety and Health Act 2007

The Occupational Safety and Health Act 2007applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of the act is to secure the safety, health and welfare of persons at work and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. Section 19 of the Act provides that an occupier of any premises likely to emit poisonous, harmful, injurious or offensive substances, into the atmosphere shall use the best practicable means to prevent such emissions into the atmosphere and render harmless and inoffensive the substances which may be emitted.

Section 16 provides that no person shall engage in any improper activity or behaviour at the workplace, which might create or constitute a hazard to that person or any other person. The contractors of the proposed road will need to fully comply with the requirements of the Occupational Safety and Health Act 2007.

### 4.3.14 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 road 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 road and even workers residing in various construction camps established all along the route

### 4.3.15 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. 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.

### 4.3.16 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 will need to comply with the requirements of this Act

### 4.3.17 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 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.

### 4.3.18 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 labourers probably from the 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.

### 4.3.19 Work Injury Compensation Benefit Act 2007

The Work Injury Compensation Benefit Act 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

### 4.3.20 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

### 4.3.21 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.

### 4.3.22 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.

### 4.3.23 The Kenya Roads Act, 2007

This is an Act of Parliament that provided for the establishment of Kenya Road Agencies i.e. Kenya National Roads 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.

### 4.3.24 HIV / AIDS Act, 2006

Section 3 of The Act indicated 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.

### 4.3.25 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

### 4.3.26 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.

### 4.3.27 The National Gender and Equality Act, 2011

National Gender Equality Commission 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 men 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.

### 4.3.28 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.

### 4.3.29 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.

### 4.3.30 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.

### 4.3.31 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 takes keen in providing adequate support to enhance the security of persons involved in this project and the community at large, which will translate to provision of critical intel that will trigger a review of the existing security measures and tactics, among other advantages such as security expertise and artillery.

## 4.4 National Institutional Framework

There are various national institutions that are important in matters related to environmental management in Kenya. These are described in the following sections.

### 4.4.1 The National Environment Council

The National Environmental Council (NEC) is responsible for policy formulation and directions for the purposes of developing the EMCA. The Council also sets national goals and objectives, and determines policies, and priorities for the protection of the environment.

### 4.4.2 The National Environment Management Authority

The National Environmental Management Authority (NEMA) exercises general supervision and, co-ordination of all matters relating to the environment. NEMA is also the principal instrument of the government in the implementation of all policies relating to the environment. The Authority reviews EIA project and study reports for the proposed projects, visits the project sites to verify information provided in the report and issues EIA licenses if it considers that all the issues relevant to proposed projects have been identified and mitigation measures to manage them have been proposed

### 4.4.3 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.

### 4.4.4 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. Since the proposed project traverses through several Counties, the

review of the report will be done at a National level for the purpose of issuance of EIA license. However, it is also recommended that the EIA report should also be reviewed in each of the counties to create awareness and obtain ownership at county level. In fact it is recommended that the review at County level be done before the ESIA Report is submitted to NEMA.

## 4.5 Administrative Framework for the Proposed Project

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

### 4.5.1 The Treasury (The PPP Unit)

The Public Private Partnership Unit (PPPU) was therefore 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.

### 4.5.2 Ministry of Roads and Infrastructure

The Kenya's Ministry of Roads and Infrastructure is charged with the responsibility of providing basic infrastructure facilities to the public. These infrastructure facilities include development, rehabilitation and maintenance of the road network in the country.

### 4.5.3 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.

### 4.5.4 Kenya National Roads Authority (KeNHA)

The Kenya National Roads 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 A.

### 4.5.5 Development Partners

This project will be financed by CFC Stanbic Bank from South Africa. The CFC Stanbic Bank is a partner that has adopted the use of Equator Principles for all its projects. As such, this project will follow the Equator Principles to the later.

## 4.6 World Bank Environment and Safety Guidelines

### 4.6.1 ESS1 Assessment and Management of Environmental and Social Risks and Impacts

ESS1sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through IPF, in order to achieve environmental and social outcomes consistent with the ESSs.

### 4.6.2 ESS2 Labour and Working Conditions

Recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

### 4.6.3 ESS3 Resource Efficiency and Pollution Prevention and Management

Recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life-cycle.

### 4.6.4 ESS4: Community Health and Safety

ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.

### 4.6.5 ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

Recognises that involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.

### 4.6.6 ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development and it recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. ESS6 also addresses sustainable management of primary production and harvesting of living natural resources, and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project.

### 4.6.7 ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities

This ensures that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities. ESS7 is also meant to avoid adverse impacts of projects on Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts.

### 4.6.8 ESS8: Cultural Heritage

This recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. ESS8 sets out measures designed to protect cultural heritage throughout the project life-cycle.

### 4.6.9 ESS9: Financial Intermediaries (FIs)

This recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. FIs are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI.

### 4.6.10 ESS10: Stakeholder Engagement and Information Disclosure

This recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

## 4.7 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.

### 4.7.1 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.

### 4.7.2 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 EIA 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. This policy is important because some sections of the proposed project route directly fall within critical and/or protected area category e.g. Ewaso Nyiro flood plain

### 4.7.3 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 Modogashe–Habasweini-Samatar 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 Borana, Somali, and mostly other Cushitic communities.

### 4.7.4 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.

The policy is not triggered by this project as during the study there were no observed physical or cultural resources to be affected by the project. Nevertheless , the Contractor is 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.

### 4.7.5 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.

## 4.8 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.

### 4.9 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.

### 4.10 Equator Principles

The Equator Principles listed below will be fundamental in this project:

- Principle 1: Review and Categorization
- Principle 2: Social and Environmental Assessment
- Principle 3: Applicable Social and Environmental Standards
- Principle 4: Action Plan and Management System
- Principle 5: Consultation and Disclosure
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review
- Principle 8: Covenants
- Principle 9: Independent Monitoring and Reporting
- Principle 10: Equator Principles Financial Institutions (EPFI) Reporting

## 4.11 International Conventions and Guidelines

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

### 4.11.1 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.

### 4.11.2 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.

### 4.11.3 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.

### 4.11.4 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).

### 4.11.5 The Ramsar Convention for the conservation and sustainable utilization of wetlands

The Ramsar Convention (formally known as the Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. The proposed Modogashe–Habasweini-Samatar road has potential of impacting a number of wetlands at Habasweini Appropriate mitigation measures will need to be implemented as detailed in the Environmental Management Plan.

### 4.11.6 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 1996.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.

### 4.11.7 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 August1994. NEMA is the focal point for the Convention.

### 4.11.8 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.

### 4.11.9 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.

### 4.11.10 Convention on the Rights of the Child

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.

### 4.11.11 Convention on the Elimination of all forms of Discrimination against Women

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.

### 4.11.12 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.

## 4.12 Project Administration

### 4.12.1 Establishment of an Environmental, Health and Safety Office

The ESIA process culminates with the formulation of a comprehensive Environmental and Social Management Plan. In order to ensure the later 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.

### 4.12.2 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.

### 4.12.3 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

# CHAPTER FIVE: STAKEHOLDER ENGAGEMENT PLAN AND PUBLIC PARTICIPATION

## 5.1 Introduction

Stakeholder Engagement and Public Participation Process particularly with local citizens affected by development proposals, is frequently construed as an integral aspect of successful decision making in the ESIA processes for major developments. As such, Public Participation is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA 1999 section 58, on ESIA. Stakeholder Engagement and Public Participation is also necessary for Category B projects as stipulated by Principle 5 of the Equator Principles. It is an important process through which stakeholders including beneficiaries and members of public living in 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. Stakeholder involvement and Public consultation about the proposed Modogashe –Habasweini - Samatar road was carried out in the three towns of Modogashe, Habasweini and Wajir in order to capture the key concerns of stakeholders along the road corridor. The Stakeholder Engagements were done in order to foster better mutual understanding, address concerns and incorporate opinions to this report

This chapter describes the process of public consultation and participation that was followed in order to identify the key issues and impacts of the proposed project. The chapter also demonstrates compliance with Equator Principles 5 on Stakeholder Engagement which states that; 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.

Views from the local residents, local leaders, surrounding institutions and development partners for the proposed upgrade of the Modogashe–Habasweini-Samatar road, 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 and its amendment Act 2015.

## 5.2 Consultation and Public Participation

The general objectives of the consultation and public participation were:

- 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 ESIA for the proposed project.
- Gather comments, suggestions and concerns of the interested and affected parties.
- Incorporate the information collected in the ESIA study.

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. The plates below show some of the engagement during the Stakeholder Engagement and Public Participation meetings conducted at Modogashe and Habasweini.

**Plate 12: ESIA Team Leader Explaining about the Project to the Modogashe Community Members (*Source; AWEMAC*)**

**Plate 13: An Elder in Modogashe giving his views about the Project (*Source; AWEMAC*)**

**Plate 14: A Youth member giving his views about the Project at Modogashe (*Source; AWEMAC*)**

**Plate 15: A Woman giving her views about the project at Modogashe**

**(*Source; AWEMAC*)**

**Plate 16: ESIA Team Leader Briefing Habasweini Community Members about the Project (*Source; AWEMAC*)**

**Plate 17: An Elder Airing his Views about the Project at Habasweini**

**(*Source; AWEMAC*)**

**Plate 18: The Ward Administrator Explaining about the Project to the Community (*Source; AWEMAC*)**

## 5.3 Methodology used in Stakeholder Engagement and Public Participation

The Consultative Stakeholder Engagements and Public Participation meetings involved in-depth consultations with key informants including:

- Kenya National Highways Authority (KeNHA)
- Kenya Urban Roads Authority (KURA)
- Kenya Rural Roads Authority (KeRRA)
- Kenya Wildlife Service (KWS)
- Kenya Forest services
- National Environment Management Authority (NEMA)
- County Governments of Isiolo and Wajir
- Civil Society Organisations (CSOs)
- Religious Leaders
- Academia, think thanks and opinion leaders
- General Public

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. Furthermore, questionnaires were also issued to these groups in order to gain much more information concerning the project and its impact on the environment. Interested and Affected Parties Consulted

The stakeholders who will be affected or have interest in the proposed Modogashe – Habasweini - Samatar road includes the County Governments and National Government

Coordinators, civil society, CBOs, farmers, land owners and traders along the road corridor. In addition, the following stakeholders were also considered:

- Local community representatives (Local political and community leaders)
- Local community members along the propose way leave.
- Business operators – Hotel owners, shop owners, bus owners among others.
- Truck drivers, bus and taxi drivers turn boys, mechanics.

The Public participation meetings were held on 10th May 2017 at Modogashe and Habasweini towns. Key Stakeholder engagements were also conducted on 11th May 2017 at Palace Hotel in Wajir town.

The opinion of the above stakeholders was taken into account during the CPP discussions and interviews.

## 5.4 Key informant interviews

About 232 members of the public (see list in Appendices) working, residing and those owning business properties along Modogashe–Habasweini-Samatar road were interviewed using a standard questionnaire. The exercise was conducted by experienced experts via interviews and discussions 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.

From the public participation, it was apparent that the majority of the members of the public were not aware of the proposed project since no public meeting had been held prior to the public participation. The consultant therefore presented the details of the project to the stakeholders.

The project was received with mixed reactions by the members of the public as they anticipated numerous impacts, both negative and positive. The local communities and major stakeholders independently expressed their views on the project (Plates below). The summary of the number of participants at public/ community interviews for the project are listed below (Table 9).

**Plate 19: Focused Group Discussion at Modogashe Town (*Source; AWEMAC*)**

**Plate 20: Focused Group Discussion at Skanska (*Source; AWEMAC*)**

**Plate 21: Focused Group Discussion at Habasweini (*Source; AWEMAC*)**

**Table 9: Summary of number of participants at Public consultation meetings**

| S. | AREAS OF PUBLIC CONSULTATIONS | PARTICIPANTS |
|---|---|---|
| 1. | Modogashe | 107 |
| 2. | Habasweini | 85 |
| 3. | Samatar | 10 |
| 4. | House to house survey in Skanska | 10 |
| 5. | House to house survey in Kanjara | 10 |
| 6. | House to house survey in Legdima | 10 |
| **Total** | | **232** |

## 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.

- Kenya National Highways Authority (KeNHA)
- Kenya Urban Roads Authority (KURA)
- Kenya Rural Roads Authority (KeRRA)
- Kenya Wildlife Service (KWS)
- Kenya Forest services
- National Environment Management Authority (NEMA)
- County Governments of Isiolo and Wajir
- Civil Society Organisations (CSOs)
- Community members/ village elders

## 5.6 Positive Comments made by the Stakeholders

The following section provides details on the positive impacts of the proposed project as expressed by the stakeholders who interviewed:

### 5.6.1 Creation of 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 operation, 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 jobs during operation stage. Job opportunities will arise at the toll stations which will be established, as well as vehicle maintenance garages. 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.

### 5.6.2 Increased Business Opportunities

The respondents were optimistic that there will be an increase in business opportunities during the construction and operation of the Modogashe-Habasweini-Samatar road. 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 towns will be economically revitalized.

The new road will also lead to the expansion of various businesses in various towns located along the road. There is in particular high possibility of expansion of petrol stations, hotels and restaurants, shopping malls, etc. due to increased number of motor vehicles (and people) using the route.

### 5.6.3 Cheap and Faster Means of Transport

The respondents were positive that the proposed Modogashe–Habasweini-Samatar road will provide a faster and cheaper means of transport for cargo trucks, passengers and personal cars, from Isiolo to Wajir. This will improve the current transport situation along the road.

### 5.6.4 Easy and Fast Movement of People

The public was positive that the road will reduce the travel time of people within the two counties and beyond. They also said that the road will lead to an increased number of bus and matatu operators hence making transportation easy.

### 5.6.5 Easy and Fast Movement of Goods

The public said that the road will improve the transportation of goods from and to the area. Since the area depends on livestock farming, they stated that their livestock will reach to the market on time. Also food stuffs e.g. vegetables, maize and other farm produce will be delivered efficiently and timely.

### 5.6.6 Interaction of People from Different Communities

The members of the public revealed that this project will promote national cohesion since people from different communities in Kenya will be working together during construction and operation phases of the project.

### 5.6.7 Growth of Towns

The locals were confident that the road would lead to development of the existing towns and the formation of newer towns.

### 5.6.8 Transfer of Skills

The members of the public suggested that with the road being a source of employment. Many different skilled workers will be employed from within and without the area. This will lead to a transfer of skills and gaining of experience during the construction period.

## 5.7 Negative Concerns of the Stakeholders

### 5.7.1 Noise pollution

There was concern over the possibility of high noise and vibration levels at the project site as a result of excavation, construction and demolition 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 proponent will take appropriate steps to minimize noise pollution through provision of appropriate protective equipment to construction workers, planning and minimizing the frequency of transporting construction materials and ensuring that all construction machinery and equipment are well maintained. The public also feared that there would be noise du ring operation stage of the project due to high speed and raving of motor vehicles along the road since it will allow for speed of between 80km/hr to 100km/hr (design speed).

### 5.7.2 Dust Generation

The public expressed concerns over possibility of generation of large amounts of dust within the project site and surrounding areas as a result of demolition, excavation works and transportation of building 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 on the access roads 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.

### 5.7.3 Loss of Vegetation Cover

Members of the public expressed concerns that during the construction phase of the project there will be clearance of vegetation along the corridor, this will lead to the negative impacts in environmentally sensitive sites such as Ewaso Nyiro flood plain. There will also be loss of few baobab trees along the proposed road. The clearance of vegetation will affect the scenic beauty and ecological functioning of these sensitive areas. 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. Most of the respondents proposed that a major landscaping and tree planting should be carried out along the road in order to restore the scenic beauty of the environment.

### 5.7.4 Displacement of Local Communities and Loss of Property

The participants were concerned that the proposed project will lead to minimal compulsory land acquisitions causing displacement of people and loss of a few properties along the transport corridor. Members of the public disclosed fear of the compensation not being done appropriately; It was noted that the project will affect persons living in Modogashe and Habasweini towns situated along the corridor. The affected people will need to be compensated appropriately according to existing best practices.

It will be important to ensure that the Resettlement Action Plan is done appropriately professionally in order to ensure all the affected members of the community are identified and compensated appropriately.

### 5.7.5 Disruption and Loss of Businesses

The squatters who have established businesses in the road reserve especially in Modogashe and Habasweini towns were concerned that they will be evicted from the road reserve in order to pave way for the construction of the road. Some business people who depend on squatters operating businesses on the road reserves expressed concern that there would be low turnover for their sales. However, it was noted that only a few of the establishments will be affected and proper compensation will be issued to the affected. This impact will be low hence a value of 1.

### 5.7.6 Road Accidents

The residents along the road expressed fears that the new road will allow vehicles to move at high speed and this may increase the number of road accidents. The project proponent will need appropriate pedestrian crossing points with foot bridges in certain key areas. Also, there will be a need to create cross points (under passes) for livestock and wild animals at strategic locations along the road. This impact will be low hence a value of 1.

### 5.7.7 Increase in the spread of STD, HIV and AIDS

The residents along the proposed road corridor expressed concern that there would be an increase in 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.

### 5.7.8 Restrictions on the use of the way leave

The squatters operating small-scale businesses along the existing road reserve suggested that they be allowed to operate their businesses on the new road reserve after construction of the road. This will however not be feasible in view of potential future challenges related to road maintenance and security of motorists along the road. Also, squatters operating next to the road poses road safety concern.

### 5.7.9 Cultural Erosion

The Public suggested that the entering of new people in the area could lead to erosion of their culture which has been preserved for a long time. It was said that the contractor should consult with the community so that he is informed on the critical issues of culture and traditions.

## 5.8 Summary of Recommendations made by the Public

The following suggestions were made during the consultations and house-to-house interviews:-

- The welfare and comfort of the community and neighbours should be considered seriously by the developer.
- The proponent should consider employing locals as casuals during construction and operation activities.
- Work Campsites should be built closer to established villages so that the community benefits from services like water and clinics that will be available. This will also discourage the mushrooming of new villages.
- The environment and health of the public should be protected from degradation.
- Schools for children, clinics, boreholes and water pans should be constructed for the communities or as part of Corporate Social Responsibility (CSR).
- Foot bridges, underpasses and pedestrian crossing points should be provided to enable convenient accessibility to either side of the road at strategic 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.
- The proponent should ensure fair compensation of all displaced persons.
- The proponent should involve KWS Scientists and Engineers and other key stakeholders at all stages of the project including design stage to ensure that the impacts to the protected and other wildlife areas are minimal.
- The proponent should ensure that all the stakeholders (including KWS, Water, Roads), 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.
- In order to avoid flooding during rainy seasons the road should be raised and big box culverts should be constructed in flood prone areas.
- The proponent should be able to optimize the utilization of the current facilities where possible such as campsites, quarries, boreholes, borrow pits among others to reduce the economic, environmental and social impacts of coming up with new facilities.
- Security of the wildlife should be ensured in order to protect them from poaching especially during the construction period as many people are expected to move to the area to work on construction of the road
- The Mosques along the road corridor should not be interfered with during the construction.
- Design measures should be put in place in order to encourage wildlife to use the underpasses that will be provided.
- The proponent should work in close consultation with the KWS, KFS and all other government and private utility developers along the road.
- Where possible and necessary the developer should install speed bumps and rumble-strips for example in towns, near schools etc. Other structures also should include: bus stops in all the villages along which the road traverses.
- The developer should come up with a proper drainage mechanism along the road and in major towns.
- Graveyards that are along the road reserve should be moved in consultation with the community elders.
- Women should be considered for office jobs and all other available jobs during construction.
- Public consultation should be continuous throughout the project.

# CHAPTER SIX: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

## 6.1 Introduction

The proposed Modogashe–Habasweini-Samatar road will have both positive and negative environmental and social impacts. Through an intensive and extensive field survey, key stakeholder consultation and public participation forums conducted on the proposed project area, the impacts were identified. Additionally, literature review of published reports, scientific papers and other approved EIAs on road projects was conducted by the consultant to provide a complete list of expected impacts on the road project. The impacts were categorised according to different phases of the project i.e. construction, operation and decommissioning phases. The magnitude and the extent of the impacts was also quantified by this study.

The negative and positive impacts likely to originate from the project are generally linked to the social and biophysical environment and also the economic aspects along the area that the road will traverse. Among the broad linkages are as follows:

I. Biophysical Environment
   - Biodiversity: Flora and Fauna
   - Water: hydrology of the area
   - Land and Soil
   - Climate and Weather

II. Social Environment
   - Population characteristics
   - Settlement trends
   - Land use patterns
   - Healthy and Safety
   - Culture

III. Economic Issues
   - Trade and industries
   - Transportation and communication
   - Income generation activities

### 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 was assessed based on the following factors:

- Location or extent: The area/volume covered
- Timing: Whether immediate or delayed
- Duration: Short term, long term, intermittent or continuous
- Reversibility or irreversibility

- Likelihood: Probability of the impact taking place
- Significance: Whether it is local, regional or global

In order to make the following observation, expert knowledge based on the magnitude of the predicted impacts was relied upon. The scale that was applied in the analysis of impacts is shown in the table below.

**Table 10; 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. |

## 6.2 Positive Environmental and Social Impacts during Construction Phase

The following were the positive environmental and social impacts for the proposed Modogashe-Habasweini-Samatar road project during the construction phase:

### 6.2.1 Creation of Employment Opportunities

During the construction phase of the road, it is expected to offer job opportunities for both skilled and unskilled locals in the area. The locals will be employed as casuals, and other permanent consultancy and technical staff during the construction of the road. Civil and structural engineers, masons, carpenters, welders and other casuals will all gain employment during the construction phase of this road. These jobs are expected to improve the economy of the area and also improve the livelihoods of the local people. This impact will be very high hence given a value of 4.

### 6.2.2 Gains in the Local and National Economy

Through the provision of employment to the locals, income from the salaries and wages will improve the economy of the town centres and the county at large. The contractor is also expected to purchase most of his materials from the project area as such contribute positively to the local and national economy. The materials for construction will also be sourced out from other areas within the nation hence positively affecting the national economy. This impact will be very high hence given a value of 4.

### 6.2.3 Transfer of Skills

During construction of the road, many people from within and without the area will be employed to provide different services. As such, the local people will learn new skills from the civil engineers, welders, masons and other employees that come from outside. This impact will be moderate hence a value of 2.

### 6.2.4 Provision of Market and Supply for Building Materials

The contractor will purchase building materials such as sand, cement etc. from suppliers within or without the area. This impact will have a moderate value hence a value of 2.

### 6.2.5 Improvement of Local and Regional trade and Business opportunities

The road will lead to the growth of local and regional trade. In the construction phase, building materials for road construction will be purchased both locally and regionally. Other small scale business people such as food vendors, kiosk owners will also benefit during the construction of the road. Livestock products will be transported efficiently from the project area to local and regional markets. The export trade of gums and resins will also improve as a result of the development of the road. This impact will be moderate hence value of 2.

### 6.2.6 Improved Security

In the wake of insecurity incidences in the project area, the proposed road project will lead to an improvement of security. There will be a high deployment of police along the

project area during the construction. Road patrols will be conducted frequently thereby improving the security of the area. This impact will be very high hence a value of 4.

### 6.2.7 Corporate Social Responsibility

The contractor will identify the needful areas in the project area and participate in CSR activities. Some of the noted problems in the area are: availability of water (Plate 26), poor education and health infrastructure, among others. Therefore, the contractor is expected to assist in any of the following areas as part of CSR. This impact will be high hence a value of 4.

**Plate 22:People and Livestock Flocking a Water pan to draw water**

*(Source: AWEMAC)*

## 6.3 Negative Environmental and Social Impacts during Construction Phase

The likely negative environmental and social impacts during the construction phase of the project are:

### 6.3.1 Noise pollution and excessive vibrations

As a result of excavation, construction and demolition works, there will be high noise and vibration levels in the project area. Noise and vibrations will emanate from transportation vehicles, construction machinery, metal grinding and cutting equipment, and among others. Excavation works will also cause vibration and noise. However, the proponent is expected to take appropriate steps to minimize noise pollution through provision of appropriate personal protective equipment to construction workers, minimizing the frequency of transport of construction materials and ensuring that all construction machinery is well maintained. This impact will be moderate hence value of 2.

### 6.3.2 Air pollution due to dust and exhaust emissions

In the construction phase, the excavations, demolitions, and transportation of building materials will result in the emissions of large amounts of dust within the project site and surrounding areas. The diversion of traffic in the construction phase will also contribute to dust emissions. The proponent will minimise this through sprinkling water on daily basis on the areas that transport trucks use, excavated areas and the diversion routes. This impact will be moderate hence value of 2.

### 6.3.3 Increased generation of solid waste

Volumes of solid wastes will be produced during the different phases of the project development. Solid waste materials will be generated during demolition works as well as from various packaging materials. Significant quantities of rock and soil materials will be generated from earth moving during construction activities. Solid waste generation during operation and maintenance activities will include road resurfacing waste (e.g. removal of the old road surface material), road litter, illegally dumped waste, or general solid waste from campsites; vegetation waste from the clearance of road reserves; and sediment and sludge from storm-water drainage system. Paint waste may also be generated from road and bridge maintenance (e.g. due to removal of old paint from road stripping and bridges prior to re-painting). 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, a storm-water management plan that has been provided in this report should be adhered to. The contractor shall comply with recommendations provided in the ESMP, to be enhanced by a Solid Waste Management Plan that is detailed, effective and compliant. The plan shall be developed within the provisions of an Integrated Solid Waste Management approach, facilitating in implementation of the Three (3) R Principles of Solid Waste Management; Reduce (Source Reduction), Recycle and Reuse. This impact will be moderate hence value of 2.

### 6.3.4 Increased Energy Consumption

The construction of the proposed Modogashe-Habasweini-Samatar road is expected to lead to an increase in traffic between Isiolo and Wajir. 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 (value of 2) in view of the measures that will be put in place to reduce consumption of fossil fuels.

### 6.3.5 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 increases will take place in construction camp sites, including also in various towns located along the road. This is attributed to increased activities in these towns. There will be impact due to the oil spillage, disposal practices of used oil, oil filters during the construction of the project. This impact will be moderate hence value of 2.

### 6.3.6 Water Abstraction and Consumption

During the construction of the road, there will be increased abstraction of water from rivers like Galana Gof, and Ewaso Nyiro wetland situated along the proposed route of the road. This may reduce the flow of rivers in an area which is generally arid and semi-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.

### 6.3.7 Modification of hydrology

The increased water abstraction from rivers and wetlands may modify the hydrological characteristics of these water bodies. Also, quarries and 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 highway preventing directly flow to river channels. This impact will be low hence value 1.

### 6.3.8 Generation of storm water and impact on drainage

Construction or widening of sealed roads increases the amount of impermeable surface area, which increases the rate of surface water runoff. The project will also impact on the drainage during the construction phase 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 property and crops. Flooding downstream can also become a health hazard (e.g. breeding ground for mosquitos, etc.). Good drainage design and construction in the development of roads is critical to the success of road construction. Also, storm 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 highway. Storm water may also contain nutrients and herbicides used for management of vegetation in the rights-of-way. This impact will be moderate hence value of 2.

### 6.3.9 Increased Soil Erosion Risk and Soil Quality Degradation

The construction of the 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. This impact will be moderate (value of 2) in view of the gentle nature of the landscape through which the road will pass.

### 6.3.10 Loss of Vegetation Cover and Biodiversity

During the construction phase of the project, there will be clearance of vegetation along the corridor to pave way for the proposed road. The project area has scarce vegetation and therefore there will be minimal clearance of vegetation (Plate 27). It is expected that the project will require huge quantities of materials such as ballast, murram, stones, conglomerates, sand, gravel, and soil, among others. In addition, the contractors will install several material camp sites as well as a batching plant that will impacts on the environment, especially with smothering vegetation species around the camp sites. The proponent is going to ensure that campsites and quarries are constructed in areas that are not high in vegetation density. Due to the need to clear vegetation existing for quarries and building of campsites. All borrow pits and quarries will need to undergo a separate Environmental and Impact Assessment Study so as to ensure there will be no major negative impacts from them. This impact will be moderate hence value of 2.

**Plate 23: A Section of the Road Corridor with Minimal Vegetation**

*(Source: AWEMAC)*

### 6.3.11 Disturbance to Wildlife

The project area has giraffes, dikdiks, gazelles, gerenuks, ostriches and among other wildlife that roam freely (Plate 28). The public raised a concern that the 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. 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 certain areas leading to overgrazing, damage to natural vegetation and general loss of ecological integrity of the ASAL ecosystem along the road. 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. The contractor is expected to fence all the borrow pits and boreholes in order to avoid wildlife accidents. This impact will be low hence value 1.


**Plate 24: Giraffes, Gazelles and Ostriches along the Project Area**

*(Source: AWEMAC)*

### 6.3.12 Disruption and Loss of Businesses

During the field survey, it was noted that few squatters have established small-scale businesses and temporary structures on the road reserves in towns such as Modogashe and Habasweini. These squatters will need to be evicted from the road reserve in order to pave way for construction of the proposed road project. 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. This impact will be low value of 1. The RAP section below gives a summary of the recommendations on resettlement of the possible PAPs.

### 6.3.13 Spread of STD, HIV and AIDS

The residents along the proposed road corridor expressed concern that there would be an increase in 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 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 moderate hence value of 2.

### 6.3.14 Interference of Existing Development Infrastructure

During the field survey, it was noted that the proposed project would interfere with other infrastructural public utilities already existing along the proposed road corridor such as power lines. In Habasweini town, a majority of power poles and lines are existing in the road corridor. These lines will need to be relocated during the construction of the road. This impact will be moderate hence value 2.

### 6.3.15 Insecurity

There were concerns that due to an influx of many people as construction workers at the project, insecurity is likely to increase. There will be increased risk of poaching of wild animals especially giraffes, dikdiks and gazelles. Also, construction workers may be attacked by wild animals like hyenas and foxes which are prone in areas where the proposed road passes. This impact will be low hence value of 1

### 6.3.16 Cultural changes

The road traverses land inhabited by Somalis (Ogaden and Ajuran) and Boranas 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 of the area;
- Increased in undesirable sexual and social interaction in the area.

### 6.3.17 Boundary Disputes

There is a likelihood of boundary conflicts between Isiolo and Garissa Counties. People in Garissa County want the road to be the boundary of the two counties while people of Isiolo County believe that the road is in their County. This impact will be low hence value of 1.

### 6.3.18 Delays in Transportation

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. This impact will be low hence value 1.

### 6.3.19 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 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.

### 6.3.20 Occupational Safety and Health

The Occupational safety and health issues associated with the construction and operation of the proposed road will include the physical hazards, chemical hazards and noise physical hazards. Chemical hazards in road construction, operations, and maintenance activities will principally be associated with exposures to road construction materials, dust during construction; exhaust emissions from heavy equipment and motor vehicles during all construction activities (including during work in tunnels or in toll collection booths). 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 power lines, falls from machinery or structures, and risk of falling objects. There is also a possibility of accidents when transporting workers to the construction sites. This impact will however be low.

### 6.3.21 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, 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 pedestrian safety, traffic safety, and emergency preparedness.

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. Collisions and accidents can 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 likely to be greater in the future as vehicular traffic is set to increase several fold. The impact scale is however considered to be significant.

## 6.4 Resettlement Action Plan (RAP)

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.

The key findings from the study were:

An estimated **125** structures will be affected along the entire project corridor. These structures are found within the towns of Modogashe and Habasweini. The estimated cost for these structures is **30,800,000 KES.** In Samatar the structures are not situated close to the proposed project road and therefore do not lie within the proposed Right of Way (RoW).

**Table 11: Possible list of affected structures in Modogashe and Habasweini towns**

| Town | Number of Structures | Total Approx. Cost (Kshs) |
|---|---|---|
| Modogashe | 60 | 12,750,000 |
| Habasweini | 65 | 18,050,000 |
| **Grand Total** | **125** | **30,800,000** |

An estimated **7** electricity poles will be affected in Habasweini town carrying low voltage electricity lines.

An Abbreviated RAP (A-RAP) report is recommended for the proposed Modogashe-Habasweini-Samatar (68km) road project. The World Bank OP 4.12 on involuntary resettlement paragraph 25 recommends that an abbreviated RAP should be conducted where there are minor impacts on the displaced population or when fewer than 200 people are displaced as in this project. In order to capture more comprehensive details on PAPs and their entitlements. The abbreviated RAP should cover the following;

i. A census survey of displaced people and valuation of assets

ii. Description of compensation and other resettlement assistance to be provided

iii. Consultations with displaced people about acceptable alternatives

iv. Institutional responsibility for implementation and procedures for grievance redress

v. Arrangements for monitoring and implementation; and

vi. Timetable and budget

It is important to note that the road will be designed and constructed along the existing

alignment, minor re-alignments effected appropriately. 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 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) ……..and*

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

***" 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 accordance 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 buildings,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 whatsoever to the said Licenced Sites, hereditaments or premises or any part thereto or enjoyed therewith, for the duration of the Project Team and, for the 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 centres. 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, Modogashe and Habasweini centres having a restricted 25m reserve.*

Additionally**,** 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.

## 6.5 Positive Environmental and Social Impacts during Operation Phase

The following were the positive environmental and social impacts for the proposed Modogashe–Habasweini-Samatar road project during the 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 whereas for the indirect employment, 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. This impact will be very high hence value 4.

### 6.5.2 Improved Local Socio-Economy

Respondents who were interviewed acknowledged that the proposed road will contribute immensely to the development of business at the trading centers 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 sale 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. This impact will be very high hence value 4.

### 6.5.3 Increased Security

The area where the road traverses over the years has been known for insecurity and cattle rustling. The road will make it easier for road patrols and security operations to be conducted in the area. Additionally, the road will lead to an improvement in the communication infrastructure as such making it easy for the relaying of intelligence reports. The impact will be very high hence value 4.

### 6.5.4 Provision of a Cheaper and Faster Means of Transport

During the field survey, the respondents were positive that the proposed road project will provide a faster and cheaper means of transport for cargo trucks, passengers and personal cars, between Isiolo and Wajir counties. This will considerably reduce additional travelling and transportation costs being incurred currently and improve the current transport situation along the road. During rainy season the road is rendered impassable hence tarmacking will solve this problem. Coming with the project are bridges and associated road infrastructure which shall be constructed to 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 Revitalization of Large Scale Agriculture in the Area

The project area is a pastoralist community. The farmers are largely livestock keepers (Plate 29). The area leads in the supply of livestock products in the country. However, the up scaling and growth of this farming has been hindered by the poor transportation network in the region. Therefore, the construction of the proposed road project in the area will offer numerous opportunities for farmers to upgrade their business and hence lead to the improvement of agriculture. There also exists an export business for gums and resins. This impact will be very high hence value of 4.

***Plate 25: Goats and Camels in the project Area***

*(Source: AWEMAC)*

### 6.5.7 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. Paving of the road surface with bitumen

will eliminate dusty conditions experienced by users and villages located along the proposed road project. This impact will be high hence value 3.

### 6.5.8 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; the standard speed of the road will be 80 Km/hr - 100 Km/hr and is likely to induce significant generation of 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.

## 6.6 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 80-100km/h. Being a pastoralists zone, livestock cross the road for pasture and water. The availability of wildlife like giraffes, dikdiks, ostriches, gazelles and gerenuk along the project road may also lead to increased accidents. Considering the above mentioned speed, there is a likelihood of possible accidents along the road, and more especially near villages. Road bumps, rumble strips and signage needs to be provided throughout the road length and especially in towns and villages such as Modogashe, Habasweini, Skanska, Kanjara, Legdima and Samatar 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 80-100km/hr. This impact will be moderate hence value of 2.

### 6.6.3 Generation of Solid Waste

Solid waste generation during operation and maintenance activities will include earthen materials, 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 Energy Consumption

The construction of the proposed Modogashe-Habasweini-Samatar road project is expected to lead to an increase in traffic movement between Isiolo and Wajir counties 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 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 operational phase 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. The storm-water management plan specified in this report should be observed. This impact will be high hence value 3.

### 6.6.6 Soil Quality Degradation due to Oil Spills

The increase in the fuel stations due to the increase in the traffic, oil residuals from fuel service stations, motor garage yards, solid waste dumping and roadside truck parking are anticipated to impact the soil quality. The impact on soil quality from these activities will be cumulative as per the IFC PS 1. The impacts will be significant in towns along the road. This impact will be moderate hence value 2.

## 6.7 Positive Impacts During Decommissioning Phase

### 6.7.1Rehabilitation and restoration of the site to its original status

During the decommissioning of the project the area will be rehabilitated to its original status by revegetating areas where vegetation is cleared, making sure that water ways are cleared to facilitate drainage etc.

### 6.7.2 Employment opportunities

In the event of decommissioning locals will gain employment from the various jobs that will arise.

### 6.7.3 Reduced Environmental Pollution

Motor vehicles emit air, soil and water polluting substances. In the event of road decommissioning, the traffic in the area will reduce and hence considerably reducing environmental pollution

### 6.7.4 Reduced Negative Environmental Impacts of Operation

At the operation phase of the project many negative environmental impacts will arise. Such impacts include; disturbance of wildlife, noise pollution, water pollution, road accidents etc. All these impacts will subsequently reduce when the project is decommissioned.

## 6.8 Negative Impacts During Decommissioning Phase

### 6.8.1 Solid waste generation

A lot of solid waste such as tarmac waste, cement waste, and among other wastes will be generated during decommissioning of the project.

### 6.8.2 Noise and vibration

There will be noise and vibration from vehicles and machines that will be used during the decommissioning phase.

### 6.8.3 Dust emission

Dust will be emitted by moving vehicles and from the decommissioning works through digging and excavating of the tarmac surface.

### 6.8.4 Reduced/ loss of positive impacts to the project

During decommissioning people will lose employment. Drivers, conductors and turn-boys and other bus operators will be affected as a result of the decommissioning. Other positive impacts that will be accrued during the operation phase like fast movement of goods and services, cheaper transportation etc. will also be reduced.

# CHAPTER SEVEN: MITIGATION MEASURES AND MONITORING PROGRAMMES

## 7.1 Introduction

The construction of the proposed Modogashe-Habasweini-Samatar 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 of the Proposed Modogashe-Habasweini-Samatar Road Project

The following section provides a discussion on the mitigation measures that will be undertaken during 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 the Environment Management and Coordination, Noise and Excessive Vibrations Pollution Control Regulations 2009.
vi. Support facilities such as hard rock quarries should adopt controlled blasting techniques, preventing flying rock debris and high intensity vibrations. The management should equally 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 around buildings 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. Collecting storm water and use to de-dust the construction site and the all-weather access roads if volumes stored are sufficient.
v. Comply with personal protective clothing requirement for dusty areas such as dust masks and protective glasses.
vi. Enforce onsite speed limit regulations.
vii. Re-vegetating exposed areas during the operation phase of the project.
viii. Sprinkling water along the diversion routes or earth along the road section.
ix. Slowing the speed of traffic by using bumps and/ or clearly marked road signs may contribute to reducing dust levels.
x. Haulage routes will need to be identified and maintained by watering to minimize the impact of dust.
xi. Dust control mechanisms at the gravel borrow sites through extraction in wet conditions and transport in covered trucks.
xii. Implement dust control measures at the quarry sites and aggregate crushing sites.
xiii. Covering heaps and berms of soil.
xiv. 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 machines, equipment and vehicles have the requisite inspection certificate.
vii. Control the speed of the traffic movement by through adequate policing and monitoring.

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 before start of the project.
xii. Sub-contract a licensed waste handling firm to collect solid wastes on regular basis and dispose off in approved dumping sites.
xiii. Drainage outfalls should be properly constructed to reduce the erosion from surface runoff and storm water.
ix. Comply with provisions of the 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 Environment Management and Coordination, Waste Management and Water Quality Regulations 2006.

### 7.2.6 Minimizing 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 Ewaso Nyiro Wetland.
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 water 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 comply with the National Sand Harvesting guidelines provided 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 as well 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 wetlands, water pans and boreholes.
ii. Provide diversion channels for rivers to avoid complete blockage during construction of bridges and culverts.
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.

### 7.2.10 Minimizing Increased 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. Separate EIAs should be conducted for camps, borrow pits, quarries and dams.
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 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 Disruption and Loss of Businesses in Modogashe and Habasweini Towns

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.
vii. Put in place a grievance redress mechanism as pointed out below

#### *7.2.12.1 Grievance Redress Mechanism*

A grievance mechanism provides a way to reduce risk for the proposed project, offers communities an effective avenue for expressing concerns and achieving remedies, and promotes a mutually constructive relationship. A well-functioning grievance mechanism:

- Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting;
- Builds trust as an integral component of broader community relations activities; and
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

Within the proposed Modogashe-Habasweini-Samatar road project, the following principles need to be established to ensure the effectiveness of the GM:

- Commitment to fairness in both process and outcomes.
- Dedication to building broad internal support across project lines.
- Mainstreaming responsibility for addressing grievances throughout the project, rather than isolating it within a single department.
- Willingness by KeNHA to visibly and sincerely champion the grievance system.

The design of this Grievance Mechanism is aligned to international best practice and guidelines and has taken the following factors into consideration:

- Proportionality: Scaled to risk and adverse impacts on affected communities
- Cultural appropriateness: Taking into account culturally appropriate ways of handling community concerns.
- Accessibility: Clear and understandable mechanism that is accessible to all segments of the affected communities at no cost.
- Transparency and accountability: To project affected stakeholders at field level.
- Appropriate protection: Prevents retribution and does not impede access to other remedies.

According to the proposed project, a grievance or complaint includes any communication that expresses dissatisfaction, in respect of the conduct or any act of omission or commission or deficiency of service and in the nature of seeking a remedial action but do not include the following:

- Complaints that are incomplete or not specific in nature;
- Communications in the nature of offering suggestions;
- Communications seeking guidance or explanation.

Anticipated grievances in the proposed project area are especially in relation to disagreements on the relocation assistance values.

### *7.2.12.2 Process of registering and Addressing Grievances*

Dissatisfactions may arise during the process of compensation for a variety of reasons, including disagreements on the compensation values during valuation of assets, controversial issues on property ownership etc. To address the problem of PAPs during implementation of compensation, a Grievance Redress Committee (GRC) will be established in project affected area.

The composition of the Grievance Redress Committee is as shown below:

- Representative of local Administration (Chairperson)
- Representative of Land Administration (Secretary)
- Representatives of local Elders (Members) in the respective affected areas

The main function of the committee would be arbitration and negotiation based on transparent and fair hearing of the cases of the parties in dispute between PAPs and the implementing agencies. The committee gives solution to grievances related to compensation amounts, delays in payment of compensation or provision of different type of resettlement assistance.

Timely redress of grievances is important in ensuring satisfactory implementation of resettlement and completion of the project on schedule. The means of grievance redress have to be accessible and credible to reduce project resistance. This section proposes a Grievance Management Mechanism (GMM) to ensure that all complaints are addressed fairly and respectfully. A checklist of issues considered in the design of grievance procedures for the project corridor included the following:

- An inventory of any reliable conflict mediation organizations or procedures in the project area and an assessment to determine if any can be used instead of having to create new ones.
- Inclusion in the list of affected person. Dispute of the disclosed list of affected persons.
- A review of grievance redresses mechanisms for simplicity, accessibility, affordability, and accountability. Mechanisms such as use of oral means and in the local and national languages were prioritized and proposals on ways to impose explicit time limits for addressing grievances. Appeal procedures were specified, and suggestions made on how information needs were to be made available to the Project Affected Persons (PAPs).
- Any new committee to be created to address grievances would need to be given the authority to resolve complaints. It was proposed that such a committee include representatives of PAPs, as well as project officials and staff from other agencies with a substantial role in road construction resettlement activities.
- A Complaints Form, a Grievance Acknowledgement Form and Grievance Resolution Form should be introduced and dully filled by the involved parties.

### *7.2.12.3 Receiving Grievances*

The channels of receiving grievances will include:

- At KENHA Level
  - Project Coordinating Team Level
  - Project Implementation Team Level
- County Government

#### *7.2.12.3 Steps in Dealing with Grievances*

a. Formal complaint received in writing (letter/email) or at the grievance desk within the project area.
b. Recording of complaint in standard form and grievance register and log.
c. Project supervisor receives the complaint and assigns to respective grievance committee at community level (PAP Committee).
d. Grievance committee reviews the complaint, verifies, investigates and takes action (if complaint is valid, resolves or passes it on to the Project Implementation Committee).
e. Project Implementation Committee resolves and closes the complaint.
f. Feedback to complainant within the stipulated timeframe.

#### *7.2.12.4 Mechanism for Appeal*

Disputes not resolved by the GRC may be referred by KeNHA to a registered and licenced Arbitrator practising in Kenya and the arbitration shall be governed by the Kenya Constitution 2010, the Arbitration Act (Chapter 49 of the Laws of Kenya).Arbitration agreements shall be enforced by the courts, which have the power to refer a dispute to arbitration.

If the PAP is still not satisfied with the settlement after formal arbitration, other legal redress mechanisms may be sort such as appealing in court through litigation. This should however be a last resort mechanism to avoid dragging the project, since project implementation will not commence until all major public grievances are addressed satisfactorily.

#### *7.2.12.5 Closure of Grievance*

Every grievance shall be disposed off within a period of thirty (30) days of its receipt and a final reply shall be sent to the complainant, containing details of resolution or rejection of the complaint, with reasons thereof recorded in writing.

A grievance shall be considered as disposed off and closed in any of the following instances, namely:

- When the intermediary or entity regulated by KeNHA or Isiolo and Wajir Counties has acceded to the request of the complainant fully.
- Where the complainant has indicated in writing, its acceptance of the response of the intermediary or entity regulated by KeNHA or Isiolo and Wajir Counties
- Where the complainant has not responded within forty-five (45) days of the receipt of the written response of the intermediary or entity regulated by KeNHA or Isiolo and Wajir Counties.

- Where the grievance redress committee has certified under indication to the subscriber that the intermediary or entity regulated by KENHA or Isiolo and Wajir Counties has discharged its contractual, statutory and regulatory obligations and therefore closes the complaint.
- Where the complainant has not preferred any appeal within fourteen (14) days from the date of receipt of resolution or rejection of the grievance communicated by the intermediary or entity regulated by KeNHA or Isiolo and Wajir Counties.
- Where the decision of KeNHA or Isiolo and Wajir Counties in appeal has been communicated to such complainant.

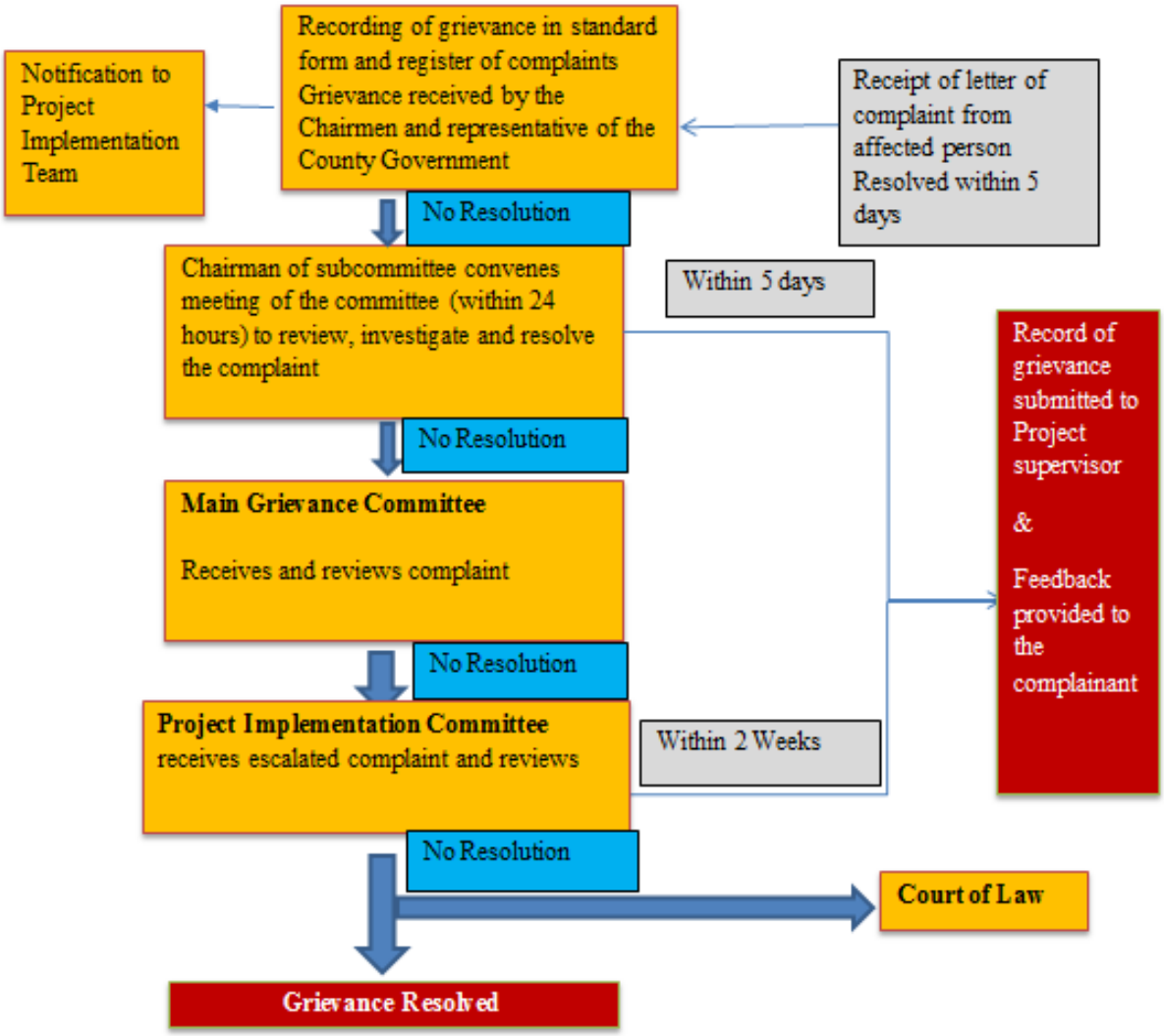


**Figure 6:Grievance Escalation Matrix**

### 7.2.13 Minimizing Increased 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.
iii. Create livestock holding pens at strategic locations along the road that enhances controlled crossing.
iv. Inclusion of road bumps in towns and villages and speed breakers at intersections.
v. Adopt strict policing to ensure that there is no over speeding along the road.

### 7.2.14 Mitigating Reduced Accessibility of Neighbourhood Areas

This should be mitigated as follows:

i. Construct overpasses or underpasses in densely populated areas to facilitate safe crossing of the road.
ii. Provide opening or crossing points in road barriers to allow crossing of pedestrians and livestock.
iii. Provide access roads linking key villages in affected areas.

### 7.2.15 Minimizing the Spread of STD, HIV and AIDS

This should be mitigated as follows:

i. Develop a comprehensive STDS, HIV and AIDs awareness and control programmes 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

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.
v. Avoid the disposition of meat waste and animal carcasses near the campsites and villages.

### 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. Applying all Kenyan Constitutional requirements on gender throughout the project.
ii. Apply all guidelines under the National Gender and Equality Commission Act, 2011.
iii. Adhere to Gender Strategy (FY16-23).
iv. Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages.
v. Incorporate best practices in gender mainstreaming from project partners.
vi. Developing the project sustainably by transforming the distribution of opportunities, resources and choices for males and females so that they have equal power to shape their own lives and contribute to their families, communities, and countries.

### 7.2.21 Minimizing Occupational Safety and Health Impacts

This should be mitigated as follows:

i. Develop and enforce a fleet 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 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 of the Proposed Modogashe-Habasweini-Samatar Road Project

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, mosques 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.
- This can be mitigated by the use of automatic 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 Storm Water Run-off

The proposed mitigation measures 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 Increased 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.
- 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 Modogashe-Habasweini-Samatar 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 Environmental Risks to the Project

In any project, there are risks associated with it during the project cycle. For the proposed Modogashe-Habasweini-Samatar road project, the following environmental risks were identified and some recommendations to reduce their occurrence are outlined.

### 7.4.1 Flush Floods along the road corridor

The project area is characterised by seasonal rivers. The seasonal rivers are usually impassable during heavy downpour especially from upstream. The project area is also flat and low lying which makes it prone for flooding. The floods 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 the area 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.

### 7.4.2 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.

### 7.4.3 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.

### 7.4.4 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 border. Several cases of terrorism have been reported in the past of terrorism where lives have been lost.

It will be prudent for both the County and National Governments 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 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.

## 7.6 Environmental Monitoring Plan

Environmental monitoring is an essential component of project implementation. An Enviromental 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 Modogashe-Habasweini-Samatar 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. This is represented in the table below.

**Table 12: Environmental Monitoring Plan for the Proposed Project**

| Environmental Component | Parameters to be monitored | Points to be monitored | Frequency of monitoring | Lab Materials and Equipments/Other Requirements | Responsibility | Cost Kshs. |
|---|---|---|---|---|---|---|
| **Water Quality** | pH, Total Suspended Solids (TSS) and Total Dissolved Solids(TDS), heavy metals, oils and grease | Galana Gof, Ewaso Nyiro flood plain, Samatar water pan, 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, Quarrying and Earth Borrowing sites, campsites, towns and villages | 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, campsites | 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(Modogashe, Habasweini), Villages (Skanska, Kanjara, Legdima, Samatar), 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 especially between Skanska and Habasweini, and 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, 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 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 Drainage** | Rainfall volume, topography | Flood prone areas, culverts, water ways, low lying areas | Continuous | Rain-gauge, field survey maps | Contractor and KeNHA | 20,000 per 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 EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

## 8.1 Introduction

This Chapter looks at 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

Modogashe-Habasweini and Samatar 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 the 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:
    i. Landscape scarring creating unpleasant changes in scenery when a gaping hole is left behind due to the excavation;
    ii. Incidences of malaria in the vicinity of pits where drainage was not possible;
    iii. Open un-protected water bodies which pose a potential drowning hazard, particularly for young children;

iv. Increased flow of surface run-off, particularly in areas where the vegetation is removed and is not re-vegetated.

## 8.3 Alternative Routes

According to the field surveys and stakeholder consultations it was noted that no alternative route is preferred to the existing proposed route. However, it was noted that there could be a slight realignment in Modogashe and Habasweini town to avoid the displacement of people.

## 8.4 Analysis of Alternative Construction Materials and Technology

The proposed road project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The road surfaces sub structure and road infrastructure will be made using locally sourced materials that meet the Kenya Bureau of Standards requirements.

Rainwater should be harvested and be used in construction activities and supply to labour camps for flushing toilets and other non-domestic activities. Community members should also be encouraged to harvest rain water not only as a means to supplement the water supplied but also to help reduce pressure on the drainage structures. Heavy use of timber and wood during construction should be discouraged to minimize destruction of natural resources. The exotic tree species should be preferred to indigenous species in the construction of the project components where need will arise as they can be replanted with ease.

Asphalt mixers, crushers and other construction equipments and machineries should be incorporated with pollution control devices like dust arrestors/precipitators, emission control, noise abatement devices and desulfurization devices. The equipments and vehicles should have highest levels of combustion efficiency, capability to use cleaner fuels like biofuels and should have enhanced safety features.

## 8.5 Solid Waste Management Alternatives

A lot of solid waste will be generated from the proposed development. An integrated solid waste management system is recommendable. First, the proponent will give priority to reduction at source of the waste materials. This option will demand a solid waste management awareness programme in the management and the workers. Notices for proper waste management/handling may be posted at strategic places for the sake of visitors in the workers' camps. Secondly, Recycling, Reuse and compositing of the waste will be the second alternative in priority. This will call for a source separation programme to be put in place especially in the kitchen section. The recyclables will be sold to waste buyers within County. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, sanitary land filling will be the last option for the proponent to consider.

## 8.6 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, Isiolo and Wajir it 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 Modogashe and Habasweini towns as discussed in detail in the Design report.

# CHAPTER NINE: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

## 9.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESMP) that will need to be implemented by the proponent/contractor to prevent or reduce significant negative impacts to acceptable levels. The ESMP is developed in accordance to Principle 4 of the Equator Principles. Principle 4 requires the client to develop an adequate Environmental and Social Management Plan to address the impacts of the proposed project. All the project components support infrastructure are all considered when this ESMP was developed. Environmental management plans for all project phases has been outline to cover:-

- Design and construction Phase
- Operation Phase
- Decommissioning Phase

The following ESMP tables forms the core of this ESMP for the construction, operational and decommissioning phases of the proposed road project. The following tables details all necessary mitigation measures as well as the person 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 periodically and reports prepared and provided at monthly site meetings during the construction phase and quarterly during the operations and maintenance period as required in EMCA 1999. Annual audits will be conducted during both the construction, operation and maintenance phases.

## 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 periodic 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 ESEIA 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 13:Environmental and Social Management Plan**

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| **DESIGN AND CONSTRUCTION PHASE** | | | | |
| ***Possible Displacement of Local Communities, Loss of Properties and Businesses*** | • The affected communities will be compensated appropriately according to existing best practices.<br>• 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.<br>• Ensure that the Resettlement Action Plan is done appropriately professionally. | Contractor/KeNHA | Continuous | 20,000,000 |
| ***Relocation of community /public utilities*** | • Prior notification and consultation to the affected communities and the responsible institutions<br>• All public utilities likely to be impacted, such as gas and/or water pipes, power and/or phone lines etc. must be relocated to suitable places, in consultations with respective agencies. | Contractor/KeNHA | During construction period | 10,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Acquisition of land and property for borrow pits, ,quarries, water ,spoil pits and workmen's camp*** | • Determination of agreeable rates for compensation to affected persons<br>• Separate ESIA study reports should be conducted for quarries , borrow pits, campsites and water pans | Contractor/KeNHA | During construction period | 5,000,0000 |
| ***Noise Pollution and Excessive Vibrations*** | • Sensitize drivers of construction vehicles and machinery operators to switch off engines or machinery that are not being used.<br>• Ensure that all vehicles and construction machinery are kept in good condition all the time to avoid excessive noise generation.<br>• Ensure that all workers wear ear muffs and other personal protective gear/equipment when working in noisy sections.<br>• Ensure machines are switched off when not in use.<br>• Undertake loud noise and vibration level activities during off-peak hours during the day (i.e. between 8.00 am and 5.00 pm). | Contractor/KeNHA | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Air Pollution due to Dust Generation and Air Emissions*** | • Consideration of design options for the reduction of traffic congestion.<br>• Sprinkling of water on dry and dusty surfaces regularly including the access roads.<br>• Use of waste water to sprinkle at the construction site so as to reduce excessive dust.<br>• Adherence to personal protective clothing such as dust masks.<br>• Enforce onsite speed limit regulations.<br>• Ensure machines and vehicles are properly and regularly maintained. | Contractor/KeNHA | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Solid Waste Generation*** | • 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;<br>• Incorporating recyclable materials to reduce the volume and cost of new asphalt and concrete mixes.<br>• Collecting road litter or illegally dumped waste and managing it according to the recommendations in the General EHS Guidelines.<br>• Provision of bottle and can recycling and trash disposal receptacles at parking lots to avoid littering along the road.<br>• Collecting animal carcasses in a timely manner and disposing them through prompt burial or other environmentally safe methods.<br>• 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.<br>• Management of all removed paint materials suspected or confirmed of containing lead as a hazardous waste;<br>• Grinding of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses. | Contractor/KeNHA | Monthly | 150,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Contamination of soil by fuels and lubricants*** | • Vehicle, machinery, and equipment maintenance and refueling will be carried out so that spilled materials do not seep into the soil.<br>• Fuel storage and refilling areas will be located at least 300 m from drainage structures and important water bodies.<br>• 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 activities.<br>• Oil traps will be provided for service areas, toll station areas, parking areas, and within drainage systems for bridges.<br>• All spoils and wastes will be disposed of as per approved disposal plans in wastelands, in consultation with communities.<br>• Scarified bituminous wastes will be disposed of at approved sites with impervious linings. | KeNHA/Contractor | Daily | 10,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***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<br>• 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.<br>• Any incidental damages like, soil trampling and damage to herbs, shrubs, and grasses will be kept to a minimum. | Contractor | Quarterly | 3,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Energy Consumption*** | • Promote the use of solar energy and energy efficient bulbs in workers base camps and for street lights in towns situated along the highway.<br>• Switch off lights when not in use.<br>• Install electricity meters to monitor the consumption of electricity in workers camps.<br>• Ensure construction machineries and trucks are well maintained.<br>• Use energy-efficient construction machineries and trucks during construction phase of the project.<br>• Avoid routing the highway on very steep sections. | Contractor/KeNHA | Monthly | 150,000 |
| ***Contamination of water sources by petrochemicals*** | • Traps will be provided at fueling points to prevent water contamination.<br>• Embankment slopes leading to water bodies will be modified and screened so that contaminants do not mix with water | KeNHA/Contractor | Monthly | 1,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Discharge of Wastewater, Sewage and Degradation of Water Quality*** | • Construct communal septic tank linked to a constructed wetland system.<br>• Promote recycling of wastewater.<br>• Install meters in premises to control consumption of water.<br>• Ensure wastewater is channeled and treated in sewerage plants.<br>• Ensure regular maintenance of plumbing system to avoid spillage of wastewater.<br>• Discharge of partially treated sewage into the sewerage system.<br>• Ensure regular maintenance of plumbing system and septic tanks to avoid spillage of raw sewage. | Contractor/KeNHA | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Water Abstraction and Consumption*** | • Install water conserving taps and toilets.<br>• Install gutters on the roof of houses in workers camps to harvest rain water.<br>• Construct underground reservoir for storage of harvested rainy water.<br>• Drilling of a borehole to supplement water supplied by water companies.<br>• Harvest surface runoff and use it for landscaping purposes. | Contractor/KeNHA | Monthly | 150,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Modification of hydrology of ASALs*** | • Control excessive abstraction of water from rivers and wetlands.<br>• Avoid complete blockage of river channels during construction of bridges and culverts.<br>• Re-open all blocked river channels after construction of bridges<br>• Quarries and pits for extraction of road construction materials to be used as water harvesting sites.<br>• Surface runoff on the sides of the highway should be channeled in areas with gentle slopes to erosion of the road sides.<br>• Construct over passes and bridges in areas occupied by rivers and wetlands. | Contractor/KeNHA | Monthly | 150,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Storm water generation and impact on drainage*** | • Use of storm water management practices that slow peak runoff flow, reduce sediment load and increase infiltration.<br>• Use of vegetated swales ,filter strips, terracing, check dams, detention ponds or basins, infiltration trenches and infiltration basins.<br>• Regular inspection and maintenance of permanent erosion and runoff control features.<br>• Paving in dry weather to prevent runoff of asphalt or cement materials. | Contractor/KeNHA | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Water conflicts with the local community*** | • Advance measures to prevent any damage to water bodies will be avoided at all costs<br>• 'Laghas' should not be interfered with.<br>• Consultations should be made to the local communities to get permission to use water.<br>• The drilled boreholes and mini-dams constructed should be handed over to communities after completion.<br>• Campsites should be constructed closer to villages to make it possible for the access of water and to avoid the sprouting of new villages.<br>• Alternative underground water should be sought.<br>• In water scarcity areas, prior arrangements for construction requirements are done in a manner that communities remain unaffected.<br>• Any community water source like wells and springs etc. if lost will be replaced with alternate sources. | KeNHA/Contractor | Continuous | 4,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Soil Erosion Risk*** | • Ensure surface runoff generated on impervious surface is not channeled directly to steep slopes.<br>• Provide grassed water ways along the access roads.<br>• Construct flow breaks on roadside drainage channels.<br>• Promote harvesting of surface runoff for landscaping purposes. | Contractor/KeNHA | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Loss of Vegetation Cover and Biodiversity*** | • Siting roads and support facilities to avoid critical terrestrial habitat by utilizing existing transport corridors.<br>• Design and construct wildlife access to avoid or minimize habitat fragmentation.<br>• Minimize clearing and disruption of riparian vegetation.<br>• Provide adequate protection against scour and erosion and give consideration to the onset of the rainy season with respect to construction schedules.<br>• Minimize removal of indigenous plant species and replant indigenous plant species in disturbed areas.<br>• Explore opportunities for habitat enhancement through placement of nesting boxes in rights of-way, bat boxes underneath bridges. | Contractor/KeNHA/KFS | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Degradation of borrow and quarry areas*** | • All borrow /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<br>• Haphazard borrowing and quarrying should be avoided<br>• Prior investigation /assessments on the drainage and other environmental aspects should be conducted according to the specifications of the authorities.<br>• borrow pits and quarries should be located far from the settlements<br>• Maximum use of existing quarries, already in operations.<br>• Degraded and barren areas, riverbeds, and wastelands to be used for borrowing materials.<br>• Use of productive lands will be prohibited.<br>• Lands could be selected through Community consultation, and sites subsequently developed into fishponds or other productive purposes.<br>• 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 | KeNHA/Contractor | Quarterly | 10,000,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Loss of Agricultural Land and Crops*** | • Provide full compensation to farmers whose land will be taken over by the proposed highway.<br>• Develop a comprehensive Resettlement Action Plan.<br>• Promote alternative sources of income among local communities. | Contractor/KeNHA/County Governments | Monthly | 250,000 |
| ***Disruption and Loss of Businesses*** | • Provide support to squatters to establish small-scale businesses in other suitable locations in affected towns.<br>• Educate squatters on the need to maintain free road reserve.<br>• Provide comprehensive health and safety education to squatters in affected towns.<br>• Promote other sources of livelihood among the local communities. | Contractor/KeNHA | Monthly | 250,000 |
| ***Road Accidents*** | • Construct pedestrian crossing points with foot bridges in certain key areas.<br>• Create under passes for livestock and wild animals at strategic locations along the highway.<br>• Create parking areas for trucks.<br>• Create bunks in towns | Contractor/KeNHA/KWS | Monthly | 250,000 |
| ***Reduced Accessibility of Neighbourhood Areas*** | • Construct overpasses or underpasses in densely populated areas to facilitate safe crossing of the road.<br>• Provide opening or crossing points in road barriers to allow crossing of pedestrians.<br>• Provide access roads linking key villages in affected areas. | Contractor/KeNHA | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Spread of STD, HIV and AIDS*** | • Develop a comprehensive STDS, HIV and AIDs control programme.<br>• Control of prostitution in main towns situated along the highway in collaboration with the Police and County Governments.<br>• Provision of STDs, HIV and AIDS prevention measures to workers.<br>• 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.<br>• Undertake an integrated system of planning for infrastructure development along the corridor for future developments.<br>• Ensure effective stakeholder participation in the design of the highway. | Contractor/KeNHA/NLC | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Security Risk and Wildlife-Human Conflicts*** | • Thoroughly screen workers, suppliers and distributors.<br>• Ensure 24-hour surveillance by engaging the services of day and night guards.<br>• Install CCTV cameras in strategic locations of the mall.<br>• Accord the local people the first priority in employment.<br>• Ensure close liaison with the local Police Department. | Contractor/KeNHA/KWS | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Disturbance to Wildlife*** | • Siting roads and support facilities to avoid critical terrestrial and aquatic habitat by utilizing existing transport corridors.<br>• Design and construction of wildlife access to avoid or minimize habitat fragmentation.<br>• Avoidance or modification of construction activities during the breeding season and other sensitive seasons or times of day to account for potentially negative effects.<br>• Minimize clearance and disruption of riparian vegetation.<br>• Minimize removal of indigenous plant species, and replant indigenous plant species in disturbed areas.<br>• Explore opportunities for habitat enhancement through reduced clearance to conserve or restore native species. | Contractor/KeNHA/KWS/KFS | Monthly | 250,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Boundary Disputes*** | • Ensure all stakeholders and the public are involved in the planning process.<br>• Obtain necessary permissions and approvals from the County Governments.<br>• Ensure separate EIAs are conducted for specific project activities such as sand harvesting. | Contractor/KeNHA/NLC | Monthly | 200,000 |
| ***Land Acquisition and Involuntary Resettlement of Affected Persons*** | • Ensure proper compensation of the affected persons.<br>• The Resettlement Action Plan should ensure all the affected persons are properly.<br>• Identified and duly compensated according to best practices. | Contractor/KeNHA/NLC | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Occupational Health and Safety*** | • Development of a transportation management plan for road construction that includes measures to ensure work zone safety.<br>• Establishment of work zones to separate workers on foot from traffic and equipment by routing of traffic to alternative roads.<br>• 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.<br>• Training of workers in safety issues related to their activities.<br>• 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.<br>• Barricade the area around which elevated work is taking place to prevent unauthorized access.<br>• Hoisting and lifting equipment should be rated and properly maintained, and operators trained in their use.<br>• Elevating platforms should be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings).<br>• Use of the correct asphalt product for each specific | Contractor/KeNHA | Monthly | 200,000 |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***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.<br>• 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.<br>• Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways.<br>• 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.<br>• Construction of roadside rest areas at strategic locations to minimize driver fatigue.<br>• 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). | Contractor/KeNHA | Monthly | 200,000 |
| | • Prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders. | | | |

| POSSIBLE IMPACTS | MITIGATION MEASURES | RESPONSIBLE PARTY | FREQUENCY/ TIMING | BUDGET (KSHS) |
|---|---|---|---|---|
| ***Gender Discrimination*** | • Apply gender Kenya constitutional requirements throughout the project<br>• Apply all guidelines under the National Gender and Equality Commission Act, 2011<br>• Undertake gender mainstreaming at project design, implementation/ construction, operation and decommissioning stages<br>• Incorporate best practices in gender mainstreaming from project partners | Contractor/KeNHA | Monthly | 200,000 |

# 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 Modogashe-Habasweini-Samatar (68km) shows that indeed the project will pioneer development in North Eastern Kenya.

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

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## APPENDICES

**Appendix A:** HASS Consortium GVR Infra Limited Certificate of Incorporation;

**Appendix B:** Proposed road preliminary design

**Appendix C**: BOQ Cost Estimate Summary

**Appendix D:** Sample Public participation questionnaire

**Appendix E:** Minutes of public meetings

**Appendix F:** List of participants in the public consultation

**Appendix G**: Water analysis results

**Appendix H**: AWEMAC 2017 Practicing License