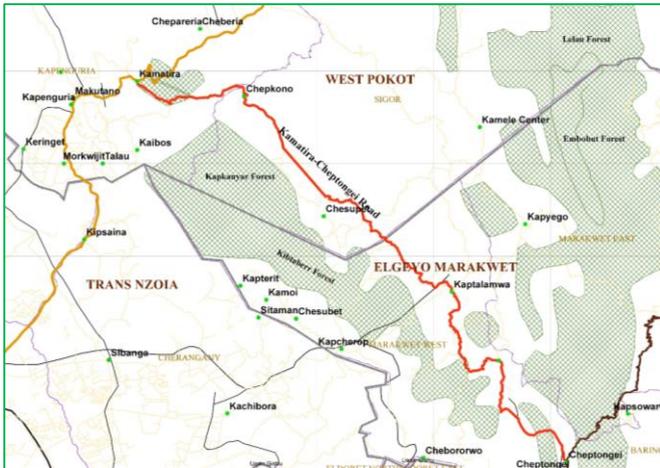


# KENYA RURAL ROADS AUTHORITY (KeRRA)



## ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE PROPOSED IMPROVEMENT TO BITUMEN STANDARDS OF KAMATIRA – CHEPTONGEI ROAD IN WEST POKOT AND ELGEYO MARAKWET COUNTIES



### FINAL ESIA STUDY REPORT

#### CLIENT:

DIRECTOR GENERAL,  
KENYA RURAL ROADS  
AUTHORITY, (KeRRA)  
P.O BOX 48151 – 00100,  
NAIROBI, KENYA

#### CLIENT'S REPRESENTATIVE:

GENERAL MANAGER (PLANNING,  
ENVIRONMENT AND R2000)  
KENYA RURAL ROADS AUTHORITY  
(KeRRA)  
P.O BOX 48151 – 00100,  
NAIROBI, KENYA

#### CONSULTANT:



Renaissance Planning Limited,  
KTDA Plaza 7th floor, Moi Avenue,  
P.O Box 2315-00200, Nairobi,  
Tel: 0727-275-123 or 0722-333-967  
Email: replanningltd@gmail.com  
Website: www.renaissanceplanning.co.ke

AUGUST, 2017

**DOCUMENT AUTHENTICATON**

This report has been prepared for the proponent by:  
Renaissance Planning Ltd,  
Registered Firm of Experts,  
Registration Number 7969,  
P.O. Box 2315-00200, Nairobi,  
Tel: 0727-275-123 or 0722-333-967  
Email: replanningltd@gmail.com  
Nairobi.

Signature: ..... Date: .....

On behalf of Kenya Rural Roads Authority as represented by:  
Director General,  
Kenya Rural Roads Authority,  
P.O. Box 48151 – 00100,  
NAIROBI, KENYA.

Signature: ..... Date: .....

## EXECUTIVE SUMMARY

Environmental and Social Impact Assessment (ESIA) study for development projects is specified in the Second Schedule of the Environmental Management and Co-ordination Act (EMCA 1999) amended. It is through this process that development projects of significant magnitudes must be environmentally acceptable, economically feasible and socially acceptable. It is against this background that the Proponent commissioned Renaissance Planning Ltd to carry out an assessment of the proposed road improvement project as per the National Environment Management Authority (NEMA) requirements. The road improvement project is funded by the Government of Kenya. The Director General- Kenya Rural Roads Authority (KeRRA) is the employer while the General Manager (Special Projects) is in charge of supervision for the Kamatira – Cheptongei Road improvement project.

### **The Study Methodology**

The study approach and methodology adopted included screening, scoping, literature review and data analysis. The consultant also engaged on multi-faceted public consultation process including roadside interviews, household social and environmental surveys using questionnaires and key informant interviews to institutions and lead agencies. Focused Group Discussions and stakeholders' workshop were also conducted.

### **The Legislative Framework for ESIA Study Process**

Part II of the EMCA 1999 amended states that *“every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment”*. Some of the legislations relevant to the proposed project includes the Constitution of Kenya, 2010, Environmental Management and Coordination Act (1999) amended, Explosives Act Cap 115 (1969, 1962), Traffic Act Cap. 403, Water Act Cap. 372, Public Health Act, Cap 242, Occupational Safety and Health Act, 2007, The Land Act 2012, The National Land Commission Act 2012, Sexual Offences Act No.3 of 2006 among others. Some of the relevant regulations for the project includes among others the: Waste Management Regulations (Legal Notice 121), Waste Management Regulations 2006, Water Quality Regulations 2006, and the Noise and Excessive Vibration Pollution Control Regulations 2009 (Legal Notice 61). The legislative framework also includes the National and International Policies and Conventions.

### **The Project Description**

The Kamatira – Cheptongei Road improvement project measures approximately 81 km long and traverses West Pokot and Marakwet Counties. The road from Kamatira Junction (JcnA1) to Kapsait is in West Pokot County and measures approximately 39.5 Km, while the section from Kapsait to Cheptongei junction is in Elgeyo Marakwet County and covers a length of approximately 41.5Km.

### **The Environmental and Social Management Plan (ESMP)**

The strategies that were used for impact mitigation are avoidance, reduction and remedy. There should be no interference with community cultural sites and where it's inevitable, community elders must be consulted. The location of all the waste (liquid and solid) disposal facilities in the camps should be done such that pollution of surface and groundwater sources is avoided. Waste materials from all the road works should be safely disposed. It is recommended that Sisal Tex or Hessian Cloth rather than Polythene sheets be used for curing the road surface to minimize negative environmental impacts or any other Best Available Technology. On sections with high fills along the roadside,

gabions, gabion mattresses and retaining walls, water intercepting ditches, outfall drains and masonry rubbles have been recommended to prevent slope failure and soil erosion. Quarry sites and other material borrow sites should be appropriately fenced off and an access gate erected to prevent unauthorized access. Top soil (approximately 30cm) will be piled for use in rehabilitation of diversion routes.

To guard against occupational hazards and avoidance of air pollution through noxious emissions, all construction machines and equipment should be kept in good working conditions through regular servicing and maintenance. Fully equipped First Aid kits should be availed on site. Construction sites, transportation routes and materials handling sites should also be water-sprayed on dry and windy days at least three times a day, especially if these sites are near sensitive receptors, such as shopping centers, health facilities, learning institutions and homes. To avoid conflicts over water resources, water must be economically used and where scarcity or drought persists, the contractor should drill boreholes to augment the current water supply.

The proposed road improvement project will bring about reduced travel periods, reduced cost of travel and improved accessibility. These will positively impact on access to markets, schools, health and administration centers and ensure speedy delivery of services like security operations, immunization programs, and other Government activities. The improvement of the road will not only enhance economic growth at the local level but also contribute to the national economy and regional integration. Monitoring progress reports including progress made in implementation of the Environmental and Social Mitigation and Management Plan should be prepared quarterly. Annual Environmental Audit (EA) report should incorporate the findings and recommendations of the quarterly reports.

### **Public Consultation**

Section 17-1 of The Environmental Impact Assessment and Audit Regulations, 2003 requires that an ESIA should “seek the views of any person who may be affected by the project”. Stakeholder meetings were held and the stakeholders briefed on the project background, scope, regulatory requirements and the measures the proponent through the contractor was going to put in place to mitigate the negative impacts from the implementation of the proposed road improvement project. Public consultation meetings were conducted with the affected and interested stakeholders living along the proposed road alignment from Kamatira to Cheptongei. The approach adopted included key stakeholders consultation, public Barazas and administration of individual and institutional questionnaires. Two key stakeholder workshops were held, one in West Pokot County and the other in Elgeyo Marakwet County. In addition, five public meetings (barazas) were held at the trading centres along the road improvement project route.

### **Conclusion and Recommendations**

The ESIA Study Team concluded that the proposed improvement of Kamatira – Cheptongei Road will have substantial positive environmental, social and economic benefits. It will provide efficient transport to meet projected present and future demands. It will not only enhance economic growth at the local level but also at the National level and also lead to the regional transport integration. Though some negative impacts on the environment will be significant, they can be effectively mitigated as indicated in the Environmental and Social Management Plan (ESMP) in this report. It is therefore recommended that the project can be approved by NEMA as per the ‘Authority’ discretion.

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## LIST OF ABBREVIATIONS

ACC	:	Assistant County Commissioner
AIDS	:	Acquired Immune Deficiency Syndrome
ARE	:	Assistant Resident Engineer
BoQ	:	Bill of Quantities
CBOs	:	Community Based Organizations
CRO	:	County Road Overseer
EA	:	Environmental Audit
EHS	:	Environmental Health and Safety
EIA	:	Environmental Impact Assessment
EMCA	:	Environmental Management Coordination Act
ESIA	:	Environmental and Social Impact Assessment
ESMMP	:	Environmental, Social Monitoring and Management Plan
FGD	:	Focused Group Discussion
GoK	:	Government of Kenya
HIV	:	Human Immuno- Deficiency Virus
ILO	:	International Labour Organization
KAPAP	:	Kenya Agricultural Productivity and Agribusiness Project
KeRRA	:	Kenya Rural Roads Authority
KRB	:	Kenya Roads Board
MCA	:	Member of County Assembly
MoH	:	Ministry of Health
MoR	:	Ministry of Roads
MP	:	Member of Parliament
NEAP	:	National Environment Action Plan
NEMA	:	National Environment Management Authority
NGOs	:	Non-Governmental Organizations
PPE	:	Personal Protective Equipment
RE	:	Resident Engineer
RM	:	Regional Manager
STECOL	:	SinohydroTianji Engineering Company Limited
STIs	:	Sexually Transmitted Infections
TORs	:	Terms of Reference
OSH	:	Occupational Safety and Health

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Project Background**

##### **1.1.1 The Road Improvement Project**

Kenya Rural Roads Authority (KeRRA) (Proponent) engaged Renaissance Planning Ltd (Consultant) to undertake Environmental and Social Impact Assessment Study of Kamatira – Cheptongei Road Improvement Project located in West Pokot and Elgeyo Marakwet Counties. This ESIA Study report is therefore for the above named road.

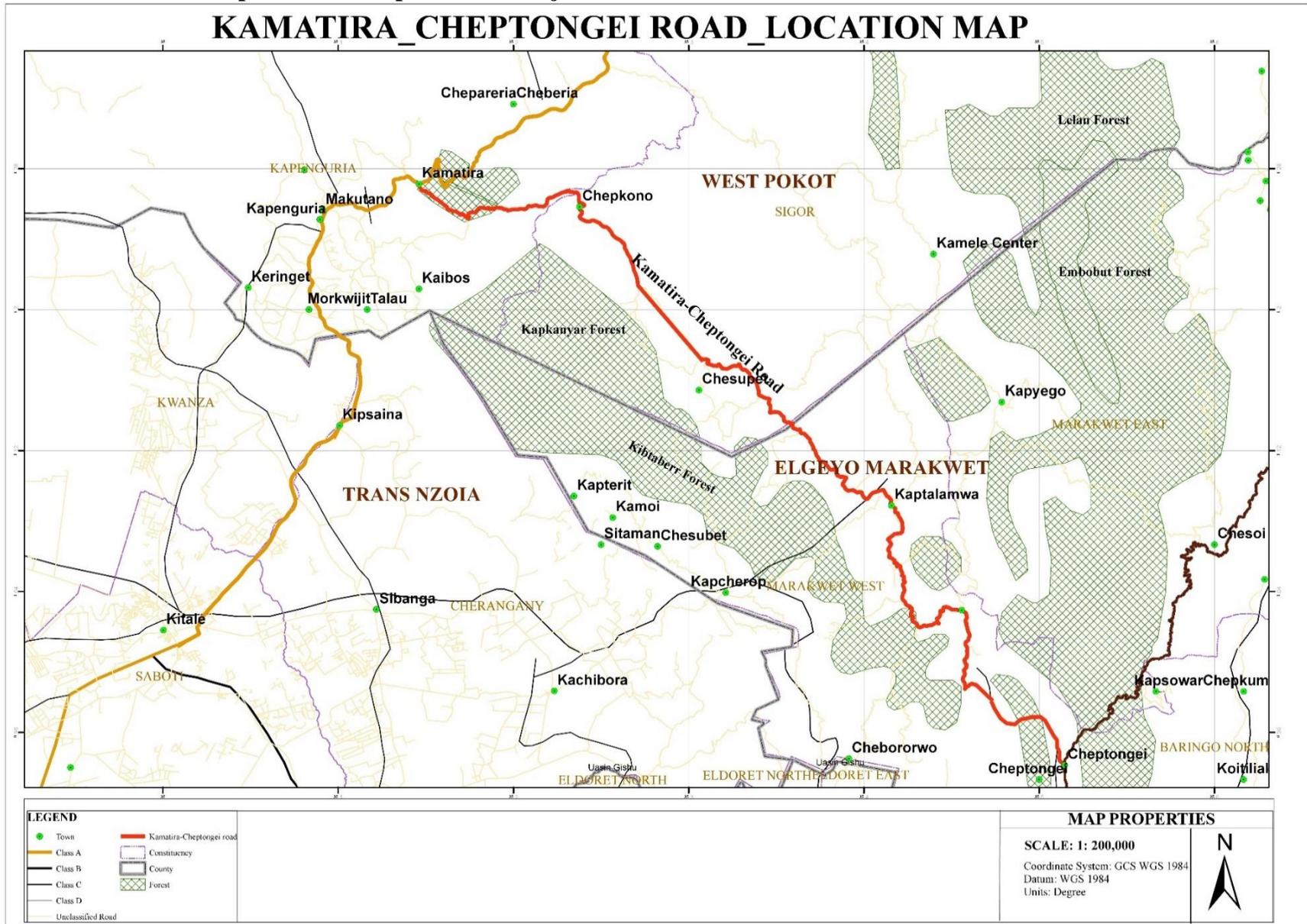
##### **Description of proposed road improvement project**

The Kamatira – Cheptongei Road improvement project measures approximately 81 km long and traverses West Pokot and Elgeyo Marakwet Counties. It commences at Kamatira junction (Jcn A1), off the Kitale - Lodwar road and approximately 15 kms from Makutano Township which is the County Headquarters for West Pokot. The route extends in a North Eastern direction passing through Paraywa, Chebyamit, Kabichbich, Kapsait and into Elgeyo Marakwet County. It also traverses Kapsait, Lobot, Kimnai, Makutano, Yemit, Kapserbet terminating at Cheptongei Trading Centre.

The road is expected to link Iten- Kapsowar Road (A109/D519) at Cheptongei shopping centre. The road from Kamatira Junction (JcnA1) to Kapsait lies in West Pokot County and measures approximately 39.5 Km; while Kapsait to Cheptongei junction section lies in Elgeyo Marakwet County and measures approximately 41.5Km.

Map 1 below shows the route plan for the proposed road improvement project:

Map 1: Route Plan of the Proposed Road Improvement Project



Source: Kenya Roads Board Website

## **1.2 The Scope of Road Improvement Works**

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

- a) Site clearance and top soil removal.
- b) Earthworks.
- c) Provision of Natural Gravel Material of CBR >30% for sub-base to a finished thickness of 150mm or as instructed by the Engineer. On shoulders and widening.
- d) Provision of cement improved material for base (CBR >160%) to a finished thickness of 150mm or as instructed by the Engineer. On shoulders and widening.
- e) Repair and crack sealing of existing pavement.
- f) Provision of 80mm DBM base on carriageway and shoulders.
- g) Provision of surface dressing of first seal using 14/20 chippings on the carriage-way.
- h) Provision of surface dressing of second seal using 6/10mm chippings on the carriage-way.
- i) The carriageway shall be 6.0m wide with shoulders (1.0m wide) constructed with the material and thickness for sub-base and base as above.
- j) Construction of standard pipe culverts and the improvement of other drainage and soil erosion protection work.
- k) Relocation of services as necessary.
- l) Installation of road furniture.

## **1.3 Objectives of the ESIA Study consultancy**

The overall objectives of the Consultancy by Renaissance Planning Limited are to:-

- (a) Take into account environmental, social, economic, cultural and legal considerations in regards to the proposed road works.
- (b) Identify the anticipated environmental impacts of the proposed road works and the scale of the impacts.
- (c) Analyze and evaluate the anticipated impacts of the proposed road works on the physical, biological, social-cultural and social economic environment.
- (d) Identify and analyze alternatives to the proposed road works.
- (e) Evaluate the road design proposed in the engineering report and consider its effects on safety, comfort and convenience of the road users.
- (f) Propose mitigation measures to be taken during and after the implementation of the road works.
- (g) Develop an environmental management plan with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of

mitigation measures and the time frame of implementing the measures.

## **1.4 Scope of Consulting Services**

### **1.4.1 Description**

The assignment consisted of:-

- a) Identification and analysis of the anticipated impacts of the proposed road works on the physical, biological, social-cultural and socioeconomic environment.
- b) Review of the existing data on the proposed road works including social and economic activities within the project study area.
- c) Production of an Environmental and Social Impact Assessment (ESIA) Study Report for the proposed road works and seeking the necessary approval for the issuance of a License by NEMA. This shall be in accordance with the general Environmental Impact Assessment guidelines outlined in the Environmental (Impact Assessment and Audit) Regulations, 2003, and administrative procedures issued by NEMA.

### **1.4.2 Detailed Scope of the Consulting Services**

The experts conducted an analysis which detailed the positive and negative effects of the project on the environment, and prepared an ESIA Study report recommending appropriate solutions to minimize any undesirable effects resulting from improvements of the road. The analyses included, but were not limited to the following:-

- (a) Description of the baseline environment;
- (b) Data analysis and evaluation of alternatives;
- (c) Legislative and regulatory framework;
- (d) Determination of impacts of the road improvement project;
- (e) Occupational health and safety concerns;
- (f) Identification and development of management plan to mitigate negative impacts;
- (g) Development of monitoring plan;
- (h) Identification of procedures for winding up of the project;
- (i) Identification of benefits;
- (j) Consultation and public participation;

## **1.5 Justification of the Road Improvement project**

The Kamatira - Cheptongei road already exists as a dirt road and there is no other road that links the market centres where it passes through; the proponent proposes to improve it to bitumen standards. The existing road is class D and has been impeding transport, communication and socio

economic development of the region especially when it rains. Dairy farming is the main source of livelihood in West Pokot County.

Crop farming, mainly growing of maize and potatoes is the major livelihood source in Elgeyo Marakwet. Improvement of this road to bitumen standards will increase the efficiency of produce delivery to various market centres. It will also reduce the losses that are usually incurred due to unmotorable roads; especially for perishable goods.

Some sections of the road are not safe for motorists in terms of horizontal and vertical alignment, visibility and cross-section. These sections will also be redesigned and the appropriate alignments done during the implementation phase of this project. Some of the sharp curves that need realignment include Kimnai just before Kimnai River and Chebulbai shopping centre as shown in plate 1a-b below. The alignment will reduce the rate at which accidents occur. However, realigning the road will require the proponent to acquire land outside the road alignment, an aspect that would not be economically viable for such project. The experts thus recommend erection of rumble strips and bumps to slow traffic as well as road signages notifying the road users on the approaching curve. These measures if properly put in place will help in ensuring the area's road safety.

**Plate 1: Sharp Curves**



**a) Sharp slope – Kimnai on chainage KM 65+100**



**b) Sharp bend – Chebulbai at chainage KM 65+100**

*Source: Field Survey, 2016*

## **CHAPTER TWO**

### **LEGAL, REGULATORY AND ADMINISTRATIVE FRAMEWORK**

#### **2.1 Overview**

The Kenya National Environment Action Plan (NEAP, 1994) demonstrates the Government's recognition of negative impacts on the environment emanating from development projects. The NEAP process underscored the need for environmental assessments culminating in the Sessional Paper No. 6 of 1999 on Environment and Development. The Environmental Management and Co-ordination Act (EMCA) of 1999, was enacted to govern environmental matters in Kenya. The Second Schedule of EMCA lists the projects that are required to undergo ESIA studies in accordance with section 58 (1- 4) of the Act. ESIA studies are guided by regulations contained in the Kenya Gazette Supplement No.56, legislative supplement No. 31 and legal notice No. 101 of 2003. There a number of policies, legal, regulatory, and institutional arrangements governing transport projects in Kenya. They are reviewed in this section and their requirements highlighted. Recommendations are given to ensure compliance by the Proponent.

#### **2.2 National Environment Policy**

The National Environment Policy aims at integrating environmental aspects into national development plans. The broad objectives of this policy include:

- i. Sustainable use of natural resources to meet the needs of the present generation while not compromising their ability to meet the needs of future generations;
- ii. Conservation and management of the natural resources including air, water, land, flora and fauna;
- iii. Optimal use of natural land and water resources in improving the quality of the human environment;
- iv. Promotion of environmental conservation;
- v. Meeting national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

## **2.3 Administrative Framework**

The Government established several administrative structures to implement EMCA. These are:

### **i. The National Environmental Council (NEC)**

The National Environmental Council is responsible for policy formulation and giving direction for the purposes of the Act. The Council also sets national goals and objectives and determines policies and priorities for environmental protection.

### **ii. The National Environmental Management Authority (NEMA)**

The National Environment Management Authority is a state corporate established under EMCA 1999. NEMA has the legal mandate to exercise general supervision and coordination over all matters relating to the environment, and is the principal instrument of the government charged with the implementation of all policies relating to the environment. NEMA's functions include the coordination of various environmental management activities, initiation of legislative proposals and submission of such proposals to the Attorney General, research, investigations and surveys in the field of environment.

NEMA undertakes to enhance environmental education and awareness on the need for sound environmental management. In addition, NEMA advises the Government on regional and international agreements to which Kenya should be a party, and issues an annual report on the state of the environment in Kenya. NEMA is also charged with the responsibility for the execution of the Environmental Impact Assessment (EIA) and Environmental Audit (EA). Other government offices that have been appointed to offer environmental administrative procedures include the County Environment Committee (CEC), Sub County Environment Committee (SCEC), the National Environment Tribunal (NET) and Technical Advisory Committee (TAC).

### **iii. The Standards and Enforcement Review Committee (SERC)**

EMCA also provides for the establishment of the Standards and Enforcement Review Committee (SERC). The committee is responsible for the enforcement of environmental quality standards that have been set by NEMA for various environmental parameters including noise and vibration control standards, water quality standards, waste management standards, among others. The SERC monitors the compliance level of committee of various projects through the Compliance and Enforcement Department of NEMA. The committee ensures pollution control standards are implemented and acts on public complaints on pollution.

### **iv. County Environment Committees**

NEMA has decentralized some of its functions to these committees for ease of access to an environmental redress system by communities at the grass roots. It also enables the County

Environment Committees to conduct quick site visits and review reports of localized proposed project on time.

## **2.4 Legal Framework**

There are a number of statutes in Kenya that relate to environmental concerns. Most of these statutes are sector-specific, covering issues such as public health, protected areas, air quality, soil erosion, endangered species, noise and vibration, water rights and water quality, cultural, historical, scientific and archaeological sites, land use, resettlement, etc.

Application of national statutes and regulations on environmental conservation suggest that the Proponent has a legal duty and responsibility to ensure that the proposed development does not compromise the rights of other to enjoy a clean and healthy environment. Some of the key laws governing the management of environmental resources in the country are hereby discussed however it is worth noting that wherever any of the laws contradict each other, the Environmental Management and Co-ordination Act 1999 prevails.

### **2.4.1 The Constitution of Kenya, 2010**

Article 42 of the Constitution states that every person 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, particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under Article 70. Article 69(2) states that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources. Article 70 (1) states that If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

### **Comments/observations**

- ❖ In an effort to comply with the constitutional requirements, the project Proponent commissioned this ESIA study.
- ❖ The Constitution requires the Proponent to uphold other people's rights and entitlements by putting in place measures to protect the environment throughout the project life (construction; operation and decommissioning phases).

### **2.4.2 Environmental Management and Coordination Act, 1999, Amended**

The Environmental Management and Coordination Act, Cap 387 received assent on 6<sup>th</sup> January 2000 and was gazetted on 14<sup>th</sup> January 2000 and amended in year 2015. The Act correlatively

entitles every person in Kenya to a clean and healthy environment meaning people are entitled by others but they also have a responsibility of ensuring they do not undermine other people's enjoyment of the environment. The main objectives of the Act are to;

- ❖ Provide guidelines for the administration of an appropriate legal and institutional framework for the management of the environment in Kenya.
- ❖ Provide guidelines for environmental impact assessment, Environmental Audit and monitoring, environmental quality standards and environmental protection orders.
- ❖ The second schedule to the Act lists the projects for which an ESIA and EA must be carried out.
- ❖ Section 68 of the Act specifies that accurate records should be maintained and annual reports submitted to NEMA as required.

#### **Comments/observations**

- ❖ According to section 58 of the Act, an Environmental and Social Impact Assessment (ESIA) needs to be carried out on all projects specified in the second schedule of the act as likely to have a significant impact on the environment. This proposed project is considered to fall under the schedule;
- ❖ Part VII section 68 requires project Proponent to carry out annual environmental audits for submission to NEMA in order to determine the level of compliance with the EMP. It is recommended that the project be subjected to statutory Environmental Audits;

#### **2.4.3 Forest Act, 2005**

There are various sections of this Act that provide for guidelines and opportunities for Participatory Forest Management and conservation. These provisions allow for the Chief Conservator; KFS with the approval of the board to enter into agreement with any person for joint management of any forest. Such person(s) so enjoined may be directed to use or refrain from using such forest or any part thereof in a particular manner in order to ensure the conservation of biodiversity.

The Act also allows a member of a forest adjacent community together with other members or persons resident in the same area, to register a community forest association under the Societies Act, which may apply to the Director for permission to participate in the conservation and management of a state forest or local authority forest in accordance with the provisions of this Act. Where there is no management plan in respect of the area, or where the association proposes that there be a new management plan, the application shall be accompanied by a draft management plan.

#### **2.4.4 Way Leaves Act, Cap 292**

Section 3 of the Act states that the government may carry any works through, over or under any land whatsoever provided it shall not interfere with any existing building or structures of an ongoing activity. In the same breath, it indicates in Section 4 that one month notice will be given before carrying out any such works with full description of the intended works and targeted place for inspection. Any damages caused by the works would then be compensated to the owner as per this section. Section 8 on the other hand states that any person who without consent causes any building to be newly erected on a way leave, or cause hindrance along the way leave shall be guilty of an offence and any alteration will be done at his/her costs.

#### **Comments/ observations**

- ❖ The Proponent will be required to comply with the provisions of this Act
- ❖ It was however noted during the site visits that some locals were shifting their fences out of the way leave on their own volition on anticipation of the proposed road works

#### **2.4.5 Explosive Act Cap 115 (1969, 1962)**

The Act regulates the use of blasting explosives and gives conditions of storage and use of explosives. It also licenses explosive experts.

#### **Comment/observations**

- ❖ The Proponent will be required to ensure that the Contractor complies with various provisions of the Act by obtaining the necessary licenses from the Director of explosives
- ❖ The Proponent will be required to safeguard the welfare of the public and the environment in handling of explosives and blasting of rock.

#### **2.4.6 Traffic Act, Cap. 403**

The Act empowers police designated to control traffic to stop vehicles and remove from the road those producing noxious emissions or to charge their owners in a court of law. Every motor vehicle is required to be constructed, maintained and used in a manner that ensures no avoidable smoke or visible vapor is emitted. The Traffic Act further requires that the vehicles shall only use the fuel specified in the vehicle license.

The Traffic Act prohibits the operation of motor vehicles that emit black fumes that pollute the air and cause visibility problems. There is however no standard measure or definition of what constitutes black fumes or visibility problems. Additionally, the Act does not address specific pollutants that are particularly harmful.

### **Comments/observations**

- ❖ During the construction and operation phases, the Proponent will be required to control vehicular pollution by avoiding to the best of its knowledge use of adulterated petroleum products.
- ❖ The Proponent will be required to subject project vehicles to regular servicing and maintenance to ensure they are roadworthy.

### **2.4.7 Water Act Cap. 372**

The Act prohibits water pollution and controls interaction with water resources by prohibiting leaving pollutants in any water supply. The Water Act states that any person who neglects or pollutes any source of supply which is used or is likely to be used for human consumption or domestic purposes, or for manufacturing of food or drinks for human consumption, shall be guilty of an offence.

The Act prohibits among others the unlawful interference with watercourse or body of water and prohibits the release of water without a permit, and specifies penalties for polluting water used for human consumption. Any person who unlawfully throws or conveys or causes to be conveyed any rubbish, dust, refuse, effluent, trade wastes or other offensive or unwholesome matter or thing into or near any body of water in such a manner as to cause or likely to cause pollution thereof, shall be guilty of an offence, punishable by a fine.

### **Comments/observation**

- ❖ The Contractor will be required to obtain permits from relevant authorities in the event of water abstraction
- ❖ The Proponent should put in place adequate measures to prevent the entry of any refuse, effluent or silt in to enter drains and water courses

### **2.4.8 Public Health Act, Cap 242**

Part IX, section 115 of the Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires local authorities to take all lawful, necessary and reasonable practicable measures to maintain areas under their jurisdiction clean and sanitary conditions up to standard and to prevent occurrence of nuisance or condition that can expose workers to injury such as may occur at construction work sites. Such nuisance or conditions are defined under section 188 as wastes, sewers drains or refuse pits in such a state, situated or constructed in the opinion of the medical officer of health to be offensive or injurious to health.

Other nuisance is noxious matter or waste flowing or discharged from any site in to a public street or into the gutter or side channel or nuisance. Additional nuisances are accumulation of materials or refuse which in the opinion of the Medical Officer of Health is likely to harbour rats or other vermin. Part XII section 136 states that all collections of water, sewage, rubbish, refuse and other fluids, which permits or facilitate the breeding or multiplication of pests shall be deemed nuisance and are liable to be dealt with in the manner provided by this Act.

### **Comments/observations**

This piece of legislation is relevant for workmen's camps and sites of concentrated works.

#### **2.4.9 Occupational Safety and Health Act 2007**

The Act sets minimum standards that are to be maintained in workplaces to safeguard health, safety and welfare of workers. These are all aimed at elimination of hazards that may cause injury and losses at the workplace. The Act further requires all workplaces to display the OSHA abstract for all workers to read and remind themselves on how to protect themselves from hazards. The Act also makes it mandatory for occupiers or employers to provide personal protective equipment and all practicable means to prevent injury to workers who are exposed to any potentially harmful substances or conditions.

Even though the Factories and Other Places of Works Act (Cap 514) was repealed, there are regulations which were enacted under the Act which are still operational under OSHA and are relevant to this project. These are:

- ❖ The Factories (Building Operations and Works of Engineering Construction) Rules 1984;
- ❖ The Factories (Eye Protection) Rules 1978;
- ❖ The Factories (Electric Power) (Special) Rules 1978;
- ❖ The Factories and Other Places of Work (Health & Safety Committees) Rules 2004
- ❖ The Factories and Other Places of Work (Medical Examination) Rules 2005;
- ❖ The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005; and
- ❖ The Factories and Other Places of Work (Fire Risk Reduction) Rules 2006
- ❖ The Factories (Wood Working Machinery) Rules 1959

### **Comments/ observations:**

The Contractor will be required to safeguard the welfare of project workers as stipulated in the Act and to comply with all provisions of the Act

#### **2.4.10 Wildlife Conservation and Management Act (CAP 376)**

The enactment of the Wildlife Conservation and Management Act of 1976 established the legal provisions for the new policies on wildlife. The Act specified regulations that were to be enforced

through the Kenya Wildlife Service (KWS) and the Ministry in charge of wildlife. The Act stipulates that all national parks and reserves in Kenya other than private land and local authority land are vested in the State, subject to any rights of the user in respect thereof, which by or under this Act or other written law, have been or are granted to any other person. The Act expressly prohibits handling of wildlife in any form, including trade in animals or their parts, hunting and consumption without a license from KWS.

#### **Comments/observations**

- ❖ The ESIA Study has established that there are no gazetted national parks or reserves in the areas near the project road. There are however forests in the area. Even though it is not documented that there is a significant number of wildlife in the area, it is believed that there are a few wild animals.
- ❖ The Proponent will be required to uphold the provisions of the Act

#### **2.4.11. The Land Act, 2012**

Part II Section 8 provides guidelines on management of public land by National Land Commission on Behalf of both National and County Governments. This law in Section 8(b) stipulates that the Commission shall evaluate all parcels of public land based on land capability classification, land resources mapping consideration, overall potential for use, and resource evaluation data for land use planning. Section 8(d) stipulates that The Commission may require the land to be used for specified purposes subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order or other instrument.

In managing public land, the Commission is further required in Section 10(1) to prescribe guidelines for the management of public land by all public agencies, statutory bodies and state corporations in actual occupation or use. In these guidelines management priorities and operational principles for the management of public land resources for identified uses shall be stated. This in essence means that the Commission shall take appropriate action to maintain public land that has endangered or endemic species of flora and fauna, critical habitats or protected areas. As well the Commission shall identify ecologically sensitive areas that are within public lands and demarcate or take any other justified action on those areas and act to prevent environmental degradation and climate change.

The other relevant part of this law is on Part VIII that deals with compulsory acquisition of interests in land. Under section 107 (1); whenever the National or County Government is satisfied that it may be necessary to acquire some particular land under section 110, the respective Cabinet Secretary or the County Executive Committee Member shall submit a request for acquisition of

public land to the Commission to acquire the land on its behalf.

Section 107 (1) of the Act deals with the compensation issues for any land to be acquired; either by the National or County Governments especially under section 110. A Cabinet Secretary or the County Executive Committee Member is required to submit a request for acquisition of public land to the National Land Commission to acquire the land on its behalf. Where the acquisition violates the constitution and the enabling law, then the request can be rejected. It also states that where an approval has been granted, then the commission shall publish a notice on the same in the Kenya Gazette or County Gazette and also copied to any other person interested in the said parcel of land to be acquired.

Section 111 of the Act calls for prompt and full payment of just compensation to all persons whose interests in the land to be acquired have been determined. It's also important to note that under sections 110 and 143, interested persons shall include any person whose interests appear in the land registry and the spouse or spouses of any such person, as well as any person actually occupying the land and the spouse or spouses of such person. Also, all land to be compulsorily acquired shall be geo- referenced and authenticated by the office or authority responsible for survey at both the National and County Governments.

### **Comment**

This part of the law seeks to preserve and direct management of fragile public land held by the various public bodies for sustainable development. Kenya Rural Roads Authority (KeRRA) is a public body and once land has been acquired for roads, it is vested into their custody as the acquiring body. It's then expected to comply with this law. Also the law on compulsory acquisition of land shall be followed in the event that it will occur. The proponent is required to get necessary authorizations from the National Land Commission as well as following the necessary provisions under Article 40 (3) of the Constitution and enabling laws.

### **2.4.12. The National Land Commission Act, 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 things, manage public land on behalf of the national and county governments, initiate investigations into present or historical land injustices and recommend appropriate redress, and monitor and have oversight responsibilities over land use planning throughout the country. It was officially established under the National Land Commission Act, 2012.

Pursuant to Article 67(2) of the Constitution, the functions of the Commission shall be:

- ❖ To manage public land on behalf of the national and county governments;
- ❖ To recommend a national land policy to the national government;
- ❖ To advise the national government on a comprehensive programme for the registration of title in land throughout Kenya;
- ❖ To conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities;
- ❖ To initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress;
- ❖ To encourage the application of traditional dispute resolution mechanisms in land conflicts;
- ❖ To assess tax on land and premiums on immovable property in any area designated by law; and
- ❖ To monitor and have oversight responsibilities over land use planning throughout the country.

Under the National Land Commission Act, the Commission shall:

- ❖ On behalf of, and with the consent of the national and county governments, alienate public land;
- ❖ Monitor the registration of all rights and interests in land;
- ❖ Ensure that public land and land under the management of designated state agencies are sustainably managed for their intended purpose and for future generations;
- ❖ Develop and maintain an effective land information management system at national and county levels;
- ❖ 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.

### **Comment**

Where there shall be any land acquisition, KeRRA shall involve the commission including settling any land dispute along the road alignment route.

### **2.4.13 Land Registration Act, 2012**

The Act principally concerns the registration of interests in land. This Act shall apply to: (a) registration of interests in all public land as declared by Article 62 of the Constitution; (b) registration of interests in all private land as declared by Article 64 of the Constitution; and (c) registration and recording of community interests in land.

Creation of easement under the Act:

According to section 98, (1) An owner of land or a lessor may, by an instrument in the prescribed form, grant an easement over the land, lease or a part of that land to the owner of another parcel of land or a lessee for the benefit of that other parcel of land.

(3) An instrument creating an easement shall clearly specify:

(a) The nature of the easement and any conditions, limitations or restrictions subject to which it is granted; (b) the period of time for which it is granted; (c) the land, or the specific part of it burdened by the easement; and (d) the land to benefit from the easement, and shall, required by the Registrar, include in a plan that sufficiently defines the easement.

(4) If a co-owner, by a disposition, severs any building or part of it or land separated by a common dividing wall or other structure, whether that wall or other structure is a party wall or other structure, cross- easements of support of the dividing wall or other structure in respect of the severed buildings or land and the owners of the severed buildings or land shall be implied in the disposition and their successors in title shall be entitled to the benefit subject to the burdens of the cross-easements.

(5) There shall be implied in every grant of an easement the grant of all ancillary rights which may be reasonably necessary for the full and effective enjoyment of the grant.

Under the Land Registration Act, 2012, the Commission shall:

- ❖ Constitute registration units in consultation with National and County Governments
- ❖ Determine the form of a land register that shall be maintained, in each registration unit,
- ❖ Appoint a date for geo-referencing plans to be kept in a land registry;
- ❖ Serve as the depository of maps; the office or authority responsible for the survey of land shall submit to the Commission a copy of the cadastral maps for depositing
- ❖ Prescribe (through regulations) guidelines that the registrar shall follow before question has been obtained by fraud.
- ❖ Advise the cabinet secretary in making regulations, rules or prescribing any matters required under this Act and such regulations or rules shall be tabled before Parliament

### **Comment**

The proponent is required to follow the requirements of this Law as it is where any easement may be required along the road alignment.

### **2.4.14. The Penal Code Cap 63**

The Penal Code prohibits the releasing of foul air that can affect human health. It states that anyone who voluntarily violates the atmosphere at any place, to make it noxious to the health of people in

the neighbourhood of a public way is guilty of a misdemeanour and is liable for imprisonment not exceeding two years with no option of a fine. The code prohibits fouling of air by industrialists and manufacturers etc.

Under this code any person who for the purpose of a trade or otherwise makes loud noise or offensive or awful smells in such places and circumstances as to annoy a considerable number of persons in the exercise of their rights, commits an offence and is liable to be punished for a common nuisance through imprisonment not exceeding one year with no option of a fine. It further prohibits the voluntary corruption or fouling of water or public springs or reservoirs, rendering it less fit for its ordinary use.

### **Comments/observations**

- ❖ The Proponent will be required to take the necessary measures to ensure that foul air is not emitted into the atmosphere. Workmen in sections emitting dust or particulate matter will need to be issued with protective masks and respirators.
- ❖ The Proponent will also be required to protect reservoirs and springs and not to contaminate them during construction activities.

### **2.4.15 Sexual Offences Act No.3 of 2006**

The Act defines sexual offences and makes provisions for prevention and the protection of all persons from harm from unlawful sexual acts. The Act describes the types of sexual offences punishable by law and this includes rape, attempted rape, assault, defilement, gang rape, and indecent act with a child or adult, promotion of sexual offence with children, child trafficking, child sex tourism, and child prostitution, child pornography, and sexual harassment, cultural and religious sexual offences among others. Section 8 Sub section 2 states that if the person commits an offence of defilement with a child aged eleven years or less shall upon conviction be sentenced to imprisonment for life.

Section (3) explains that any person who commits an offence of defilement with a child between the age of twelve and fifteen years is liable upon conviction to imprisonment for a term of not less than twenty years. Section 23 warns those in a position of authority, or holding a public office, from persistently making sexual advances or requests which are unwelcome and states that they will be guilty of the offence of sexual harassment and shall be liable to imprisonment for a term of not less than three years or to a fine of not less than one hundred thousand shillings or to both.

### **Comments/observations**

The Act empowers Kenyans to take legal action in the event of a sexual offence. The code of conduct for road improvement project workers should uphold the provisions of this law.

#### **2.4.16 Factories and Other Places of Work Rules, 1984**

These 1984 rules are provided under Legal Notice No. 40. Providers of health, safety and welfare of persons employed in factories and other places of work. The provision requires that all practicable measures be taken to protect persons in places of work from dust, fumes or impurities originating from any process within the work place. The provisions of the act are also relevant to the management of hazardous and non-hazardous wastes, which may arise at the project site. The rules provide for all necessary safety precautions to ensure the health and safety of workers.

The Act further requires all workplaces to have stocked first aid boxes under the charge of trained first aid attendants. The factories (Building Operations and Works of Engineering Construction) Rules of 1984 are more specific on standards and requirements for the construction works. These rules state clearly that it is the duty of the Proponent to ensure health, safety and welfare of workers and authorized visitors to the site.

The rules also state that qualified and experienced persons must be appointed to act as safety supervisors by the Proponent. These persons supervise the enforcement of standards to achieve the objectives mentioned above. The rules have specific sections on excavations, transport, demolitions, formwork and scaffolds, lifting and lifting equipment and other general safety measures.

The Proponent will appoint a reputable contractor who will be responsible in enforcing the requirements during construction and subsequent repairs and maintenance after project completion. Appropriate safety measures proposed include the following: Provision of protective wear for site workers such as overalls, helmets and gumboots; Provision of an onsite standard first aid kit; Diversion of human traffic away from the construction site; Provision of safe scaffolding to avoid accidental fall by site workers.

#### **2.4.17 Environmental (Impact Assessment and Audit) Regulations, 2003**

These are entrenched under section 147 of the EMCA, 1999. They were published in the Kenya Gazette supplement No.56 legislative supplement No.31, legal notice No.101 of 13<sup>th</sup> June, 2003. The regulations provide a framework for conducting ESIA and Environmental Audit and apply to all policies, plans, programmes, project and activities specified in parts IV, V and the second schedule of EMCA 1999.

#### **Comments/observation**

This ESIA is being conducted in conformity with these regulations and EMCA, 1999 and an ESIA report has been prepared for submission to NEMA.

#### **2.4.18 Environmental Management and Coordination (Water Quality) Regulations, 2006**

The regulations provide for sustainable management of water resources including prevention of water pollution and protection of water resources (Rivers, streams, springs bore/holes, wells etc.) in order to protect human health and the environment. All persons are required to refrain from any actions, which directly or indirectly cause pollution. In order to protect water sources from pollution, these regulations place a restriction on the discharge of effluent into water bodies. These regulations were published in the Kenya Gazette supplement No.68 legislative supplement No. 36, legal notice No.120 of 29<sup>th</sup> September, 2006.

##### **Comments/observations**

In line with this regulation, proper disposal measures of effluent and solid waste have been recommended so as to protect water resources from contamination.

#### **2.4.19 Environmental Management and Coordination (Waste Management) Regulations, 2006**

The government has established regulations to provide details on management (handling, storage, transportation, disposal and treatment) of various waste streams which include: domestic, industrial, hazardous, toxic, biomedical and radioactive waste with an emphasis on waste minimization and clean production. The aim of these regulations is to protect human health and the environment; they define the responsibilities of waste generators and the duties and requirements for transportation and disposal of waste. The regulations require a waste generator to dispose waste only to a designated waste receptacle. These regulations were published in the Kenya gazette supplement No.69 legislative supplement No. 37, Legal Notice No.121 of 29<sup>th</sup> September, 2006.

##### **Comments/observations**

The Proponent shall ensure that cleaner production measures are incorporated and that all waste is disposed at NEMA/Local authorities designated sites.

#### **2.4.20 Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009**

Part 2 of the regulations 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 noise will be determined if loud, unreasonable or unusual by factors such as: time of day; proximity to residential area; whether the noise is recurrent, intermittent or constant; the level and intensity of noise; whether the noise has been enhanced in level or range by any type of electronic or mechanical means; whether or not the noise can be controlled without much effort or expense to the person making the noise.

Section 5 of the regulation warns against operating beyond the permissible noise levels while Section 6 gives guidelines on the control measures for managing excessive noises. The regulation states that a day starts from 6.01 A.M. to 8.00 P.M., while night starts from 8.01 P.M. – 6.00 A.M. Construction sites near the silent zones are allowed maximum noise level of 60 dB (A) during the day, whilst night levels are maintained at 35 dB (A). The time frame for construction sites is adjusted and the day is considered to start at 6.01 A.M. and ends at 6.00 P.M while night duration starts from 6.01 P.M. and ends at 6.00 A.M.

Part 3 Provision relating to noise from certain sources states that where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority (NEMA) may impose requirements on how the work is to be carried out including but not limited to requirements regarding; Machinery that may be used and the permitted levels of noise as stipulated in the second schedule and third schedule of these regulations.

### **Comments/observations**

In view of this regulation, the contractor should observe the noise regimes for the different zones especially so for working in areas termed as silent zones which include institutions, and worship places, amongst others. These areas are permitted to exposure of Sound Level Limits not exceeding 40 dB (A) during the day and 35 dB (A) at night.

## **2.5 National and International Policy Framework**

There are several policies in place at the national and international levels to ensure that development projects are both socially and economically sustainable. These policies are discussed below:

### **2.5.1 The Kenya Roads Policy**

The Kenya Road Policy was formulated with an aim of addressing the following parameters:

- ❖ Accessibility: Making it easy to reach destinations
- ❖ Safety: Making travel safer
- ❖ Tackling congestion on the road.
- ❖ Economy: getting value for money and supporting sustainable economic activity in appropriate locations.
- ❖ Integration: ensuring that all road decisions are taken factoring all modes of transport.
- ❖ Environmental impact: Both positive and negative, on both the built and the natural environments, and at the global, regional and local levels.

The road policy further emphasizes on the certain issues of environmental concern by pointing out that road improvement project should be sustainable to the societies where they are built. While acknowledging the positive environmental benefits that the road can bring, possible damage to the

environment should be reduced at the local, regional and global levels. It states that roads construction can be counter-productive as far as emissions are concerned. It can reduce harmful emission by easing congestion but at the same time create an opportunity for the increase of a different set of emission. The policy argues that short-term gains of the project should not obscure long-term damage that may come from the road.

### **2.5.2 The Wildlife Policy (Sessional Paper No. 3 of 1975)**

This is the policy that governs wildlife management in Kenya. Its goal is “to optimize returns from this resource, taking into account returns from other land uses”. The policy not only recognizes economic benefits from tourism and consumptive uses but also the intangible benefits that include aesthetic, cultural, and scientific gains that accrue from conservation of ecosystems and biodiversity.

### **2.5.3 Kenya National Gender and Development Policy (2000)**

The overall objective of the policy is to facilitate the mainstreaming of the needs and concerns of both men and women in national development. The Gender and Development Policy provides a framework for advancement of women’s interests in resource allocation and utilization to ensure greater efficiency. The policy echoes the government’s commitment to implementing the National Plan of Action which is anchored on the Beijing resolutions.

The following are the areas targeted by the policy: Equality before the law-for Kenyan men and women as provided for in the Constitution and under the obligations of the Kenyan State in international law; Equal access to economic and employment opportunities- for both men and women in Kenya; Reducing gender disparity in political participation and decision-making; Sustainable Livelihoods - to remove obstacles to women’s access to and control of productive assets, economic opportunities, and environmental resources; Education and Training - to enhance and sustain measures to eliminate gender disparities in access, retention, transition and performance in education for both boys and girls.

To achieve the highest attainable standard of health for both men and women by addressing gender disparities pertaining to access and use of basic health services and facilities; To increase the participation of women in the media and communications sector and promote gender sensitive portrayal of both men and women in the media; Empowering both men and women to be equal partners in development for an affirmative action to address gender disparities. With regard to the environment, the policy advocates for programmes that take into consideration issues that concern women, men, girls and boys. The policy acknowledges that certain environmental issues have specific relevance to women.

### **Comments/observations**

- ❖ Most job openings in road improvement projects are likely to be more suitable for men due to the nature of the works involving operating heavy machinery and equipment, tasks requiring working at heights or in deep excavations such as quarrying and being absent from home for long hours. Social norms restrict women's sphere of activity but they are also likely to benefit if the contractor employs a quota system that would oversee a certain number of women given employment.
- ❖ Women may also benefit from the influx of people in the area by engaging in small income generating activities.

#### **2.5.4 Kenya National HIV/AIDS Strategic Plan, 2006-2010**

The overarching theme of the strategic plan is social change to reduce poverty and HIV/AIDS. The goal of the plan is to reduce the spread of the HIV virus, improve the quality of life of the affected persons and mitigate its socio-economic impact at the individual, community, sector and national levels. The priority areas for the HIV/AIDS Strategic Plan: Prevention of new infections.

The objective of this priority area is to reduce the number of new HIV infections among both vulnerable groups and the general population. Improving the quality of life of people infected and affected by HIV/AIDS- The objective of this priority area is to improve the treatment and care, protection of rights and access to effective services for infected and affected people by HIV/AIDS in Kenya. Mitigation of socio-economic impact- The objective of this priority area is to adapt existing programs and develop innovative responses to reduce the impact of the epidemic on communities, social services and economic productivity.

### **Comments/observations**

The Proponent recognizes that construction activities influences social behaviour in a manner that may perpetuate the spread of HIV/AIDs. Budgetary allocation should be made to complement sensitization and management efforts of agencies dealing with HIV/AIDs issues in the project area.

#### **2.5.5 National Climate Change Action Plan 2013-2017**

It is widely recognized that climate change is happening and that its effects can be devastating. The Government of Kenya developed the National Climate Change Action Plan to help in tackling the effects of climate change. The Action Plan equips the country to take decisive action in responding to the challenges of climate change by encouraging people-centered development that ensures that climate change actions support achievement of national development goals. This Action Plan guides the country towards a low carbon climate resilient development pathway. The ESIA Study will identify the potential climate change impacts and their mitigation options.

### **Comments/observations**

The proponent is required to follow the action plan by enforcing use of best available technology that reduces emissions of greenhouse gasses and related pollutants.

### **2.5.6 National Climate Change Response Strategy 2010**

Globally, climate change is considered one of the most serious threats to sustainable development. Climate change can affect many sectors such as agriculture, health, forestry, wildlife amongst others and its impacts can be felt by several generations. The National Climate Change Response Strategy puts in place measures to address the challenges posed by climate change and climate variability. The strategy recommends massive awareness campaigns so that the public can be sensitized and mobilized to adapt and mitigate impacts of climate change.

### **Comments/observations**

The strategy recognizes the need to enhance coordination of climate change activities in the country with a view of ensuring climate-proof socio-economic development anchored on a low carbon path.

### **2.5.7 Environmental and Development Policy (Sessional Paper No.6 1999)**

The goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.

### **Comments/observations**

To observe the requirements of this policy, it is recommended that environment friendly practices should be undertaken during project implementation such as:

- ❖ Increasing tree cover and using clean energy to reduce deforestation
- ❖ Taking measures to reduce pollutants leading to pollution of both ground and surface water
- ❖ Rehabilitation of areas of completed works

### **2.5.8 International Conventions and Treaties**

International Conventions and Treaties that are applicable to road improvement project include:

- ❖ The Convention on Biological Diversity (CBD) 1990 is relevant to the proposed development as it will have an impact on plant and animal species. The Convention requires that projects should avoid disturbance of sensitive ecosystems.
- ❖ Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora, 1990 prohibits trading in rare, threatened, endangered or extinct plant and animal species

- ❖ Convention concerning the protection of workers against occupational hazards in the working environment due to air pollution, noise and vibrations.
- ❖ The Convention of Control of Desertification in Countries Experiencing Serious Drought and/or Desertification particularly in Africa (UCCD), 1992
- ❖ United Nations Convention to Combat Desertification (UNFCCC), 1994
- ❖ Convention concerning the Protection of World Cultural and Natural Heritage, 1972

**Comments/observations**

The proposed works should be in tandem with national and international conventions that aims to safeguard the environment and natural resources.

## **CHAPTER THREE**

### **PROPOSED PROJECT**

#### **3.1 The Kamatira - Cheptongei road profile**

The area traversed by the road has a relatively higher population at West Pokot County than in ElgeyoMarakwet County; where a longer proportion of the road runs through forests. The main trading centres along the route from Kamatira junction include Paraywa, Chebyomit, Kabichbich, Kapsait, Lobot, Kimnai, Makutano, Yemit, Kapserebet and Cheptongei. The road between Kamatira junction and Cheptongei trading centre is classified by the Ministry of Roads as a Class D road thus falls under the jurisdiction of Kenya Rural Roads authority (KeRRA). The entire stretch is a murrum road that is marked by undulating land with high hills and valleys; generally described as hilly terrain. In general the road is in a motorable status. However, some sections of the road are near impassable during the rainy seasons.

#### **3.2 Current Road Improvement Status**

The ARE took the consultant through 27 km of the project where road improvement has been completed or is currently ongoing. In 20+500 out of the 27km, road improvement has been completed. The base layer starts at KM 23+200 and ends at KM24+600, while earthworks starts at KM 24+601 and ends at KM 27+000 accounting for the remaining 7Km. The following is the current status of the road improvement project:

##### **3.2.1 Field Findings**

###### **i. Tarmacked road section**

The completed tarmacked road section starts at KM0+300 and ends at KM 20+500. At KM 0+000 to KM 0+300, only preparatory works for the road improvement exercise have been done as seen in plate 2a below. The tarmacking of this section (the first 300 meters) has been impeded by Kenya Power posts that have not been relocated from the road reserve as seen in plate 2b below:

**Plate 2: Preparatory works between KM 0+000 and KM 0+300**



**a) Preparatory Works**



**b) Power posts at the middle of the road – see the circle**

*Source: Field Survey, 2017*

**ii. Base layer section**

The base layer starts at KM 23+200 and ends at KM 24+600;

**iii. Earth works and Benching**

The section with earthworks starts at KM 24+601 and ends at KM 27+000 as seen in plate 3a below. Due to the high cuts, benching on the back slope has been done as seen in plate 3b:

**Plate 3: Earth Works and Benching in Progress**



**a) Earth works at chainage KM 24+600**



**b) Benching on a back-slope at chainage KM 27+200**

*Source: Field Survey, 2017*

**iv. Stone pitching**

**Plate 4: Stone Pitched Area at chainage KM 20+600**



Stone pitching will be done on the side drains. However, most of the steep walls/cuts are stable and might not require stone pitching. A section of the road for example at KM 20+600 has an unstable back slope on the cut section because of continued soil erosion. As result of the instability, the section has been stone pitched as shown in plate 4 alongside:

*Source: Field Survey, 2017*

v. The trees that were felled near the forest area were sold to individuals and schools;

**vi. Drainage system**

Due to the sloping terrain, most of the road sections have been stone pitched along the drainage system for example at KM 0+700. Culverts have also been constructed to drain water from the road side for example at KM 1+320 a culvert has been constructed to drains water into the forest as seen in plate 5a below: Access culverts are being provided at appropriate places like at KM 21+620 as seen in plate 5b below.

**Plate 5: Constructed Culverts**



**a) Drain under Construction at Chainage KM 1+320**



**b) Access Culvert under Construction at chainage 21+620**

*Source: Field Survey, 2017*

**vii. HIV/AIDS's awareness campaigns**

**Plate 6: An HIV/AIDS Sign Board along the Road**



The contractor conducts HIV/AIDS's awareness campaigns on a weekly basis. Boards sensitizing the residents and the workers on the same has also been erected along the road. Plate 6 alongside shows one of the erected HIV/AIDSs sensitization board:

*Source: Field Survey, 2017*

**viii. Sharp Curves**

The existence of sharp curves at some road sections has necessitated their re-alignment. For example at KM 2+000, the road was aligned to avoid a sharp curve at Corner Ya Lotodo. However, at KM 21+620, a very sharp curve exists as alignment was not possible. The owner of the land where a diversion would have passed through could not allow his land to be used for the diversion. Plate 7 below shows the sharp curve along the road:

**Plate 7: A Very Sharp Curve along the Road at chainage KM 21+620**



*Source: Field Survey, 2017*

### ix. Drains

Drains are some of the structures that have been put in place to prevent soil erosion. Mitre drains are located at KM 2+740 and KM 5+800. Plate 8a below shows a mitre drain under construction. At KM 3+300, Kwa Ranger area, there is an outfall drain from the road into the forest as seen in plate 8b below.

#### Plate 8: Constructed Drains



a) A Mitre Drain under Construction at chainage KM 3+300



b) An outfall drain into the forest at KM5+400

*Source: Field Survey, 2017*

There is a homestead that would have been affected by surface water from the road side drainage but the water was directed away from it at KM 80+220.

### x. Unstable soil dumpsites

#### Plate 9: Erosion on a dumpsite at chainage KM 13+100



Most of the soil dumpsites are not stable for example at KM 5+300 and 4+400 in Chepyomet and KM 13+100 and KM 3+300 in Kwa Ranger area. In those areas, cracks and soil erosion is already evident at the sides as seen in the plate alongside. There is a need for soil erosion control measures such as scour checks and benching in those areas.

*Source: Field Survey, 2017*

However, some dumpsites are in a good condition for example the one at Daraja Mungu, KM 12+150.

#### **xi. Natural springs**

Some areas have natural springs where the community has been drawing water from by connecting pipes from the source across the road to their homesteads for example at KM 3+600 and KM 22+640. The contractor made a provision for the pipes before tarmacking started; others emanate on both sides of the road and they have water drawing points further down from the road side for example at KM 12+150 –Daraja Mungu and Lelan. At Chepkono, KM 13+570; there is a spring whose eye is just by the road side as seen in plate 10b below. However, the contractor did not interfere with it.

#### **Plate 10: Natural Springs**



**a) A Mitre Drain under Construction at KM 5+800**



**b) An outfall drain into the forest at KM 3+300**

*Source: Field Survey, 2017*

#### **xii. Borrow pits and Contractor's campsite**

Some of the identified borrow pits for construction materials include:

- i. N01<sup>0</sup> 15'17.9" and E 035<sup>0</sup> 11'01.0" at an elevation of 2,286m ASL, KM 6+700;
- ii. N01<sup>0</sup> 15'34.3" E 035<sup>0</sup> 11'44.3" at an elevation of 2,386m ASL KM 11+900;
- iii. N 01<sup>0</sup> 16'10.3" and E 035<sup>0</sup> 14'06.4" at an elevation of 2,431m ASL ,
- iv. N01<sup>0</sup> 14'41.1" and E 035<sup>0</sup> 14' 33.3" at an elevation of 2,480m ASL, KM 11+500;
- v. N01<sup>0</sup> 16'10.6" and E 035<sup>0</sup> 13'55.0" at an elevation of 2,444m it's the only borrow pit for the base material so far;

The consultant also received lease agreements for borrow pits from the contractor. Plate 11 below shows the borrow site at Chebyamit. It's also important to note that EIA has been done for four

borrow sites as well as the campsite. EIA licenses for some borrow pits have already been given by NEMA.

**Plate 11: A Borrow Site at Chebyamit**



*Source: Field Survey, 2017*

The contractors campsite on the other had is located at  $N01^{\circ} 15'22.6''$  and  $E 035^{\circ} 12'26.5''$  at an elevation of 2,318m above sea level.

**xiii. Structures along the road**

**Plate 12: Kabichbich Health Centre at chainage KM 22+800**



Some structures at Kabichbich trading centre,  $N 01^{\circ} 12'17.5''$  and  $E 035^{\circ} 16'59.7''$  at an elevation of 2,630m above sea level were demolished because they were within the road reserve. However, some structures at Kabichbich health centre at  $N 01^{\circ} 12'44.6''$   $E 035^{\circ} 16'34.9''$  and an elevation of 2553m above sea level were left intact but are very close to the road as seen in plate 12

alongside:

*Source: Field Survey, 2017*

At KM 13+570;  $N01^{\circ} 15'26.2''$  and  $E 035^{\circ} 14'17.7''$  at an elevation of 2,536m above sea level, opposite the point where the Presidential Road Launch Plaque was erected; a resident was compensated for loss of fence.

### 3.2.2 Cultural issues

At KM 4+400, Chebyamit cultural site was affected by the deep vertical cut on the road. However, the local community is now comfortable with the road as the place where the dumpsite was sited still offers a good view point.

The site at Ketpochepokoro at KM 11+500, coordinate, N01° 16'10.6" E 035° 13'55.0" at an elevation of 2,444m is a historic cultural site, though it has not been in use in the recent times. The local community still regards it as so even presently. The site has however been interfered with, though the community is comfortable with the interference since the road improvement project will be of great benefit to them.

A tree named *Simotwo*, is considered sacred by the community. One had to be felled at KM 13+480; coordinate, N01° 15'36.6" E 035° 14'13.1" and elevation 2,522m above sea level to pave way for the road improvement as seen in plate 13b below. However, an agreement was reached between the community and the contractor and a cleansing ceremony conducted. The ceremony partly involved slaughtering a goat at the site and leaving the fallen tree on the ground until it rots.

#### Plate 13: Cultural Issues



a) Chebyamit Trading Centre – Cultural Site Area at chainage KM 4+900



b) A sacred *Simotwo* tree felled and left to rot on the ground at chainage KM 13+480

Source: Field Survey, 2017

### 3.3 Horizontal Geometrics

The road has reasonable horizontal geometry with long straight sections and curves with large radii. There are a few sections with poor geometrics especially at Chebulbai shopping centre and at Kinnai near Kinnai River where there are sharp horizontal curves which can be improved by provision of bigger radius to achieve recommended standards.

### 3.4 Vertical Geometrics

The road runs on a flat to gently sloping undulating terrain. There are however sudden changes on the general terrain especially at Chebyamit market centre where there are sharp hills. Ideally, a road constructed in such terrain would be cut to attain the required dimensions; the back slopes should be cut and stone pitched to reduce the slope and soil erosion respectively.

**Plate 14: Back Slopes near Chebyamit Market Centre at chainage KM 5+900**



*Source: Field Survey, 2016*

### 3.5 Availability of Road Construction materials

The road alignment traverses areas of varying physiographic characteristics giving rise to different alignment levels. There is notable prevalence of quartzite gravel along the alignment for example at Makutano Market Centre and in some other areas. Plate 15 below shows an already existing material site at Makutano:

**Plate 15: Existing Material Site – Makutano at chainage KM 51+000**



*Source: Field Survey, 2016*

### 3.6 Drainage system

The following is the proposed drainage system for the road improvement project:

#### 3.6.1 Culverts

##### i. Skew (cross) culverts

Installation of skew (cross) culverts should be done at the following proposed chainages.

**Table 1: Chainages where skew culverts should be erected**

0+550	13+900	51+600	65+800	76+300
3+000	14+300	52+000	66+600	76+400
4+900	15+450	52+400	67+100	76+900
5+200	16+600	53+800	69+700	77+300
6+600	18+200	54+200	69+900	77+800
7+000	18+400	54+500	70+800	78+500
8+200	19+000	57+200	71+000	
11+470	19+200	61+500	72+900	
11+900	25+000	62+800	73+100	
12+200	31+000	63+000	74+400	
12+300	46+600	65+300	75+100	

The contractor should avoid installation of culverts at chainages 0+500, 0+557 and 0+645 because they are community sources of water that form River Siyoi. Culverts next to these points should channel the storm water away from the streams.

##### ii. Access culverts

The contractor should install access culverts at the following chainages:

**Table 2: Chainages where access culverts should be erected**

0+800 RS	1+900 RS	3+200 RS	4+500 RS	5+400 RS
7+050 RS	7+250 RS	7+400 LS	8+400 RS	9+000 LS
9+200 RS	10+400 RS	10+750 RS	12+000 LS	12+700RS
13+500 LS	14+200 RS	14+700 LS	15+450 RS	16+900 LS
18+040 RS	18+800 LS	19+500 LS	20+100 RS	21+150 LS
21+360 RS	21+900 LS	22+465 RS	23+100 RS	23+600 LS
23+930 RS	24+745 RS	25+200 RS	25+600 RS	30+780 LS
40+340 RS	40+750 RS	50+200 LS	50+750 LS	59+870 LS
60+120 RS	61+050 LS	61+650 LS	62+200 RS	62+710RS
69+500 LS	72+450 RS and 72+700 LS			

### **iii. Box culverts**

Box culverts should be constructed at chainages 59+100, 80+000 across Rivers Kimnai and Moiben respectively due to their large volumes of water. Diversion of stream water should be done at this point to create working space at the construction site.

### **3.6.2 Mitre drains**

Mitre drains should be cut at the following chainages: 47+230, 56+800 and 68+130. They will reduce accumulation of storm water to large volume along the ditches which may cause gully erosion.

### **3.6.3 French drains**

These are underground culverts i.e. passing through a farm or homestead where storm water from road could cause erosion. They should be erected at chainage 0+600. A French drain can be constructed which will drain storm water away from the river system while not affecting the adjacent farms.

### **3.6.4 Open channels**

They should be constructed at chainage 5+750 with a concrete slab with steps and stone pitched walls to reduce speed of storm water to the forest.

### **3.7 Borrow pits**

The following chainages are proposed to be possible borrow pit sites: 4+000, 47+000, 6+600, 55+700, 11+500, 74+700 and 41+500.

### **3.8 Material tests**

Samples should be taken for lab tests. Approved materials for this class of road (Class D) should attain CBR (California Bearing Ratio) test strength of 95% to 110%. During construction phase, MDD (Maximum Dry Density) tests are done during compaction to ensure 100% - 105% dry density is achieved.

### **3.9 Sharp corners**

Sharp corners were identified at the following chainages:

- ❖ 4+600: Road alignment through forest should be done to avoid sharp corner and steep slope.
- ❖ 52+300: The curve should be improved by widening it to improve visibility.
- ❖ 59+100: Re-alignment of the road to individuals land should be done to avoid a sharp corner.
- ❖ 68+010: Improvement of curve should be done to reduce a sharp corner.

### **3.10 Dump sites**

The following chainages are proposed as possible dumping sites:

**Table 3: Proposed chainages for dumping of spoil**

0+500	5+750	16+500	41+700
2+500	9+500	16+900	44+000
4+600	12+200	17+500	46+900
5+300	13+000	30+000	48+600
5+600	14+900	40+400	50+400

### 3.11 Round about

At Makutano Market Centre, it is proposed that a roundabout should be constructed at chainage 47+500.

### 3.12 Bumps

Bumps should be constructed at the following chainages (note the indicated facility beside the chainage):

**Table 4: Chainages where bumps should be erected**

4+500 – Market	19+100 – School	59+100 - Market
4+900 – Market	19+200 – School	60+400 - School
8+300 – School	19+500 – School	65+800 - Market
14+300 – Church	31+200 – Market	69+500 - School
15+600 – Dispensary	46+600 – Church	75+200 - Market
16+700 – School	47+500 – Market	80+900 - Market
18+700 – Market	50+400 - Market	

### 3.13 Protection works

#### 3.13.1 Dump sites

**Plate 16: Spoil Material dumped near the Forest**



At points where dumping of spoil will be done, the backfill should be compacted to a level or gentle slope by considering the existing ground. Vegetation soil should be put on top of the formed ground at 100mm thick layer and grass should be planted. Construction of concrete scour checks at the bottom should be done to minimize soil erosion downstream and prevent land slide. Plate 16 alongside shows spoil material dumped near the forest.

*Source: Field Survey, 2017*

### **3.13.2 Quarry pits**

Areas where materials are excavated should be restored to ground level so as to avoid stagnation of water which may harbor harmful animals and disease vectors. It may also cause drowning of people and animals.

### **3.13.3 Guard rails**

They should be erected at chainages 59+100 and 80+000; guard rails should also be put at the proposed box culverts locations. At Chainages (5+600 to 5+650), (5+800 to 5+950), (11+320 to 11+400), (11+550 to 11+900), (13+400 to 13+600) and (17+500 to 17+700); the road at these points is open to valleys.

### **3.13.4 Catch water drains**

These should be constructed at points with large volume of storm water to enable channeling it to the available culverts.

### **3.13.5 Masonry drains**

These should be constructed across the ditches to reduce the speed of storm water which may cause gullies along the ditches on road sides at interval of 20 m.

### **3.13.6 Gabions**

At points where there is a loose soil prone to erosion, gabions should be constructed i.e. at chainages 59+100 and 80+000

### **3.13.7 Stone pitching**

Back slopes at Chebyomet centre (plate 14) and Loiloi markets should be cut to reduce slope and should be stone pitched to stop erosion.

### 3.14 Road diversions

**Plate 17: A Diversion under Construction at chainage KM 4+000**



Road diversions should be done at the following chainages: 4+000 to 12+500 and Siyoi – Kapchila – Lomuke – Kabichbich areas. This will minimize disturbance of traffic during road improvement phase. Alternative diversions should be 7m wide and should be graded, murramed and compacted.

*Source: Field Survey, 2017*

### 3.15 Road signs

Road signs should be erected at the following chainages to create awareness to road users (see sites after the chainage):

**Table 5: Areas where road signs should be erected**

3+600 – Sharp corner	15+300 - Sharp corner	52+600 - Sharp corner
4+500 – Market	19+100 – School	59+100 –Sharp corner to Market
4+900 – Market	19+200 – School	60+400 - School
8+300 – School	19+500 – School	65+800 - Market
14+300 – Church	31+200 – Market	69+500 - School
15+600 – Dispensary	46+600 – Church	75+200 - Market
16+700 – School	47+500 – Market	80+900 - Market
18+700 – Market	50+400 – Market	68+010 – Sharp corner

### 3.16 Project output

The main output of the project is a bitumen standard road, with road cross drain comprising of culverts. The geometrics of the existing road will also be improved by widening of existing horizontal curves and improvement of vertical curves.

## CHAPTER FOUR

### BASELINE INFORMATION

#### 4.1 Physical Environment

##### 4.1.1 Geology and Soils

The geology of the project area comprises of a shallow basement zone where only localized aquifer occur in the weathered pockets of the bedrock or in the fractured zones which are potential for ground water discharge. The soils are generally predominantly volcanic clay, loam and sandy soils which are generally poor in water retention. The soils that are within the project area are suitable for the road construction, nevertheless material site will still be identified along the project area where borrow pits will be created. The hills are composed of metamorphic rocks, with conspicuous quartzite ridges and occasional veins of marble.

The area has mainly moderately deep soils of good structure and high organic matter content and variable acidity (mainly Cambisols). The north-western and northern parts of the area have deep to shallow soils which are in general, liable to sheet erosion. The mountain and hills have shallow to very shallow soils and are often stony and rocky. The whole area is occupied by Precambrian rocks of the basement systems, and consists of gneisses and schists.

##### 4.1.2 Topography

The topography of the area comprises of undulating land with high hills and valleys it is generally described as hilly terrain. The Counties also experiences great variations in temperature with the lowlands experiencing temperatures of up to 30<sup>0</sup> C and the highlands experiencing moderate temperatures of 15<sup>0</sup> C. The high altitude area of Lelan, Kabichbich particularly with moderate temperatures experience high rainfall and low evapo-transpiration hence suitable for crop production. The rains will affect the road improvement works, thus the months between April and August will experience a decreased progress on the road construction.

##### 4.1.3 Hydrology

Cherangani Forest ecosystem is a source of several rivers and these include: Nzoia, Maron, Kapolet, Saiwa, Embobut, Siga and Weiwei. The forests are also important for water catchment, and sit astride the watershed between the Lake Victoria and Lake Turkana basins. Streams to the west of the watershed feed the Nzoia river system, which flows into Lake Victoria; while streams to the east flow into the Kerio river system.

#### 4.1.4 Rainfall

The annual rainfall in the ecosystem varies from approximately 1,200 mm in the east to at least 1,500 mm in the west; it is influenced by the moist prevailing winds from Lake Victoria. On the other hand, the average annual rainfall varies from 800 mm in the northern part to more than 1,400 mm in the central part. The rainfall received is of bimodal type with long rains falling between April and August and short rains in October and February. The highest amount of rainfall is received during long rains and the lowest amount of rainfall is recorded during short rains.

#### 4.2 Population and Demography

##### 4.2.1 Population Size and Composition

According to the West Pokot CIDP, the county's total population was estimated at 631,231 persons as outlined in the table below. This comprised of 313,746 males and 317,484 females translating to a sex ratio of 100:101.

**Table 6: West Pokot County Population density per sub-county**

Sub-County	Area in Sq. KM	Pop. 2009	Density (persons/Sq. Km)	Pop. 2013	Density (persons/Sq Km)	Pop. 2015	Density (persons/Sq. Km)	Pop. 2017	Density (persons/Sq. Km)
		Total		Total		Total		Total	
Pokot South	1284.0	132,100	103	162,643	127	180,469	141	200,249	156
West Pokot/ Kapenguria	1822.5	139,500	77	171,754	94	190,579	105	211,466	116
<b>TOTAL</b>	<b>9,169.4</b>	<b>512,690</b>	<b>56</b>	<b>631,231</b>	<b>69</b>	<b>700,414</b>	<b>76</b>	<b>777,180</b>	<b>85</b>

Source: West Pokot CIDP, 2013

According to the 2009 Housing and Population Census of 2009, Elgeyo Marakwet County had a total population of 370,712 people as shown in the table below. The inter-census population growth rate for the county is 2.7 percent per annum.

**Table 7: Elgeyo Marakwet County Population density per sub-county**

Sub-County	Area (KM <sup>2</sup> )	Pop. 2009	Density (persons/Sq Km)	Pop. 2013	Density (persons/Sq Km)	Pop. 2015	Density (persons/Sq Km)	Pop. 2017	Density (persons/Sq Km)
		Total		Total		Total		Total	
Marakwet East	784	78,749	100	85,393	109	92,598	118	97,736	125
Marakwet West	804.7	108,374	135	117,518	146	127,433	158	134,503	167

Source: Kenya Housing and Population Census, 2009

### 4.3 Land use

Agriculture is the main land use within the proposed road improvement project area. The main agricultural activities include livestock and crop farming with potatoes being the main crop grown in Elgeyo Marakwet County. There are also several forests within the project area.

### 4.4 Economic activities

The proposed road traverses through areas with varying economic activities dictated by climatic conditions, trade opportunities and availability of resources. Dairy farming is the main source of livelihood in West Pokot County while crop farming, mainly growing of maize and potatoes is the major livelihood source in Elgeyo Marakwet.

#### Plate 18: Economic Activities



Potato plantation – Elgeyo Marakwet



Livestock farming – West Pokot

Source: Field Survey, 2016

### 4.5 Biological Environment

#### 4.5.1 Fauna

The Cherangani ecosystem is home to large and small wildlife animals. There are the elephants, buffaloes and leopards on the higher sides of the hills. However, these are threatened by the increasing encroachment on the forest with the secure place currently being the Mount Elgon national park and the other parks within the ecosystem. Saiwa Swamp National Park, which is part of the Cherangani ecosystem, has a mixture of smaller animals, including black and white Colobus monkeys, otters, genet cats, mongooses, bushbucks and De Brazzas monkeys as well as the Sitatunga antelope. The ungulate *Tragelaphus eurycerus* has been recorded here in the past, but its current status is unknown.

The butterfly *Capys juliae Spp.* is endemic to the Cherangani Hills. The avifauna of the Cherangani is characteristic of the highland forests of Kenya west of the Rift Valley, comprising both central highland species and western species.

**Plate 19: *Juniperus sp.* (Red cedar)**



Source: Field Survey, 2016

Ecological surveys have recorded over 73 forest-dependent species, none of which is presently globally threatened. Regionally threatened species include *Gypaetus barbatus* (one of the last breeding populations in Kenya, nesting on the high peaks), *Stephanoaetus coronatus* (widespread in small numbers), *Glaucidium tephronotum* (recently recorded in Kapkanyar), *Campephaga quiscalina* (uncommon and local; recent records from Kapkanyar) and Indicator *conirostris spp* (uncommon).

#### **4.5.2 Flora**

The forests are of different types. The lower western parts of Kiptaberr - Kapkanyar are dominated by Aningeria - Strombosia - Drypetes forest, with a large area of mixed *Podocarpus latifolius* forest on the higher slopes. The southern slopes hold Juniperus – Nuxia – Podocarpus falcatus forest, with heavily disturbed *Podocarpus falcatus* forest on the eastern slopes. Valleys in the upper peaks area shelter sizeable remnants Hagenia forest. Tree ferns *Cyathea manniana* occur in stream valleys, and there are patches of bamboo *Arundinaria alpina*, though no bamboo zone as such. In clearings, *Acacia abyssinica* occurs among scrubby grassland with a diversity of flowering plants.

At higher altitudes, the forest is interspersed with a mixture of heath vegetation and swamps, the latter with *Lobelia aberdarica* and *Senecio johnstonii*. Much of this heath land may be maintained by burning and grazing. Juniperus and Hagenia trees occur here and there. In the east especially, there is a mosaic of vegetation types with little obvious altitudinal zonation, possibly as a result of the hills' varied topography and the long history of interchanging practices of cultivation, grazing and bush fires, and the establishment of plantations of *Cupressus lusitanica*, *Pinus patula* and a few Eucalyptus species.

## CHAPTER FIVE

### PROJECT IMPACT ASSESSMENT

#### 5.1 Impact Identification

The identification of impacts in the ESIA study generally used the following methods:

- ❖ Identification of all the sources of impacts such as dust, spoils, vehicles emissions, water pollution, construction camps, etc using checklists or questionnaires. This was followed by listing possible receptors in the environment (e.g., crops, residents, and migrant laborers) through surveying the existing environmental and socio-economic conditions and consultation with concerned parties.
- ❖ Compilation of a comprehensive list of key environmental impacts such as changes in air and water quality, noise levels, wildlife habitats, bio-diversity, landscape, social and economic systems, cultural heritage, settlement patterns, and employment levels.
- ❖ Identifying and quantifying various environmental and socio-economic impacts through the use of checklists, interaction matrices et al.

#### 5.2 Impact prediction

Prediction of impacts characterizes the causes and effects of impacts, and their secondary and synergistic consequences for the environment and the local community. It examines each impact within a single environmental parameter into its subsequent effects in many areas (e.g., destruction of forest resources, deterioration of water quality, destruction or disruption of economic activities and resulting socio-cultural changes). It draws on physical, biological, socio-economic, and anthropological data and techniques. In quantifying impacts, it involves socio-cultural, economic, and expert judgments techniques.

It is worth noting that all prediction techniques of environmental impacts, by their nature, involve some degree of uncertainty. Road development infrastructure impacts can be identified at the following four phases.

- ❖ Pre- construction
- ❖ Construction
- ❖ Operation phase
- ❖ De - commissioning

#### 5.3 Mitigation of impacts

Each predicted adverse impact is evaluated to determine whether it is significant enough to warrant mitigation. This judgment of significance has been based on one or more of the following: (a)

comparison with laws, regulations or accepted standards; (b) consultation with the relevant decision makers and lead agencies; (c) reference to present criteria such as protected sites, or endangered species (d) consistency with government policy objectives (e) acceptability to the local community or the general public

#### 5.4 Types of impacts

The project activities are likely to result in social and environmental impacts. The impacts are classified as:-

- ❖ Positive Impacts
- ❖ Negative Impact
- ❖ Neutral Impact

A matrix has been used to analyze these impacts in this report as follows:

**Table 8: Impacts Analysis Matrix**

<b>Biological and physical environment</b>					
<b>Item</b>	<b>Nature of anticipated impact</b>	<b>Project phase</b>	<b>Positive</b>	<b>Negative</b>	<b>Neutral</b>
Land resources	Altered landscape	Site preparation and construction		(- -)	
	Loss of farm land	Site preparation and construction		(-)	
	Loss of vegetation	Site preparation and construction		(-)	
	Soil contamination	Site preparation and construction		(-)	
	Soil erosion	Site preparation and construction		(-)	
	Increased liquid waste	Site preparation and construction		(- -)	
	Increased solid waste	Site preparation and construction		(- -)	
Construction camps	Solid and liquid waste generation	Pre-construction		(-)	
	Economic empowerment	construction	(+)		
	Health and safety	construction		(- -)	
	Loss of vegetation cover	construction		(- -)	
	Security	construction	(+)		
Rivers and other water bodies	Water quality degradation by oil spills	Construction and operation		(-)	

<b>Biological and physical environment</b>					
<b>Item</b>	<b>Nature of anticipated impact</b>	<b>Project phase</b>	<b>Positive</b>	<b>Negative</b>	<b>Neutral</b>
	Sedimentation	Construction		(-)	
	Interference with drainage	Pre-construction and Construction	(+)	(-)	
	Water use conflicts	Construction		(- -)	
	Removal of vegetation and sand harvesting	Construction and operation		(- -)	
Quarries and borrow pits	Stagnation of water causing infestation by mosquitoes and outbreak of malaria	Construction and operation		(- -)	
	Soil erosion	Construction		(-)	
	Noise pollution from blasting activities	Construction		(-)	
	Altered landscape	Construction and operation		(-)	(x)
	Interference with community heritage	Construction		(-)	(x)
	Occupational safety hazards	Construction		(-)	
Ambient air quality and noise	Noise pollution from construction activities	Construction and operation		(- -)	
	Generation of dust from construction activities	Construction and operation		(- -)	
Aesthetic appeal	Change in landscape	Construction and operation		(-)	(x)
	Disturbance to natural drainage system	Construction and operation			(x)
Flora and fauna	Alteration of vegetation species	Pre-Construction, Construction and operation		(-)	(x)
	Loss of vegetation	Pre-Construction, Construction		(-)	
	Disturbance to natural habitats	Pre-Construction, Construction		(-)	
<b>Socio economic aspects</b>					
Health and safety	Increase in traffic accidents	Construction and operation		(- -)	
	Increased generation of dust	Construction and operation		(- -)	
	Occupational hazards	Construction		(-)	
	Risk of contracting STD's by workers	Construction		(- -)	
	Road as a route for transmission of STD's	Construction and operation		(- -)	

<b>Biological and physical environment</b>					
<b>Item</b>	<b>Nature of anticipated impact</b>	<b>Project phase</b>	<b>Positive</b>	<b>Negative</b>	<b>Neutral</b>
	Improved access to health care facilities by sick and expectant mothers	Operation	(++)		
Agriculture and farming	Access to inputs	Operation	(++)		
	Access to markets	Operation	(++)		
	Timely delivery of farm produce	Operation	(++)		
	Improved extension services	Operation	(++)		
	Will promote increased farm production	Operation	(+)		
Economic empowerment	Cropping up of unplanned settlements, shanties	Construction and Operation		(-)	
	Facilitation of trade between towns	Construction and Operation	(++)		
	Employment creation for skilled and unskilled workers	Construction	(+)		
	Facilitation of transport and communication	Operation	(++)		
	Promotion of investment in transport business and reduced travel time	Operation	(++)		
Migration from other areas	Introduction of alien cultures	Operation			(x)
	Insecurity due to increased incomes	Operation		(-)	
	Interpersonal conflicts	Operation		(-)	
<b>KEY:</b>					
Impact	Symbol				
Major negative impact	(- -)				
Minor negative impact	(-)				
Major positive impact	(++)				
Minor positive impact	(+)				
Neutral impact	(x)				

## **5.5 Potential impacts**

### **5.5.1 Construction Camp impacts**

Potential environmental and social impacts associated with camps include clearing of vegetation, potential for contaminants, generation of wastes, sewage disposal, spread of communicable diseases such as HIV/AIDS, interactions of worker with the local communities. Road construction camps will provide enhanced interaction of better paid construction workers (men who are not living with their families) with the surrounding communities. This will inevitably put the local population and the construction crew at risk of contracting HIV/AIDS & other Sexually Transmitted Diseases (STD's).

The camps will be a source of liquid and solid wastes which need to be well disposed. On the other hand, the construction camps are commercial points for the local population and small scale businesses such as food vending.

### **Mitigation**

- ❖ Garbage to be collected and stored in covered containers and removed daily to an approved site.
- ❖ The contractor to provide waste disposal facilities for both Liquid and solid wastes such as tanks and ensure regular removal to licensed disposal areas.
- ❖ Portable latrines to be used in remote areas where no other suitable toilets are available. All latrines must conform to the Public Health Act and be subject to the approval of the local Public Health Officer.
- ❖ Condom dispensers to be located in appropriate locations within the camp and the camp environs such as in public toilets in market centres
- ❖ Intensify awareness on HIV/AIDS by use of bill boards in market centres and along the project road.
- ❖ Workers and the surrounding communities to be sensitized on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas.
- ❖ Upon decommissioning construction camps and project management offices to be decommissioned such that they will be beneficial to the community.

### **5.5.2 Impacts on Rivers beds**

Potential environmental impacts associated with river beds include erosion, sedimentation, pollution, foreign material spills, slumping, interference with natural drainage and removal of

vegetation. Soils in the area are erosive. Over harvesting of construction sand may lead to degradation of the riverbed and reduction of the water storage capacity. During operation phase of the project sand harvesting along the river beds may increase due to improved transport system.

### **Mitigation**

- ❖ Streams to be crossed at right angles to minimize shoreline disturbance to the extent possible.
- ❖ Vehicles, machinery and equipment working near stream crossings to be kept in good working condition and free of fluid leaks.
- ❖ Construction materials, cleared vegetation and other debris (lime, cement and fresh concrete, etc.) to be prevented from entering waterways.
- ❖ After removal of any temporary stream crossings, the banks to be protected from erosion and flows in the waterway to be returned to pre-construction flow.
- ❖ Vehicles and equipment to be cleaned at a location dedicated for that purpose. Wastewater resulting from washing vehicles or equipment shall not be discharged directly into waterways.
- ❖ Temporary storage of hazardous materials at remote sites must be located at a minimum of 100 meters from a waterway.
- ❖ Farmers along the road to be encouraged to construct retention ditches in order to trap road runoff and silts to avoid sedimentation of the river beds.
- ❖ Install soil erosion control devices e.g., scour checks, gabions and planting ground cover vegetation.
- ❖ Regarding activities related to sand harvesting, reference to be made to the National Mines and Geology Act.

### **5.5.3 Impacts on Land Use**

The existing land use of the project area will be affected by the construction of access roads, construction camps, opening up of material sites and quarry sites. These will damage the landscape, cause vegetation loss leading to soil erosion. Although the loss of optional uses for the land is considered to be a negative impact, the construction of the road is a positive and necessary intervention and any such loss of alternative use is the trade-off for an all-weather road.

There will be an increased pressure on land and natural resources once the road is constructed. There is likely an increase in profitable farming activities like horticulture in the affected areas hence more incomes for the community.

## **Mitigation**

- ❖ Restoration of affected lands after road up grading will be done.
- ❖ Depending on the planned future use for the site and the size of the excavation, pits and quarries to be backfilled with clean mineral soil or granular material, leveled or sloped and if necessary re-vegetated. They can also be used as pans for watering animals. Restoration plans shall be forwarded to NEMA and the project Engineer.
- ❖ The first choice for selecting a site for the construction camp shall be previously cleared sites or natural openings. This will minimize unnecessary clearing.
- ❖ Upon decommissioning construction camps and project management offices should be left such that they will be beneficial to the community for their use i.e. halls, meeting points.

### **5.5.4 Air Quality and Noise**

Airborne dust will be caused by excavation, vehicle movement and materials handling, particularly downwind from the construction sites. Uncovered stock piles and asphalt mixing plant operations are another source of dust. Air pollution will be caused by emissions from vehicles and construction machinery. Noise will be caused by construction equipment rock blasting, excavation, asphalt mixing plant operations and vehicular movement. Introduction of new sources of noise is an issue in areas where ambient noise levels have been low.

Noise mitigation may be achieved through a variety of measures that modify the noise source, noise path, or receiver characteristics. Noise barriers will not be economically practical since they are not cost effective for isolated individual rural residences. To be effective, noise barriers must be continuous, without openings for driveways or access.

## **Mitigation**

- ❖ Construction sites, transportation routes and materials handling sites to be water-sprayed on dry and windy days up to three times a day, especially if these sites are near sensitive receptors, such as shopping centres, health facilities and learning institutions.
- ❖ Construction activities to be scheduled carefully to minimize the impact of noise from construction machinery. Night time's uses of certain noisy machines, such as pile drivers and concrete vibrators, will be regulated.
- ❖ Vehicles and construction machinery to be properly maintained and to comply with relevant emission standards.
- ❖ Surface dressing of diversions through population centres.
- ❖ The location and operation of asphalt batch plants to be sited as far as possible from sensitive receptors, such as shopping centres, health facilities and learning institutions.

- ❖ Regular dust collection, removal and water sprinkling at the asphalt mixing and cement stabilization yards.
- ❖ Monthly maintenance of asphalt and stabilization plants.
- ❖ Speed controls by temporary speed pumps on diversions where necessary
- ❖ Use protective clothing like helmets and dust masks on construction crew
- ❖ Plant trees on the road reserve to help filter out particulate matter emitted from exhaust fumes and dust during the operation stage.

### **5.5.5 Conflicts over water resources use**

Over harvesting of construction sand may lead to degradation of the riverbed and reduction of the water storage capacity. The water available may not be enough for construction works, watering animals as well as for domestic use. Lack of enough water may bring about competition resulting to conflicts with the community. There are springs near the road which should not be interfered with by the road improvement activities.

#### **Mitigation**

- ❖ The contractor should not interfere with natural springs along the road alignment in some areas;
- ❖ The contractor to drill boreholes to supplement for water. These boreholes will be left for community use after the project is completed where it's established that local water resources are likely to be adversely affected and there's a likelihood of low river flows.
- ❖ The contractor will provide a hydro – geological survey report in order to acquire a license from Water Resources Management Authority (WRMA) and National Environment Management Authority (NEMA) to drill boreholes where it applies.
- ❖ Regarding activities related to sand harvesting on river beds; reference to be made to the National Mines and Geology Act.

### **5.5.6 Impacts on soils**

Potential environmental impacts associated with construction activities on soil include soil erosion and soil contamination. Clearing of vegetation and excavation works may expose the soils to wind and water erosion. The erosion factor increase in steep areas particularly during the rainy season. The soils in the area are easily eroded. Soil erosion will cause degradation of agricultural land and consequent reduction in agricultural production thus exposing the population to food insecurity. The accumulation of silt in various water bodies will lead to water resources degradation. Hazardous material spills will cause contamination of the soils with substances such as propane, solvents, petroleum products and battery acid.

## Mitigation

- ❖ Natural drainage to be maintained. Measures will be taken to maintain normal flows as well as, to prevent erosion and pounding.
- ❖ Wherever possible drainage water from construction areas shall be diverted through vegetated areas prior to entering a water body.
- ❖ Farmers along the road to be encouraged to construct retention ditches in order to trap road runoff and silts to avoid sedimentation in the river beds.
- ❖ Where soil is stripped from a work site, it will be stockpiled in a location where natural drainage will not be impeded. This soil will be re used upon completion of construction activities.
- ❖ Where necessary to minimize erosion, exposed slopes to be re-vegetated as soon as possible.
- ❖ Run-off to be diverted away from erosion susceptible slopes to prevent further site degradation.
- ❖ Install soil erosion control devices e.g., scour checks, gabions and plant ground cover vegetation
- ❖ Side drains to be line with concrete or stone pitched.
- ❖ Embankment of slopes to avoid erosion.
- ❖ All applicable laws, regulations and standards for the safe use, handling, storage and disposal of hazardous waste to be followed.
- ❖ Hazardous materials to be stored within dedicated areas at work camps and marshalling yards in full compliance with regulatory requirements.
- ❖ Areas dedicated for hazardous material storage shall provide spill containment and facilitate clean up through measures such as: maximum separation from sensitive features (water bodies); clear identification of the materials present; access restricted to authorized personnel and vehicles only and dedicated spill response equipment.
- ❖ Storage sites for petroleum products to be secured and signs to be posted which include hazard warnings, who to contact in case of a release (spill), access restrictions and under whose authority the access is restricted will be posted.
- ❖ If stored outside, containers to be labeled and products stored in weather-proof containers on spill containment pallets and under a weather-proof tarp, the contractor/spill response coordinator will monitor periodically for leaks, and check to ensure that labels are still present and legible.
- ❖ All containers to be inspected daily by the Contractors. A product inventory shall be maintained by the Contractor and retained for inspection upon request by NEMA.

- ❖ Contractors to, on a regular schedule, inspect all mobile and stationary equipment requiring fuels and lubricants and ensure that appropriate measures are immediately taken to stop any leakage no matter how minor.

### **5.5.7 Generation of solid waste**

Solid waste can be as a result of abandonment of litter/construction materials on site, Use of plastic container/bags by road users and the construction crew and use of polythene sheet for curing by the contractor. Construction camps can be a source of both solid and liquid wastes.

#### **Mitigation**

- ❖ The contractor to submit to the road engineer a camp and site office plan defining all facilities to be created. These include human waste disposal facilities and solid waste management facilities.
- ❖ Ensure that all waste materials at the point of construction are transported to place of safe disposal
- ❖ Sisal tex or hessian cloth sheets to be used for curing instead of polythene sheets

### **5.5.8 Borrow Pits and Quarry Sites**

Borrow pits and quarry are sites where stone, sand, gravel, till, clay, or other granular soils are extracted for construction of the road. The term 'pit' is used when granular material is extracted. The term 'quarry' is used where consolidated rock is removed. Environmental impacts of pit and quarry development can include the loss, reduction or disturbance to wildlife and habitat, erosion, dust, soil/groundwater contamination, damage to historic resources, waste disposal, noise, and aesthetics. Over harvesting of sand from the riverbeds.

#### **Mitigation**

- ❖ Regarding activities related to pit and quarries, reference to be made to the National Mines and Geology Act and the Guidelines for the Use of Explosives
- ❖ New borrow pits and quarries to be located close to existing access routes as possible.
- ❖ The work face of the quarry to be oriented away from sensitive areas such as learning institutions, shopping centres and recreation areas. This practice will direct noise away from environmentally sensitive areas and minimize potentially negative aesthetic impacts
- ❖ Quarry blasting operations to be scheduled to minimize disturbance to people and ensure safety of the workers
- ❖ Garbage, debris, or refuse shall not be discarded into the excavated areas
- ❖ A deep quarry excavation is preferable to a shallow excavation since a deep site minimizes the amount of surface disturbance relative to the amount of material excavated.

- ❖ Borrow pits to be monitored for the presence of historic or heritage material by all project employees. If found, work shall cease and the field supervisor shall contact the designated archaeologist for inspection
- ❖ Organic material, topsoil, and subsoil to be stripped and piled separately adjacent to pits and quarry excavations for future site rehabilitation
- ❖ To encourage re-vegetation, the organic layer of the soil to be separated from other overburden soils and replaced on pit slopes and bottoms after borrow material has been removed from sites designated for decommissioning. Pit walls shall be left at a maximum slope of 4:1 (horizontal: vertical).
- ❖ The contractor to implement erosion and dust control measures on site.
- ❖ Signs to be erected to warn unauthorized personnel of safety hazards.
- ❖ Appropriate site drainage and erosion control measures to be implemented for borrow sites which are no longer needed.
- ❖ All waste, refuse, structures, material and equipment to be removed by the contractor at the end of construction

#### **5.5.9 Blasting and Rock Excavation**

Blasting is used to loosen or break up rocks for removal. It is used during excavation of bedrock. Potential environmental impacts include dust (air quality), contaminant spills, sedimentation, safety (workers, storage), fly rock and debris, noise and explosive detonation effects on people and structures.

#### **Mitigation**

- ❖ The blasting contractor to be in possession of all required permits/certificates.
- ❖ Notification to be given to affected parties including the Engineer, site employees and the public prior to each blasting event.
- ❖ Blasting plans to comply with blasting regulations.
- ❖ Transportation, Storage facilities and personnel handling explosives to be in accordance with regulations.
- ❖ Vehicles, machinery, and equipment to be kept in good working condition and free of fluid leaks.

#### **5.5.10 Road Safety**

It is envisaged that with the improvement of the project road, the traffic volumes and speeds will increase, and composition will change. This will cause increased frequency and severity of accidents

## **Mitigation**

- ❖ Parking bays and bus stops to be provided.
- ❖ To reduce accidents, appropriate road signs and road markings to be put in locations where standards are compromised to warn drivers of safety hazards especially while approaching bends, junctions, bridges, schools and shopping centres.
- ❖ Clearing of vegetation on the road reserve to improve sight distance and visibility.
- ❖ Discouraging parking on the road by having shoulders throughout the length of the road.

### **5.5.11 Social and Economic Impacts**

Skilled and unskilled labour will be directly employed by the road construction works. In addition, indirect job opportunities such as sale of food to construction workers will develop. The road construction and operation will facilitate labour and other migration as well as regular travel to paid employment. This will result in socio-cultural interactions which influence behaviour.

The project road, when completed will encourage local transport operators, both motorized and non-motorized, to invest in transport industry and improve the capacity road network. The road development will facilitate trade along the road and between existing market centres. It will provide all-weather access at reduced cost and time. Transportation of goods will be facilitated. In addition, it will provide a boost to regional integration.

## **Mitigation**

- ❖ Hap-hazard and un-planned development of commercial enterprises such as kiosks and roadside markets along the road should be prevented.
- ❖ Labor to be sourced from the community as much as possible.

### **5.5.12 Health, Safety, HIV and AID's Impacts**

Construction camps, good transport systems and the spread of disease especially HIV/AIDS and other STD tend to go in tandem. Road construction camps provide enhanced interaction of better paid construction workers (men who are not living with their families) with the surrounding communities. This inevitably puts the local population at risk. The camps are a source of liquid and solid wastes which if not well disposed can be a breeding ground for disease causing pests and rodents. The location of pit latrines and septic tanks in the camps should be taken into consideration not to cause pollution of surface water and groundwater sources. Biological degradation of organic waste and sewage is an effective option.

Intestinal diseases, hepatitis, respiratory diseases (including tuberculosis) and plague are diseases that can occur in situations where a large work force is not provided with the proper sanitary and

work place facilities. Many illnesses can be attributed to contaminated water and food (hepatitis, worms, diarrhoea, typhoid, etc.). There will be an increase in number and severity of Traffic accidents due to increase in traffic volumes and speed. Construction workers will be exposed occupational hazards such as injury by the construction machines.

A large construction labour force comprising of young men living away from families, relatively stable wages and ideal time with few recreational pursuits and no domestic responsibilities can often lead to the overindulgence with alcohol. This can lead to abuse, fighting and injury, particularly if women are involved. Men who live in the area but who work on the construction of the road, return home in an inebriated state and abuse and injure family members, and generally can cause a good deal of domestic upheaval.

The risk of maternal mortality among women in the region will be reduced as pregnant mothers can access health facilities easier. Immunization programs and Malaria fighting campaigns will benefit from the improved road infrastructure. Other social services delivered by NGO's and CBO's such as outreach programs on general hygiene and HIV/AIDS awareness and prevention programs will be facilitated.

### **Mitigation**

- ❖ Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards from occurring;
- ❖ Establish an Environmental, Health and Safety Plan (EHS) for both civil and electromechanical works;
- ❖ Provide appropriate human and solid waste disposal facilities;
- ❖ Use of Personal Protective Equipment's such as gas masks, gloves, hardy gumboots, helmet and overalls et al while working;
- ❖ Provide workers with training on safety procedures and emergency response;
- ❖ Intensify awareness on malaria prevention;
- ❖ Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia, use of bill boards and workshops or during community Barazas;
- ❖ Provision of condoms through dispensers located strategically at all work stations and shopping centres;
- ❖ Provide VCT centres along the route in collaboration with the Ministry of Health;
- ❖ The problems of alcohol abuse must be explained to workers as a part of the health education program;

- ❖ Severe penalties for drunkenness and disorderly behavior must be meted out along with the provision of counseling services for substance abuse;

### **5.5.13 Gender Empowerment Impacts**

There is need to promote gender equality in all aspects of economic development and more so in road construction. Women roles in road construction are mainly confined to supply of unskilled labour and vending of foodstuffs to the construction workers.

#### **Mitigation**

- ❖ Give equal employment opportunities for both men and women and encourage women to apply in skills they can be good at.
- ❖ Expose and involve women in road construction and maintenance activities in an effort to transfer required skills to them
- ❖ Involve women groups in activities that they are good at such as environmental management of the road operation such e.g. planting trees and grass and in clearing bush along the road.
- ❖ Enhance gender sensitivity and reduce gender discrimination in construction activities

### **5.5.14 Impacts to infrastructure**

The construction activities will cause disruption of services such as electricity supply and transportation in the area and diversion of traffic flow. Trucks with heavy loads of construction materials may damage the access roads (mainly earth roads) especially during the rainy season. When trucks get stuck on a poor road; transport will be disrupted. Electric poles may need to be moved causing disruption of electricity supply.

#### **Mitigation**

- ❖ Provide appropriate signage to warn motorists and other road users of the construction activities, diversion routes to ward off traffic accidents.
- ❖ The contractor should communicate any intended disruption of the services to enable the people to prepare.
- ❖ In the event that delivery trucks damage parts of the road, repair the spots in consultation.
- ❖ Restrict delivery of materials during wet seasons.

### **5.5.15 Impact on Flora and Fauna**

The construction works will involve bush clearing, removal of top soil, excavation and mass haulage. These activities will expose the land to elements of erosion such as wind and water and thus will trigger the process of land degradation. Potential environmental impacts associated with clearing include: removal of trees, shrubs and wildlife habitat, changes to soil water, temperature and fertility in adjacent areas, erosion and fire hazards due to slash stockpiling. Where farmland or

natural vegetation exists, and which provide adequate habitats for fauna clearing activities will affect animals such as rabbits, moles and birds. Generally, animals are less affected by construction activities than plants. While transporting materials to the site invasive vegetation may be introduced in the area.

### **Mitigation**

- ❖ Right-of-way clearing will be limited to the area required for construction, operation and maintenance of temporary diversion routes and permanent road alignment.
- ❖ Storage areas shall be contained within the project areas and associated access routes.
- ❖ Vegetation will be removed by mechanical means except where other selective clearing methods are stipulated.
- ❖ Right-of-way boundaries and sensitive areas shall be clearly marked with flagging tape by the Engineer prior to clearing.
- ❖ Areas requiring selective clearing (i.e., buffer zones, sensitive sites) shall be marked prior to clearing. The Contractor or a designate will supervise the equipment operators to ensure these areas are not missed or unduly disturbed by construction equipment and related activities.
- ❖ The contractor to collaborate with the forester in order to get the correct specification of size and type of seedling to be planted.
- ❖ Trees to be planted on both sides of the road at a spacing of 25m apart
- ❖ To reduce the possibility of vehicle and animals collisions vehicle speed shall not exceed posted speed limits and animal crossing warning signs shall be installed where appropriate.

### **5.6 Project de-commissioning phase**

De-commissioning refers to the final end of the project and associated project infrastructure at the expiry of the project construction and operational design life which in this case is over 20 years. De-commissioning is not anticipated in the case of this road improvement project. However, components of the road improvement project that needs to be de-commissioned are mainly the Quarry and Borrow sites as well as the contractor's camp and mixing plants.

#### **5.6.1 Quarry and Borrow Pits**

All waste, refuse, structures, material and equipment shall be removed by the contractor at the end of construction. Depending on the planned future use for the site and the size of the excavation, pits and quarries should be backfilled with clean mineral soil or granular material, leveled or sloped. The restored pit will be monitored by the Contractor for a period of time agreed to with ministry of roads to determine if additional restoration activities are required. If appropriate for the site, re-vegetation will be allowed to reoccur naturally. Areas that are seeded with grass to assist in

rehabilitation will be seeded with vegetation that only contains native and/or non- invasive introduced grasses. These pits can also be used as pans for watering animals.

### **5.6.2 Concrete and Asphalt Mixing Plant**

These will be de-commissioned by the contractor under the supervision of the Project Engineer and Environmental Officer at the close of construction period and the equipment hired or reused elsewhere.

### **5.6.3 Contractor's Camp and Project Management Offices**

These camps and offices can be sited on public land and converted to an agreed utility that can be of help to the community e.g. a health centre or kindergarten once the project is completed. Else, a complete de-commissioning program should be submitted to the project engineer at project inception.

### **5.6.4 The Road Pavement and Associated Structures**

- ❖ Temporary access routes and associated stream crossings may be decommissioned at the completion of the construction phase under the supervision of an environmental expert.
- ❖ Decommissioned roadbeds will be reclaimed.
- ❖ On-going visual inspection of the worksite will be conducted by the Contractor to ensure adequate restoration and minimal environmental degradation.

## CHAPTER SIX

### PUBLIC PARTICIPATION

#### 6.1 Overview

Consultation and public participation processes are a mandatory requirement as stipulated in EMCA 1999, amended. Section 17 of the Environmental Regulations of 2003 (Impact Assessment and Audit), requires that all ESIA studies must incorporate Public Consultation (PC). The aim of public consultation is for;

- ❖ Disclosure of planned activities of the proposed project and impacts identified through the Environmental and Social Impact Assessment;
- ❖ Identification of concerns and grievances from interested and affected people;
- ❖ Harnessing of local expertise, needs and knowledge from interested and affected people;
- ❖ Response to grievances and enquiries of affected people.

Public participation was guided by a number of objectives namely:

- ❖ Improve transparency and increase public confidence in ESIA Study
- ❖ Identify the social, bio-physical, economic and environmental concerns as perceived by the public.
- ❖ Identify the positive and negative impacts that the project should consider.
- ❖ Identify and record contentious issues that could later bring conflict.
- ❖ Obtain local input into the design of the project, alternatives and mitigation measures of negative impacts of any nature.

The consultant employed various forums to ensure public consultation. These included focused group discussions, administration of community questionnaires and holding of key stakeholders workshops. Table 9 below shows the various consultation modes, the respective venues and dates of consultation.

**Table 9: Mode and Schedule of Consultation**

<b>Mode of Consultation</b>	<b>Venue</b>	<b>County</b>	<b>Date of Consultation</b>
Focused Group Discussions	Siyoi – Kamatira Junction	West Pokot	1 <sup>st</sup> December 2016
	Kabichbich	West Pokot	2 <sup>nd</sup> December 2016
	Chepkono	West Pokot	2 <sup>nd</sup> December 2016
	Kimnai Centre	Elgeyo Marakwet	6 <sup>th</sup> December 2016

	Kibirech Sub-Location at Makutano	Elgeyo Marakwet	6 <sup>th</sup> December 2016
Community Questionnaires Administration	Various venues along the road alignment	West Pokot and Elgeyo Marakwet Counties	26 <sup>th</sup> November – 6 <sup>th</sup> December 2016
Key Stakeholders Workshops	Kapenguria Town - Mutelo Hall	West Pokot	30 <sup>th</sup> November 2016
	Iten Town - CDF Hall	Elgeyo Marakwet	5 <sup>th</sup> December 2016

Administration of institutional questionnaires was also employed as shown in table 10 below:

**Table 10: Institutional Questionnaire Administration**

No.	Institution	Officer	Officer's Name	Date
1.	Elgeyo Marakwet County Commissioners' Office	Assistant County Commissioner	Rhoda K. Mwanza	6 <sup>th</sup> December 2016
2.	Elgeyo Marakwet County	County Engineer	Philemon Kurgat	7 <sup>th</sup> December 2016
3.	KFS Kapenguria Forest	Station -Forester	David	25 <sup>th</sup> November 2016
4.	Ministry of Agriculture: Livestock & Fisheries	Director	Peter K. Chepkwony	7 <sup>th</sup> December 2016
5.	Elgeyo Marakwet County	County Physical Planner	Leona Waudu	5 <sup>th</sup> December 2016
6.	Kenya Meteorological Department	County Director of Meteorology	Simon K. Cheplot	5 <sup>th</sup> December 2016
7.	Water Resources Management Authority	Water Officer	Norgen Alokutio	25 <sup>th</sup> November 2016
8.	Ministry of Education, Science and Technology, Keiyo Sub-County	Deputy Sub-County Director of Education	Luilu M. Chemoiywo	5 <sup>th</sup> December 2016
9.	Chepkono Dispensary	Nurse in charge	Monica Tudokou	28 <sup>th</sup> November 2016
10.	Kabichbich Health Centre	Public Health Officer	Barnabas K. Kipserem	28 <sup>th</sup> November 2016
11.	Muruny Farmers' Cooperative Society	Extension Officer	Lochale Josephat	28 <sup>th</sup> November 2016
12.	Lelan Highlands Dairies Ltd	AG General Manager/Accountant	Nicholas Lomuket	28 <sup>th</sup> November 2016
13.	Kenya Agricultural Productivity and	Project Accountant	Boniface P. O Dimba	30 <sup>th</sup> November 2016

	Agribusiness Project(KAPAP)			
14.	St. Mulumba Mixed Day Secondary	School Principal	Mirimo K. David	30 <sup>th</sup> November 2016

For the two key stakeholders' workshops, various stakeholders were invited both from the Government and Non-Governmental institutions. Among the key officials invited were officers from:

- i. Ministry of Interior and National Coordination-County Commissioner
- ii. Deputy County Commissioner
- iii. Ministry of Environment, Water and Natural Resource
- iv. Ministry of Education
- v. Ministry of Health
- vi. Ministry of Labour
- vii. Kenya Wildlife Service
- viii. Public Health
- ix. Department of Agriculture
- x. Department of Trade and Industrialization
- xi. Department of Livestock
- xii. Department of Roads
- xiii. Department of Lands and Physical Planning
- xiv. Ecosystem Conservator/Kenya Forest Service
- xv. Water Resource Management Authority
- xvi. Meteorological Department
- xvii. County Director Education
- xviii. Area MP
- xix. Food and Agriculture Organization, other relevant NGO's
- xx. KAPAP
- xxi. MCA's
- xxii. Ward Administrators
- xxiii. Chiefs
- xxiv. Sub-County Administration
- xxv. Contractor
- xxvi. NEMA
- xxvii. Public transport Representative

In this project, public consultation meetings were conducted with the affected residents living along the proposed road from Kamatira to Cheptongei. The approach adopted included, public meetings (Key stakeholders and Barazas) and administration of individual and institutional questionnaires. Two Key stakeholder meetings/workshops were held, one in West Pokot and the other in Elgeyo Marakwet counties, since the road traverses two counties. Several public meetings (barazas) were held in trading centres along the road improvement project area. During the start of the process, the consultant made courtesy calls to various offices especially local administration.

The photos below show various consultation levels:



**Photo 1: Consultation with the ARE (KeRRA) at the project office**



**Photo 2: Consultation with the ARE (KeRRA) and Chief – Kaisakat Location at the project office**



**Photo 3: Courtesy Call to the Deputy County Commissioner (D.C.C), West Pokot County**



**Photo 4: key stakeholder workshop held at CDF Hall - Iten- Elgeyo Marakwet**



**Photo 5: Public Meeting held at Kamatira Junction in Kaiakat Location**



**Photo 6: Public Meeting held at Kabichbich**



**Photo 7: DCC, Pokot South addressing the baraza at Chepkono Trading Centre**



**Photo 8: Sub County Administrator at the public meeting held at Chepkono Trading Centre**



**Photo 9: Public Meeting held at Chepkono Trading Centre**



**Photo 10: Public Meeting held at Makutano Trading Centre**



**Photo 11: Public Meeting held at Kimmnai Trading Centre**



**Photo 12: Key stakeholder workshop held at Mtelo hall, Kapenguria- West Pokot**

## **6.2 Questionnaire Analysis**

Section 17-1 of The Environmental-Impact Assessment and Audit Regulations, 2003 requires that an ESIA should “*seek the views of any person who may be affected by the project*”. The consultative public participation exercise was carried out December 2016. It involved surrounding community along the project route. The aim of involving the public through questionnaires was mainly to:

- ❖ Improve transparency and increase public confidence in Environmental Impact Assessment process.
- ❖ Identify the social, bio-physical, economic and environmental concerns as perceived by the public.
- ❖ Identify the important impacts that the project should not ignore.
- ❖ Identify and record contentious issues that could later bring conflict.
- ❖ Obtain local input into the project design, possible alternatives and mitigation measures of the anticipated negative impacts of any nature.

The public participation involved participants from Elgeyo Marakwet and West Pokot Counties and was carried out using questionnaires. (See copy of filled questionnaires and list of participants in the appendices). The following is therefore an analysis of the questionnaires:

### **6.2.1 Environmental impacts**

#### **6.2.1.1 Construction phase**

##### **i. Perceived positive project impacts**

- ❖ Employment creation

##### **ii. Perceived negative project impacts**

- ❖ Dust generation
- ❖ Implementation may cause deforestation through felling indigenous trees

- ❖ Likelihood of water pollution
- ❖ Interference with water catchments
- ❖ There will be soil erosion
- ❖ Dumping sites for waste soil are unsightly
- ❖ There will be noise generation

**iii. Measures expressed by the stakeholders' to reduce the negative impacts**

- ❖ Sprinkling water when dusty conditions set in
- ❖ Conducting a forestation activities to replace cut trees
- ❖ Construction of gabions on eroded areas
- ❖ Designate waste disposal sites that are licensed
- ❖ Diversion roads should be properly sited
- ❖ Drilling of boreholes to augment available river supply
- ❖ The contractor should provide seedlings for planting to the community for free

**6.2.1.2 Operation Phase**

**i. Perceived positive project impacts to the environment**

- ❖ There will be reduced generation of dust unlike the current situation
- ❖ Waste generation from road repair activities will be minimized i.e. soils

**ii. Perceived negative project impacts to the environment**

- ❖ Oil spills from vehicles that are not well maintained
- ❖ Air pollution from exhaust fumes
- ❖ Noise pollution from vehicles
- ❖ It may cause water scarcity in the areas where the road passes through
- ❖ It may cause water borne diseases due to pollution

**iii. Measures expressed by the stakeholders' to reduce the negative impacts of the project to the environment:**

- ❖ Drainage channels should not be directed to the rivers
- ❖ Desilting sedimented water bodies
- ❖ Reuse of excavated soils
- ❖ Compensation to the affected people

## **6.2.2 Socio-economic impacts**

### **6.2.2.1 Construction phase**

- i. Perceived positive socio economic impacts of the project:**
  - ❖ Employment creation
  - ❖ It help in increasing market prices for agricultural goods
  - ❖ There will be increase in business rental houses which will spur development
  - ❖ Secondary businesses like food vendors will benefit
  
- ii. Perceived negative project socio economic impacts of the project**
  - ❖ There might be increase in social vices due to new workers coming to the area with increased disposable income
  - ❖ It may lead to spread of diseases i.e. HIV/AIDS
  - ❖ There might be displacement of people
  - ❖ It may cause destruction of property
  - ❖ It may lead to drug abuse i.e. bhang by workers
  - ❖ Social conflicts may arise due to skewed employment
  - ❖ It may lead to destruction of cultural sites
  - ❖ It may cause school children to drop out in search of easy road works jobs
  
- iii. Measures expressed by the stakeholders' to reduce the negative socio economic impacts of the project**
  - ❖ Youths should be employed in the project
  - ❖ Government intervention when conflicts arise
  - ❖ Contractor should set up a community liaison office in collaboration with the local Chief

### **6.2.2.2 Operation phase**

- i. Perceived positive socio economic impacts of the project:**
  - ❖ There will be ease of access to transport services
  - ❖ Improved communication between towns
  - ❖ There will be expansion of market for agricultural goods
  - ❖ Transport costs will be lowered
  - ❖ Land values will increase
  - ❖ Pregnant women will access maternity services with ease as well as other community members' health services
  - ❖ Security will improve

- ii. **Perceived negative socio economic impacts of the project**
  - ❖ There will be increase in road accidents i.e. from over speeding
  - ❖ There will be increased competition for local resources from outsiders
  - ❖ There will be population increase in local towns which will constrain resources i.e. water
  
- iii. **Measures expressed by the stakeholders' to reduce the negative socio economic impacts of the project**
  - ❖ There should be construction of road bumps on risky places
  - ❖ Installation of speed bumps on risky places
  - ❖ Feeder roads should be constructed to ease transport on the new road
  - ❖ Awareness creation initiatives for community members to reduce conflicts
  - ❖ Zebra crossings should be marked

### 6.2.3. Cultural sites to be affected

The following were the perceived cultural sites that will be affected by the project implementation:

- ❖ *Sowarwo* tree at Chepkoro under which community meetings are held
- ❖ Mugumo tree at Karengi which is a ritual site for the community may be cut
- ❖ Kwa Ranger Cultural site may be affected and Tingowon
- ❖ Chebyomot singing site
- ❖ Karsogot tourist site

All the stakeholders were in support of the proposed road improvement project;

### 6.2.4 Other comments:

- ❖ The road improvement project should be completed as fast as possible
- ❖ The community welcomes the proposed road improvement project
- ❖ All the affected people whose land will be taken should be compensated
- ❖ Waste materials should be disposed responsibly
- ❖ The project will help in poverty alleviation for the beneficiary communities
- ❖ The communities appreciate the Government initiative to tarmac the road

### 6.3 Comments from the Stakeholders Meetings

The following were the comments by the stakeholders:

- i. Use of locally available human resources

The proponent to ensure that casual labourers are sourced from the project area. He should also use construction materials from local sources such as sand, aggregate and stones where possible.

ii. Preservation of water sources

Most of the water sources originate from one side of the road (Hilly side) and cross to the other. They are mainly tributaries and streams that are very valuable sources of water for the community and since their location is very close to the road they can be easily interfered with by the earth works. It is therefore imperative that the proponent and the contractor afford technical solution avoid damage to these sensitive facilities

iii. Preservation/improvement of accesses to feeder roads

The community expressed concerns on the possibility of destruction of their local access road to their homes and cattle truck during the construction of the road. The contractor should ensure that entry to the accesses is maintained at the same levels so that they are not cut off.

iv. Cutting down of trees

Some trees were going to be felled where the road passed through the forest, but there was already an agreement between KeRRA and KFS or the County government depending on who owns which forest. There was concern where a tree (*Simotwo*) of cultural significance was cut down to pave way for the road construction.

v. Quality of works

The community expressed concerns that they have evidence of poor workmanship on several roads project in the country and they hoped that this would not happen on the Kamatira- Cheptongei Road. It is therefore important that the contractor will address this concern by doing a standard job that meets all the specifications necessary.

vi. Cultural erosion due to influx of “new people”.

The locals feared that the road would open up the area to many different people and this will lead to prostitution, early pregnancies, school drop outs, broken marriages, inter-race children and loose moral fabric.

vii. Dust pollution

People had started experiencing a lot of dust pollution especially where construction had already began.

viii. Drugs and other social evils

The road was going to open up the area to outsiders and this will lead to development that would consequently lead to emergence of social evils like theft and drug use.

ix. Accidents

Accidents were going to increase because the road was going to be tarmacked making it smooth and therefore easy and fast to drive on it. High speed driving will lead to increased accidents and death for both human and livestock.

x. Displacement

Displacement, concerns were raised that people who had settled along the road reserves or where the road was to be aligned were going to be displaced. They felt that there was need to give notices early enough in order to give those affected enough time to relocate. Also the proponent should ensure timely compensation where appropriate.

xi. They expressed concern that the material sites would be left open after they had been quarried and they wanted to be given an assurance that the contractor will backfill them after use.

xii. Human waste was improperly being disposed especially where construction had already begun. There was a need to construct toilets along the road project.

xiii. Some cultural sites had been interfered with thus rendering them impossible for example at Chebyomit, where the old people could not access the cultural site across the road due to the deep excavation; they needed a foot bridge to be constructed across the road.

In summary, the community supports the road improvement project since it will bring about numerous social economic benefits along the entire road alignment. However, it emphasizes the need to be involved in the overall project and more specifically in sustainable utilization of the available natural and human resources. Local leaders are an entry point into the community hence the Contractor should ensure that they are involved at all stages of the project. In so doing, this will go a long way in ensuring the smooth implementation of the project.

## **6.4 Comments from the Stakeholders Workshops**

### **6.4.1 Mtelo Hall, Kapenguria – West Pokot**

#### ***6.4.1.1 Concerns Raised***

- i. Possible termination of the road improvement project based on the ESIA study outcomes
- ii. Health issues as a result of dust and pollution of water sources
- iii. Impassable diversions especially during the rainy season
- iv. Possible project's negative impact on the water catchment areas

#### ***6.4.1.2 Responses***

- i. The ESIA study was a requirement by law and negotiations were done between the proponent and NEMA to allow the construction to take place awaiting the license.

- ii. Use of Kapchila Road as a diversion that connects to Kabichbich to avoid interfering with the road construction.
- iii. The contractor to ensure that dust emission is minimized by watering the dusty areas
- iv. The contractor to liaise with the chiefs in identifying the exact points for dumping to protect the soil from being washed downstream and cause sedimentation of rivers
- v. The contractor to ensure that all the feeder roads/diversions are passable

## **6.4.2 CDF Hall, Iten - Elgeyo Marakwet**

### **6.4.2.1 Concerns Raised**

- i. Possible project's effects on people's property and trees to pave way for the road upgrading project
- ii. Soil erosion due to the sloppy terrain
- iii. The plight of the people's farms where surface run off would be directed and the plots for people living on the road reserve.
- iv. Safety issues along the road
- v. Possible flooding of the farms where surface runoff will be directed

### **6.4.2.2 Responses**

- i. People encroaching on roads reserve would be given notice to vacate and compensation would only be done in instances where the road would deviate from the original route due to necessary alignments
- ii. Adoption of various soil erosion curbing measures
- iii. Diversion of water shall be done through the existing channels and if need be, introduce new channels after negotiations with the public.
- iv. The contractor shall erect bumps and road signs to ensure the people's safety.
- v. Trees will also be planted once the tarmacking process is over as part of the landscaping exercise.

The minutes of the two key stakeholders' meetings/workshops have been annexed in the report as appendix 1 and 2.

## CHAPTER SEVEN

### ANALYSIS OF PROJECT ALTERNATIVES

Several options were considered in designing alternatives for the proposed project. These included the following options:

#### **7.1 The Proposed Project**

The Kamatira - Cheptongei road already exists as an ungraded road and there is no other road that links the market centres where it passes through; the proponent proposes to improve it to bitumen standards. The alignment will follow the existing road access and the road reserve except in very short sections where it might cut into sections of private land. Most of the road passes through market centres that are not fully developed; most buildings are semi-permanent, made from timber.

Moreover the time taken from Kamatira to Cheptongei will reduce significantly from around 6 hours to a maximum of 1 hour. Thus the proposed improvement to bitumen standard of the Kamatira – Cheptongei road is the best option. The local access roads are in a very poor condition and the proposed roads classification means it will not have an alternative in the region.

#### **7.2 Design Alternatives**

Improvement of the road to gravel standards, may be a possible design alternative than upgrading it to a paved road. Maintenance of gravel roads in good motorable condition in such an area will require frequent re-gravelling and reconstruction may also be prompted since some parts of the road will be washed away whenever it rains. It would also mean that the road would be impassable during the rainy season.

This will result in frequent use of scarce good quality gravel resulting in removal of vegetation, borrowing and hauling materials besides the regular financial expenditure. Gravel roads are also a source of dust pollution to the surrounding environment. Hence the proposed design of paved surface dressed road is the most cost effective and environmentally sustainable. If well maintained; it may not require the use of additional material in its design life. Adequate and cost effective engineering measures have been taken to arrive at the road alignment, both vertical and horizontal, material sites and material selection, siting of the hydraulic structures and pavement design.

#### **7.3 Construction Techniques**

The various techniques to improve the proposed road improvement project would involve either use of both heavy machinery or labor intensive. Labour intensive approach alone will have certain limitations, which include inability to excavate, inability to fill up road elevation and slow progress. From a positive perspective labour intensive techniques are environmentally friendly compared to

the use of heavy machinery. In respect to the new construction and rehabilitation and in the right of the fact that this is a class C road, use of heavy machinery may be favoured more than labour intensive methods for the speedy implementation of the project.

#### **7.4 No Construction Alternative**

Under the ‘No Action’ alternative, the Proponent would not carry out the intended construction works; the anticipated impacts resulting from commissioning and operation of the development as proposed, would not occur. Additionally, the resultant socio-cultural/economic benefits that would be created by the proposed development would also be foregone. The no construction alternative would imply that the road be left in its present state. This decision is not favorable if the millennium development goals (MDG) and the vision 2030 are to be achieved.

While the “no project construction’ alternative may ensure non-interference in the biodiversity, social conditions without the project will continue to suffer as a result of inaccessibility to agro-industries, markets, educational services and health care facilities. The “no project construction would mean that these area with great horticultural potential would remain inaccessible and the horticultural products will not reach their destination in time especially during the rainy season. It would also mean that traders as well as the government will continue to incur heavy maintenance costs due to tear, wear and breakdown of their vehicles.

#### **7.5 The Recommended Alternative**

The recommended alternative is the “Proposed Alternative” because it recognizes the viability and need for the proposed road improvement project and is designed to address environmental issues and concerns, meets or exceeds all local regulatory requirements and supports communication and close relations during all stages of the development between the proponent and the community and other stakeholders.

## CHAPTER EIGHT

### ENVIRONMENTAL AND SOCIAL MITIGATION PLAN

**Table 11: ESMP for the project**

No.	Source of impact	Mitigation and Management Measures	Objective/s	Responsibility	Time frame	Cost Estimate (Ksh)
<b>Site preparation and Construction Phases</b>						
1.	Material Sites (storage areas, borrow pits and quarries)	<ul style="list-style-type: none"> <li>• All borrow sites and quarries must be subjected to an EIA as stipulated in the second schedule of EMCA, 1999 amended before extraction of any material commences and a license should be acquired for the same;</li> <li>• Inspections for soil stability should be carried out for proposed sites;</li> <li>• The Contractor will be responsible for ensuring that consents and authorizations for material sites are obtained prior to commencing works;</li> <li>• The Contractor will develop site specific rehabilitation plans to be approved by the RE before excavating any material. Such a plan must contain photos of the site before excavation and indicate the site coordinates;</li> <li>• Material sites shall be located at least 10 meters from watercourses to minimize sediment transportation by runoff;</li> <li>• The Contractor shall give notice to site neighbors of his intention to excavate;</li> <li>• All sites will be cordoned off for the safety of animals and the public;</li> <li>• Prepare an emergency preparedness and response plan for quarries;</li> </ul>	Satisfactory reinstatement of material sites Compliance with environmental law	Contractor Resident Engineer	During construction phase	300,000 per site for EIA. And Ksh. 125 for every M <sup>3</sup> of spoil to be transported

		<ul style="list-style-type: none"> <li>• The Contractor shall reinstate and decommission all material sites immediately they are disused;</li> <li>• Top soil will be stripped and piled with the intention of using for rehabilitation of material sites;</li> <li>• Upon completion of works, borrow areas should be graded and backfilled with top soil. The sites should be planted with indigenous species where its deemed feasible;</li> <li>• In case blasting is required, the Contractor will seek authorization from the Department of Mines and Geology;</li> <li>• The Contractor should engage a licensed blaster for all blasting and rock-splitting operations;</li> <li>• The Contractor shall notify neighbors before blasting;</li> </ul>				
2.	Interference with cultural sites	<ul style="list-style-type: none"> <li>• The contractor should liaise with the community elders;</li> <li>• Compensation for any damage should be done.</li> <li>• Relevant cultural rituals should be allowed to cleanse the areas interfered with;</li> <li>• The contractor should get permission from the elders in order to access those areas;</li> </ul>	Damage to community heritage	Contractor Resident Engineer Community elders	Construction and site preparation phase	1,500,000 for stair cases.
3.	Interference with structures at the road reserve	<ul style="list-style-type: none"> <li>• Adequate notices to be given for owners of structures on the road reserve to remove them;</li> <li>• Provide retaining walls and a fence where structures are near the road for example Kabichbich health centre in the short run and relocating it in the long run;</li> <li>• Erect gabions where there are deep cuts that block access to properties and facilities;</li> <li>• The contractor should erect access lanes where there are deep cuts on the roadside that interfere with access to properties;</li> </ul>	Removal of obstructions on the road reserve	Contractor Resident Engineer	Construction phase	2,000,000 for removal of structures.

4.	Air Pollution	<ul style="list-style-type: none"> <li>• Regularly service and maintain vehicles and construction machinery in accordance with the owner’s manual to minimize gaseous emissions;</li> <li>• Spray all earthworks areas and transport routes depending on prevailing weather conditions;</li> <li>• Workers should be provided with dust masks in dusty work environments;</li> <li>• Clear vegetation only from those areas necessary for construction work to occur;</li> <li>• Sprinkle stock piles with water and keep them covered in dry weather;</li> <li>• Prohibit unnecessary idling of motorized equipment;</li> <li>• Use clean and low sulphur fuels for vehicles and machinery;</li> <li>• Bulk-soil transporting trucks should be covered to avoid spills and wind-blown dust;</li> <li>• Complaints regarding decline in air quality as a result of project activities should be recorded and communicated to the RE for monitoring;</li> <li>• Project vehicles should observe speed limits to keep down dust;</li> <li>• Prepare and implement project-specific design improvements to limit vehicle air pollution impacts;</li> <li>• Comply with all the provisions of EMCA Air Quality Regulations (2014).</li> </ul>	Prevention of air pollution	Contractor Resident Engineer	Construction phase	2,500,000 For PPE
5.	Drainage system and outfalls	<ul style="list-style-type: none"> <li>• Integrate drainage system in the overall road planning and construction;</li> <li>• Harmonize drainage with all point sources of surface runoff;</li> <li>• Relevant authorities are requested to address enhanced sanitation;</li> </ul>	To prevent conflict with residents. To enhance the drainage system	Contractor Resident Engineer	Construction and operation phases	3,000,000 for outfall drains.

		<ul style="list-style-type: none"> <li>• All culverts be designed on the basis of hydrological studies such to carry peak runoff;</li> <li>• Drainage outfalls should not be directed into private plots or premises;</li> <li>• The relevant Authorities to enforce control of discharging polluting effluent into the open drains during construction period;</li> </ul>	so as not to cause soil erosion in farms			
6.	Noise and vibrations	<ul style="list-style-type: none"> <li>• Where possible, confine construction activities to day time hours;</li> <li>• Regularly service and maintain vehicles and construction machinery in accordance with the owner's manual to minimize noise nuisance;</li> <li>• Sensitive noise receptors such as schools, hospitals and homesteads should be notified by the Contractor if construction is likely to cause more noise than usual;</li> <li>• Construction workers should be provided and encouraged to use PPE appropriately;</li> <li>• Avoid unnecessary hooting by project vehicles within 200 m of noise sensitive receptors;</li> <li>• Any complaints regarding noise and vibrations by project activities should be recorded and communicated to the RE for monitoring;</li> <li>• Comply with all provisions of the EMCA (Noise and Excessive Vibrations) Regulations 2009,;</li> </ul>	To maintain noise emissions within legally acceptable limits for particular surroundings	Contractor Resident Engineer	Construction phase	400,000 for monitoring activities
7.	Wildlife corridors poaching	<ul style="list-style-type: none"> <li>• Erection of electric fence along the road corridor;</li> <li>• Posting warning signs on dangers of encroaching on wildlife crossings;</li> <li>• Community education on wildlife conservation;</li> </ul>	To prevent accidents and human wildlife conflicts and	KWS KeRRA Contractor	Operation phase	8,000,000 per corridor

		<ul style="list-style-type: none"> <li>• Wildlife corridors should have speed bumps to prevent accidents;</li> <li>• Poaching must not be allowed under any circumstance;</li> <li>• Authorities to closely monitor construction activities at the forested sections;</li> </ul>	poaching activities			
8.	Vegetation loss	<ul style="list-style-type: none"> <li>• Site clearance for construction shall be kept to a minimum. It is encouraged that open grounds should be given first consideration for use over vegetated areas;</li> <li>• Trees should be trimmed rather than completely cut wherever possible;</li> <li>• Consider planting grass in areas not of active works;</li> <li>• A clear understanding of ownership should be reached with the relevant parties before any tree or vegetation is felled;</li> <li>• Clearance should be done in such a way that that damage to adjacent areas to the site is prevented or minimized;</li> <li>• Clearance especially at material sites should be done with the intention of noting the type of species native to that area for purposes of re-vegetating during reinstatement;</li> <li>• Areas with threatened or endangered plant should be avoided and only used as a last resort;</li> <li>• Use of fuel wood for any project associated activity should be highly discouraged;</li> </ul>	Conservation of vegetation and prevention of soil erosion	Contractor Resident Engineer	Construction phase	2,000,000 for restoration works
9.	Solid wastes	<ul style="list-style-type: none"> <li>• The contractor should develop a waste management plan;</li> <li>• All personnel shall be instructed to dispose of all waste in a proper manner;</li> <li>• Contractor shall provide litter collection facilities;</li> <li>• The final disposal of the site waste shall be done by approved waste disposal agents;</li> </ul>	To maintain sound waste management practice.	Contractor Resident Engineer	Construction phase	2,500,000 for waste disposal site and its management.

		<ul style="list-style-type: none"> <li>• Wherever possible, materials used or generated by construction shall be recycled;</li> <li>• Provision for responsible management of any hazardous waste generated according to NEMA regulations on waste management;</li> <li>• Dispose of surplus material ("spoil") only at designated sites and by approved methods;</li> <li>• The spoil designated area need to be more than 20 meters from watercourses;</li> <li>• The development and rehabilitation of spoil areas shall include the following activities;</li> <li>• Stripping and stockpiling of topsoil;</li> <li>• Contouring of spoil site to approximate natural topography and drainage and/or reduce erosion impacts on the site;</li> <li>• Placement of excavated subsoil and then topsoil over spoil material;</li> <li>• Contouring and re-vegetation;</li> <li>• The Contractor shall ensure that the placement of spoil is done in such a manner to minimize the spread of materials and the impact on surrounding vegetation and that no materials spill into surrounding areas;</li> </ul>				
10.	Liquid wastes	<ul style="list-style-type: none"> <li>• No grey water runoff or uncontrolled discharges from the site/working areas;</li> <li>• Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site;</li> <li>• The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas;</li> </ul>	To maintain properly disposed wastewater	Contractor Resident Engineer	Construction phase	2,500,000 for each disposal site

		<ul style="list-style-type: none"> <li>• Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered;</li> <li>• Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;</li> <li>• The Contractor shall notify the RE of any pollution incidents on site;</li> </ul>				
11.	Soil Erosion and Embankments	<ul style="list-style-type: none"> <li>• As far as possible earthworks should avoid wet seasons that increase susceptibility of soil erosion and collapse of embankments;</li> <li>• Earth dumping sites should be designed in such a manner as to facilitate natural water discharge;</li> <li>• Excavated materials and excess earth should be kept at appropriate sites approved by the Resident Engineer;</li> <li>• Cut areas susceptible to landslides should be protected immediately after the works, and works should not be prolonged at such sites unnecessarily;</li> <li>• The Contractor should adhere to specified cut and fill gradients and consider planting embankments with shrubs and grass to minimize erosion and take care of stability problems;</li> <li>• The Contractor should protect areas susceptible to severe erosion such as across steep slopes by installing necessary temporary and permanent drainage works;</li> <li>• Areas affected by construction related activities and are susceptible to erosion or landslides must be monitored regularly;</li> </ul>	To conserve soil and ensure slope stability	Contractor Resident Engineer	Construction phase	10,000,000 for protection works

		<ul style="list-style-type: none"> <li>• On areas where the risk of erosion is evident, stabilize the areas and prevent erosion. This may include, but not be limited to: <ul style="list-style-type: none"> <li>– Confining construction activities;</li> <li>– Using cut off drains;</li> <li>– Using mechanical cover or packing structures such as geo-fabric to stabilize steep slopes or retaining walls;</li> <li>– Using mulch or chip cover;</li> <li>– Constructing anti-erosion berms;</li> <li>– The erosion prevention measures must be implemented to the satisfaction of the RE;</li> </ul> </li> </ul>				
12.	Water resources use conflicts and interference with natural springs	<ul style="list-style-type: none"> <li>• The contractor should not interfere with community natural springs near some sections of the road</li> <li>• The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006;</li> <li>• Ensure community complaints related to water abstraction activities are promptly mitigated;</li> <li>• Liaise with the community leaders to address any water use conflicts;</li> <li>• Where water scarcity is acute, drill boreholes to augment available supply;</li> </ul>	To ensure the community's right to access water is not infringed	Contractor Resident Engineer WRMA	Construction phase	1,400,000 for each borehole. 300,000 for restoration works.
13.	Construction camps	<ul style="list-style-type: none"> <li>• The site for the Contractor's Camp shall be determined in collaboration with the Roads Engineer taking into consideration the following: <ul style="list-style-type: none"> <li>– The security situation in the area (expressed authority must be given by the Officer Commanding Police Division)</li> </ul> </li> </ul>	To ensure proper siting of contractor's camp	Contractor Resident Engineer Security agencies	Construction phase	3,400,000 for waste management and decommissioning.

		<ul style="list-style-type: none"> <li>- Involve local community and administration in site selection.</li> <li>• Decommission the camps and Reinststate the land to its natural</li> <li>• The Contractor shall implement the following as required with the approval by the RE: <ul style="list-style-type: none"> <li>- The contractor shall prepare a waste management plan.</li> <li>- A suitable water drainage system to prevent soil erosion.</li> <li>- A suitable potable water supply;</li> <li>- Suitable ablution facilities.</li> <li>- Facilities for cooking;</li> <li>- Facilities for solid waste collection;</li> <li>- Facilities for waste water management.</li> </ul> </li> </ul>				
14.	Sanitation and management of septic waste	<ul style="list-style-type: none"> <li>• Mobile toilets should be provided to workers;</li> <li>• The Contractor shall comply with laws and by-laws relating to public health and sanitation;</li> <li>• All temporary/ portable toilets or pit latrines shall be secured to the ground;</li> <li>• All toilets shall be maintained by the Contractor in a clean sanitary condition;</li> <li>• A wash basin with adequate clean water and soap shall be provided alongside each toilet;</li> <li>• Ensure that solid/liquid effluents are disposed by licensed agents or through approval by the local Public Health Office;</li> </ul>	To ensure proper sanitation	Resident Engineer and Contractor	Construction phase	1,500,000 for portable toilets and maintenance per site.
15.	Workshops	<ul style="list-style-type: none"> <li>• All maintenance of equipment and vehicles shall be performed in the workshop;</li> <li>• If it is necessary to do maintenance on site, but outside of the workshop area, the Contractor shall obtain the approval of the Roads Engineer prior to commencing activities;</li> </ul>	To ensure proper maintenance of equipment and machinery and	Contractor Resident Engineer	Construction phase	5,000,000 for waste management and transport.

		<ul style="list-style-type: none"> <li>• The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water;</li> <li>• The workshop shall be kept tidy at all times and shall have the following as a minimum: <ul style="list-style-type: none"> <li>– An impermeable floor either constructed of concrete or suitable plastic fabric</li> <li>– The floor shall be bunded and sloped towards an oil trap or sump.</li> <li>– Drip trays shall be used to collect the waste oil and lubricants.</li> <li>– The drip trays shall be inspected and emptied daily;</li> <li>– Drip trays shall be closely monitored during wet weather</li> </ul> </li> </ul>	cleanliness in the workshop			
16.	Fuels, Oils, Hazardous Substances and other Liquid Pollutants	<ul style="list-style-type: none"> <li>• Hazardous materials shall be stored above flood level and at least 20 metres from any watercourse;</li> <li>• Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations;</li> <li>• Chemicals and fuel shall be stored in storage tanks within a secure compound. All chemicals and fuels shall be stored in accordance with their Material Safety Data Sheet (MSDS);</li> <li>• Storage areas or secondary containment shall be constructed of waterproof reinforced concrete or approved equivalent, which is not adversely affected by contact with chemicals captured within them;</li> <li>• Pipe-work carrying product from the tank to facilities outside the containment shall be provided with secondary containment;</li> <li>• Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment;</li> </ul>	To ensure proper handling of fuels and hazardous substances	Contractor Resident Engineer.	Construction phase	Operations and maintenance cost as above.

		<ul style="list-style-type: none"> <li>• Fence of the tank compound with locks or other adequate security controls at the site;</li> <li>• Appropriate training for the handling and use of fuels and hazardous material is to be provided by the Contractor as necessary. This includes providing spill response and contingency plans;</li> <li>• Extreme care will be taken when transferring chemicals and fuels from storage vessels to equipment and machinery on an impervious sealed area which is kerbed and graded to prevent run-off. Chemical and fuel transfer areas shall drain away from the perimeter bund to a containment pit.</li> <li>• All chemicals stored within the bunded areas shall be clearly labelled detailing the nature and quantity of chemicals within individual containers;</li> <li>• Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal;</li> <li>• Storm water shall be diverted away from the fuel handling and storage areas. An oil water interceptor shall be provided to treat any rainwater from fuel storage and handling areas.</li> </ul>				
17.	Cement/ Concrete Batching	<ul style="list-style-type: none"> <li>• Concrete batching plant shall be located more than 20 m from the nearest stream/river channel;</li> <li>• Topsoil shall be removed from the batching plant site and stockpiled;</li> <li>• Concrete shall not be mixed directly on the ground;</li> <li>• The concrete batching works shall be kept neat and clean at all times;</li> </ul>	To ensure proper siting and operation of cement/concrete batching	Contractor Resident Engineer	Construction phase	No additional cost

		<ul style="list-style-type: none"> <li>Contaminated storm water and wastewater runoff from the batching area and aggregate stockpiles shall not be permitted to enter streams but shall be led to a pit where the water can soak away;</li> <li>Unused cement bags are to be stored so as not to be affected by rain or runoff events;</li> <li>Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via wind-blown dust);</li> <li>Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment;</li> <li>Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching;</li> <li>Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site;</li> <li>All visible remains of excess concrete shall be physically removed on completion and disposed at an approved disposal site. Washing the remains into the ground is not acceptable;</li> <li>All excess aggregate and sand shall also be removed;</li> <li>After closure of any area where concrete was mixed all waste concrete/cement sludge shall be removed together with contaminated soil. The surface shall then be ripped to a depth of 150mm and the topsoil replaced evenly over the site and re-grassed.</li> </ul>				
18.	Diversion and access roads to properties	<ul style="list-style-type: none"> <li>Adequate signage should be erected where there are diversions and workers manning diversions should wear reflective clothing;</li> </ul>	Use of existing roads and proper use of	Contractor Resident Engineer	Construction phase	4,500,000 for diversions, watering,

	<ul style="list-style-type: none"> <li>• Bumps should be installed at all sharp corners;</li> <li>• Road improvement should not block access to properties, where the contractor interferes with the same, the he should provide access;</li> <li>• Where there is a deep cut, an access lane should be provided;</li> <li>• The Contractor should adhere to the road reserve as much as possible in locating the diversion if required. If diversion routes go beyond the road reserve, necessary permission should be sought;</li> <li>• Where possible the diversion must be limited to already connecting routes in the area;</li> <li>• The Contractor shall comply with all applicable laws and by-laws in Kenya with regard to road safety and transport;</li> <li>• Access to the construction site and works area shall utilize existing roads and tracks where possible;</li> <li>• Upgrading of the access roads shall be undertaken within the existing confines of the road, unless otherwise agreed with the RE;</li> <li>• All diversion and temporary access routes shall be rehabilitated at the end of the contract to the satisfaction of the RE;</li> <li>• Damage to the existing access roads and services as a result of construction activities shall be repaired to the satisfaction of the RE. The cost of the repairs shall be borne by the Contractor;</li> <li>• To avoid dusts and air pollution, the Contractor must sprinkle water in the diversion route, as necessary.</li> </ul>	diversion and access roads			reinstatement and warning signs.
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19.	Occupational Health and Safety	<ul style="list-style-type: none"> <li>• The Contractor shall comply with all standard and legally required health and safety regulations as promulgated by Factories and Other Places of Work Act and also the ILO Guidelines on Safety and Public Health in the construction activities;</li> <li>• The Contractor shall provide a standard first aid cupboard at the site office;</li> <li>• There should be a Safety Officer on site who has first aid training and knowledge of safety procedures;</li> <li>• Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads;</li> <li>• Appropriate firefighting appliances shall be provided on site;</li> <li>• The Contractor shall provide the appropriate Personal Protective Equipment for staff;</li> <li>• The contractor must have insurance cover for the workmen;</li> </ul>	To reduce occurrence of accidents	Contractor Resident Engineer	Construction phase	PPE cost of 2,000,000
20.	Fire Prevention and Control	<ul style="list-style-type: none"> <li>• The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site;</li> <li>• The Contractor shall ensure that there is basic fire-fighting equipment available on site;</li> <li>• The Contractor shall ensure that some workers are trained as fire marshals;</li> <li>• Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires;</li> <li>• ‘Hot’ work activities shall be restricted to a site approved by the RE;</li> <li>• Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include: <ul style="list-style-type: none"> <li>– Workshop;</li> </ul> </li> </ul>	Fire prevention and control	Contractor Resident Engineer	Construction phase	Firefighting appliances and firefighting training and monitoring activities cost of 2,300,000

		<ul style="list-style-type: none"> <li>- Fuel storage areas;</li> <li>• Any areas where vegetation or other material is such as to make liable the rapid spread of an initial flame;</li> <li>• The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This shall include, but not be limited to: <ul style="list-style-type: none"> <li>- Regular fire prevention talks and drills;</li> <li>- Posting of regular reminders to staff;</li> <li>- Any fires that occur shall be reported to the RE immediately and then to the relevant authorities;</li> <li>- In the event of a fire, the Contractor shall immediately employ such a plan and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring the fire under control;</li> <li>- Costs incurred through fire damage will be the responsibility of the Contractor, should the Contractor's staff be proven responsible for such a fire.</li> </ul> </li> </ul>				
21.	Public Health	<ul style="list-style-type: none"> <li>• The Contractor shall be responsible for the protection of the public and public property from any dangers associated with construction activities</li> <li>• All works which may pose a hazard to humans and domestic animals are to be protected, fenced, demarcated or cordoned off as instructed by the RE. If appropriate, warning signs must be erected;</li> <li>• The HIV/AIDS prevention campaigns should be conducted at the camps as well as in the trading / market centres. The contractor shall take an active role in civic and public health education to his employees. The campaign shall include the training of facilitators within the workers, information</li> </ul>	To reduce transmission of diseases; To create awareness of HIV/AIDS	Contractor Resident Engineer, relevant NGO's, County HIV/AIDS Control Council, and Health Officers	Construction phase	3,000,000 for HIV/AIDS related activities and items.

		<p>posters in more frequented areas in the campsite and public areas, availability of promotional material (T-shirts and caps), availability of condoms (free), and theatre groups. The contractor will co-ordinate with the Provincial and District HIV/AIDS control councils, health officers and the NGO's undertaking education and sensitization programmes;</p> <ul style="list-style-type: none"> <li>• The contractor will provide condoms at appropriate places in the work camps. The campaigns will be continuously done by the relevant Government organization even during operation phase of the project;</li> <li>• The implementing agency for HIV/AIDS campaign shall monitor activities regularly to assess effectiveness and impact. This should include an initial, interim and final assessment of basic knowledge, attitude and practices taking account of existing data sources and recognizing the limitations due to the short timeframe to show behaviour change. The assessment will be supported by qualitative information from focus group discussions;</li> <li>• The contractor should follow the recommendations of the Kenya National Aids Strategic Plan in communicating prevention measures;</li> </ul>				
22.	Relocation of public utilities such power lines	<ul style="list-style-type: none"> <li>• No road improvement activities should take place where there are utilities on the road reserve i.e. power posts.</li> <li>• Undertake inventory of existing utilities in the project area before beginning construction;</li> <li>• Relocation of services, if needed, should be provided for in the Bill of Quantities (BoQ);</li> <li>• Notice should be given to the utility users prior to any interruption in supply;</li> </ul>	Minimum disruption of access to public utilities	Contractor Resident Engineer , Kenya Power	Construction phase	As contained in the compensation documents and BoQ

		<ul style="list-style-type: none"> <li>• Liaise with relevant parties;</li> </ul>				
23.	Emergence of unplanned settlements	<ul style="list-style-type: none"> <li>• To forestall the growth of unplanned settlements around the construction camps and other work sites, KeRRA and the local administration will need to undertake routine and strict surveillance around the work sites;</li> <li>• To mitigate against the potential increase of persons who may be affected by the project, presently and in future, the KeRRA should inform the local administration to help in stopping further informal developments within the project areas;</li> </ul>	To curb against unplanned settlements	KeRRA County Administration	Construction phase	As per County Government administration budget.
24.	Alterations in downstream flow of rivers	<ul style="list-style-type: none"> <li>• Regulating water flow while abstracting for road works to mimic the natural flooding regime and maintain ecologically sustainable flow conditions;</li> </ul>	To ensure downstream users rights to water is not compromised	KERRA and WRMA Contractor Resident Engineer	Construction phase	1,400,000 for one year for conservation activities and maintenance of river training.
25.	Increased incidence of water borne diseases due to possible pollution	<ul style="list-style-type: none"> <li>• Public sensitization on domestic water treatment;</li> <li>• Pollutants must not be allowed to enter into rivers;</li> <li>• Where the contractor pollutes rivers, the Polluter Pays Principle applies;</li> </ul>	Reduce occurrence of disease	KERRA an Public Health Department	Construction phase	300,000 for monitoring
26.	Discrimination on employment opportunities	<ul style="list-style-type: none"> <li>• At least 30% of the jobs should be provided to each gender.</li> <li>• To avoid conflicts with the local people on employment it is proposed and important that the Contractor employs the locals in liaison with local leaders and administration in unskilled and semi-skilled duties;</li> <li>• To promote the livelihood of vulnerable groups such as the women-headed households, the Contractor should make</li> </ul>	Employment of locals Follow labor laws	Contractor Resident Engineer and local administration	Construction phase	No additional costs

		<p>deliberate efforts to include and retain women in construction</p> <ul style="list-style-type: none"> <li>• Make deliberate efforts to include at least 33% of women as employees within the dam construction project;</li> <li>• Contractor to put in place a code of conduct to prevent sexual harassment / exploitation of female employees;</li> <li>• Contractor to strictly follow Kenya's Labour Laws;</li> </ul>				
27.	Disruption of Access to Property	<ul style="list-style-type: none"> <li>• The road improvement works should not block access to properties, the contractor should also provide access to properties where original access has been interfered with;</li> <li>• Where a deep cut is made, then an access lane should be constructed;</li> <li>• Where such blockage is unavoidable, the Contractor shall advise the affected parties and the Resident Engineer at least seven working days in advance.</li> </ul>	Minimize disruption of access to property	Resident Engineer and the Contractor.	Construction phase	120,000 for notices and 400,000 for access culverts
28.	Site Security	<ul style="list-style-type: none"> <li>• Security arrangements must be made to avoid any delays which might be caused by insecurity;</li> <li>• The Resident Engineer and Contractor in liaison with the security organs should create awareness of the security situation on the ground at all times;</li> <li>• Appropriate fencing, security gates, shelter and security guards are to be provided at the Construction Site to ensure the security of all plant, equipment and materials, as well as to secure the safety of site staff;</li> <li>• The Contractor must ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft;</li> </ul>	To improve site security and prevent theft	Resident Engineer and Contractor.	Construction phase	150,000 per month on security services

		<ul style="list-style-type: none"> <li>Site staff that is found to be involved in incidences of theft or pose other security risks to the local community are to be dismissed and reported to the authorities;</li> </ul>				
<b>Operation Phase</b>						
29.	Changes in settlement patterns	<ul style="list-style-type: none"> <li>Proactive planning by the County Planning office;</li> </ul>	To forestall unplanned urbanization	County Government	Operation Phase	Cost not applicable to the project
30.	HIV/AIDS	<ul style="list-style-type: none"> <li>Sensitization and awareness campaigns should be the responsibility of the National Aids Control Council in Kenya together with their County Co-coordinators;</li> <li>Prevention measures to include access to free condoms to all workers within the project;</li> </ul>	To reduce prevalence rates	Contractor and National Aids Control Council	Operation Phase	No additional cost
31.	Erosion and water quality	<ul style="list-style-type: none"> <li>Maintenance engineers from KeRRA shall inspect all drainage structures and outfalls;</li> <li>All the damaged sections of the culverts, wing walls, and aprons shall be repaired and additional measures for velocity reduction and erosion protection shall be implemented.</li> </ul>	To ensure good water quality for various users	KeRRA Contractor Resident Engineer	Operation Phase	5,000,000 for erosion control structures maintenance yearly.
32.	Road safety	<ul style="list-style-type: none"> <li>There should be a designation of pedestrian crossing points, stair cases and guard rails where appropriate;</li> <li>Adequate signage should be erected where there are diversions and workers manning diversions should wear reflective clothing;</li> <li>Bumps should be installed at all sharp corners;</li> <li>The Resident Engineer and the Contractor involved with the implementation of the design of the road should:</li> </ul>	To prevent accidents and incidents	KeRRA Contractor Resident Engineer Traffic Department	Construction and operation	8,000,000 for signage's Follow maintenance budget

		<ul style="list-style-type: none"> <li>– Examine road design standards, safety equipment specifications and training to ensure that design details take account of safety concerns and that specific safety features are correctly designed and installed;</li> <li>– Require that road design audits be done, at final design stages, by specialists</li> <li>– Draft road management plans, including details of signs, markings, channelization of flows, access restrictions and public crossing points</li> <li>– Education and safety trainings.</li> <li>• Road safety and accident prevention campaigns are recommended at the end of construction. To monitor the effectiveness of the road safety information and education campaigns, the following measures are recommended:</li> <li>• Monitor road accidents through records kept at the local administration offices and police stations ;</li> <li>• KeRRA and the Livestock Department shall record accidents with livestock;</li> <li>• A report will be required after two years of monitoring and the results used to recommend further mitigation measures, if necessary;</li> </ul>				
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## CHAPTER NINE

### ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMP)

The Environmental Monitoring Plan focuses on two main areas namely institutional strengthening and training, and environmental monitoring. Monitoring will serve the following functions:

- ❖ To ensure that the proposed environmental and social remedial measures are implemented during the project execution stage;
- ❖ To ensure that the procedures recommended in the approved ESIA report are adhered to by the various agencies;
- ❖ To ensure that the environmental and social mitigation is well understood and communicated to all involved parties, including the general public;
- ❖ To evaluate the effectiveness of environmental and social management measures;
- ❖ To evaluate the effectiveness of various evaluation techniques and procedures;

Table 12 below presents the potential indicators that will be used to monitor the implementation of the road improvement project. The indicators are selected according to the project context and major anticipated impacts:

**Table 12: Environmental and Social Monitoring Plan for the project**

<b>Component</b>	<b>Performance Indicator/s</b>	<b>Monitoring requirement/s</b>	<b>Corrective action and interface</b>
Public health and safety	<ul style="list-style-type: none"> <li>• Prevalence rates for diseases such as Malaria and HIV/AIDS;</li> <li>• Availability of condoms, contraceptive supply, impregnated bed nets, mosquito repellents;</li> <li>• Health and safety awareness among staff;</li> <li>• Frequency of incidents/accidents and fatalities numbers;</li> <li>• Number of health awareness campaigns held;</li> <li>• Outpatient attendance records;</li> </ul>	<ul style="list-style-type: none"> <li>• Daily inspection of work sites; and planning meetings;</li> <li>• Records kept;</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate incident/accidents and fatalities;</li> <li>• Follow up on complaints and other issues from planning meetings;</li> <li>• Conduct awareness meetings;</li> <li>• Updates on the OSH issues and orders given;</li> </ul>
Gravel pits and quarries	<ul style="list-style-type: none"> <li>• Number of vector breeding sites created by quarry and borrow sites;</li> </ul>	<ul style="list-style-type: none"> <li>• Number of operational material sites</li> </ul>	<ul style="list-style-type: none"> <li>• Implement recommendations;</li> </ul>

<b>Component</b>	<b>Performance Indicator/s</b>	<b>Monitoring requirement/s</b>	<b>Corrective action and interface</b>
rehabilitation	<ul style="list-style-type: none"> <li>• Lack of complaints / Complaints received;</li> <li>• Lack of complaints / Complaints received;</li> </ul>	<ul style="list-style-type: none"> <li>• rehabilitated after use;</li> <li>• Number of licenses issues for the sites;</li> </ul>	<ul style="list-style-type: none"> <li>• Comply with the EMP contained in this report;</li> </ul>
Land take	<ul style="list-style-type: none"> <li>• Number of people compensated</li> <li>• Ease of access to properties</li> </ul>	<ul style="list-style-type: none"> <li>• Physical inspection records;</li> <li>• Documentation;</li> <li>• Land easements</li> </ul>	<ul style="list-style-type: none"> <li>• Implement recommendations</li> <li>• Ensure compliance with the relevant Laws of Kenya</li> </ul>
Air quality	<ul style="list-style-type: none"> <li>• Lack of complaints / Complaints on dust and smoke;</li> <li>• Air quality monitoring;</li> </ul>	<ul style="list-style-type: none"> <li>• Physical inspection;</li> <li>• Liaise with other stakeholders;</li> <li>• Compliance with standards issued by NEMA;</li> </ul>	<ul style="list-style-type: none"> <li>• Implement recommendations;</li> <li>• Review and comply with laws and regulations;</li> </ul>
Noise generation	<ul style="list-style-type: none"> <li>• Number of complaints;</li> <li>• Existing noise standard issued by NEMA;</li> </ul>	<ul style="list-style-type: none"> <li>• Liaise with other stakeholders;</li> <li>• Make records of complaints;</li> </ul>	<ul style="list-style-type: none"> <li>• Implement recommendations;</li> <li>• Review and comply with relevant laws and regulations.</li> </ul>
Water Quality depletion	<ul style="list-style-type: none"> <li>• Lack of complaints / Complaints on pollution;</li> <li>• Turbidity on river water and oil presence;</li> <li>• Obstruction of water ways;</li> <li>• Sedimentation and pollution incidents;</li> </ul>	<ul style="list-style-type: none"> <li>• Physical inspection;</li> <li>• Number of complaints recorded;</li> <li>• Liaise with stakeholders;</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate cause of pollution on a timely basis;</li> <li>• Implement corrective measures;</li> <li>• Review and comply with</li> </ul>

<b>Component</b>	<b>Performance Indicator/s</b>	<b>Monitoring requirement/s</b>	<b>Corrective action and interface</b>
		<ul style="list-style-type: none"> <li>Follow strictly Water quality standards;</li> </ul>	relevant laws and regulations;
Conflicts over water use	<ul style="list-style-type: none"> <li>Lack of complaints / Complaints received;</li> <li>Sand harvesting activities;</li> <li>Number of boreholes drilled;</li> </ul>	<ul style="list-style-type: none"> <li>Liaise with all stakeholders;</li> <li>Number of complaints recorded;</li> <li>Physical inspection of water sources;</li> <li>Inspection records;</li> </ul>	<ul style="list-style-type: none"> <li>Implement corrective measures and recommendations;</li> <li>Review and comply with relevant laws and regulations.</li> <li>Comply with the EMP contained in this report;</li> </ul>
Socio economic aspects	<ul style="list-style-type: none"> <li>Number of jobs created (directly and indirectly) and done by men and women;</li> <li>Number of new businesses (formal and informal) operated by men and women;</li> <li>Prevalence of hap-hazard unplanned development.</li> <li>Increased agricultural production due to market accessibility;</li> <li>Increased income leading to better living standards;</li> </ul>	<ul style="list-style-type: none"> <li>Liaise with all stakeholders;</li> <li>Physical inspection;</li> <li>Documentation;</li> </ul>	<ul style="list-style-type: none"> <li>Implement recommendations made by authorities;</li> <li>Comply with the 1/3 gender rule;</li> <li>Comply with the EMP contained in this report</li> </ul>

## CHAPTER TEN

### CONCLUSION AND RECOMMENDATIONS

#### **Conclusion:**

The findings of the ESIA based on the Contract Document, Design Reports and the baseline site assessment indicated that the project is desirable and will support the realization of national and counties' development goals due to the benefits that will be realized. There is need for all the responsible stakeholders to implement the recommendations given in the ESMP to ensure sustainability of the project.

#### **Recommendations:**

- ❖ The proponent must adhere and implement in full the proposed Environmental and Social Management Plan. The proponent must observe adherence to the legislations discussed under Legal and Regulatory Chapter of this report.
- ❖ Only inevitable disturbance of flora and fauna should occur. Replanting of cleared vegetation should be done to replace the cleared vegetation. Birds nesting sites must be preserved as much as practicable.
- ❖ The project contractor should only use serviceable equipment and machinery during construction phase.
- ❖ Workers should be provided with the right working tools and safety gear to protect them when executing their duties including an equipped First Aid Kit.
- ❖ The contractor should conduct an EIA for the borrow pits or quarry sites and a license should be acquired from NEMA before starting to extract construction materials.
- ❖ There should be no road improvement works where there are electrical posts at the middle of the road until they have been removed.
- ❖ Bumps should be installed at all sharp corners.
- ❖ A retaining wall and gabions should be constructed at Kabichbich Health Center as a stop gap measure and the maternity wing should be relocated on a priority basis since a big part of it is on a road reserve.
- ❖ The road improvement works should not block access to properties and where it has happened, then the contractor should provide access and where there is a deep cut, then an access lane or stair cases should be provided.
- ❖ The contractor should designate pedestrian crossing points, stair cases, guard rails and adequate signage at appropriate places to improve on road safety.
- ❖ During site decommissioning, all the waste and unused building materials should be removed safely from the site.
- ❖ Mobile toilets should be provided to workers for managing septic waste.
- ❖ Overall, the experts conclude that the project is environmentally, socially and economically feasible and should be allowed to be implemented or as per NEMA discretion.

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## APPENDICES

### Appendix 1: Minutes of the Stakeholders Workshop – Mtelo Hall, Kapenguria

#### MINUTES OF THE STAKEHOLDERS WORKSHOP HELD AT MTELO HALL, KAPENGURIA, WEST POKOT COUNTY ON 30<sup>TH</sup> NOVEMBER, 2016 FOR THE KAMATIRA –CHEPTONGEI ROAD IMPROVEMENT PROJECT

#### Represented Stakeholders

NO	Name	Designation
1.	Cao Jin Sheng	Contract Manager
2.	Robert Mutai	Assistant Resident Engineer (ARE) KeRRA
3.	William Chemkenyang	Ward Admin, Kapenguria
4.	Michael K Tikol	Snr Chief Kaisakat
5.	Rashid Chepkurui	CRO. West Pokot
6.	Samwel P Toroitich	Ward Admin Siyoi
7.	Kakuri Richard	County Public Health
8.	Charles Ngoletuke	Chief, Kapenguria
9.	Elijah Lomuton	Chief, Kapyongen
10.	Daniel Nguriatudo	Chief, Lelan
11.	Thomas Wasike	Moa
12.	Jacob Ruto	Ward Admin
13.	Daniel Mwelema	Engineer-Renaissance Planning Ltd
14.	John Tinyang	Sub-County Administrator, West Pokot
15.	Zacheus Chemeltorit	Secretary, Lelan Travellers Sacco
16.	Daniel L Ptiony	Ward Admin
17.	Lotepes William	Pokot South
18.	Charles Mbithi	A.C.C
19.	Hon. Losilian K Johnson	MCA, Chepareria
20.	Joseph Kakuri	MP's Office, Pokot South
21.	Mark Pkemei	MP's Office, Pokot South
22.	Godfrey Acherer	MP's Office, Pokot South
23.	Mukutina Johson	C.O.M
24.	Bonface Dimba	KAPAP
25.	Daniel Lokukai	Chief, Kipkomo
26.	John Kakuko	W/Manager
27.	Moses Khaemba	Eo-Interior
28.	Naomi Komol	Sociologist- Renaissance Planning Ltd
29.	Faith Chebet Sialuk	Sociologist- Renaissance Planning Ltd

The County Road officer KeRRA Mr. Rashid Chepkurui, called the meeting to order at 11:10 AM. The meeting was opened with a word of prayer from Kapenguria Ward Administrator, Mr. William Chemkenyang.

### **Minute 1/30/11/2016/ ESIA/ Opening Remarks**

The Assistant County Commissioner, Mr. Charles Mbithi requested the members to be open and discuss all the issues arising from the project to avoid future complaints and also for the well-being of the community. He declared the meeting officially open.

### **Minute 2/30/11/2016/ ESIA/ ARE KeRRA remarks**

The Assistant Resident Engineer KeRRA welcomed all the members to the meeting, he informed the members that the meeting was very important since KeRRA had experienced a number of challenges since the project began, a stop order had been issued twice by NEMA because of non-compliance to submit an ESIA study report. He requested the members to participate fully in raising their views and concerns on the possible impacts of the proposed Kamatira – Cheptongei road improvement project.

### **Minute 3/30/11/2016/ ESIA/ Overview of the Project**

A member took the stakeholders through the project overview as summarized below;

#### **Summary of Contract Details**

Project title	Upgrading to bitumen standard of Kamatira – Cheptongei roads
Project funding	Government of Kenya
Employer	The Director General, Kenya Rural Roads Authority (KeRRA), P.O Box 48151-00100, Nairobi. Kenya
Implementing agency	Kenya Rural Roads Authority KERRA, P.O Box 48151-00100, Nairobi. Kenya
Engineer	General manager special projects, KeRRA
Supervision	General manager special projects, KeRRA
Contractor	Sino-hydro Tianjin engineering company ltd
Scope of works	Upgrading to bitumen standards
Contract sum	Ksh 2,725,125,116.22
Contract sum PBRM	Ksh 644,222,650.97
Contract period	36 months
Commencement date	24 <sup>th</sup> May 2016
Completion date	24 <sup>th</sup> May 2019
Defects liability period	12 months
Maintenance period	36 months
Amount certified to date	Ksh 272,512,511.62 10 of contract sum-advance payment
Time elapsed	6 months - 16.67% of contract period
Overall physical progress	4.53%

The ARE, informed the members that the project was officially launched on 2<sup>nd</sup>November 2016 by the president of the Republic of Kenya, His Excellency Hon. Uhuru Kenyatta. However, the road improvement

project had been affected by various factors as follows: Stop order for the works by NEMA: He said that two environmental stop orders had been issued to KeRRA by NEMA citing lack of EIA study and license, the first order was issued on 3<sup>rd</sup> August 2016 and the second was issued on 3<sup>rd</sup> November 2016.

He brought to the attention of the members that a proposed change in horizontal alignment (Kamatira forest way leave) led to a delay in commencement of works at km 0+000 - 4+100 because approval to utilize the effected part of the forest land was not given in time by County Government and by the time this meeting was held; the trees in the affected sections were still being cleared. A further delay was also caused by the Kenya Power who took long to relocate services and had not commenced rerouting of the Power lines. The ARE further explained to the stakeholders that there were labour issues just after the construction works commenced and this led to a conflict between the local community and the Contractor with regard to the way people were being employed. However, this had since been resolved after holding barazas between the community and all stakeholders. He then invited the Contractor to give further details on the project.

The Contract Manager, Mr. Cao Jin Sheng, acknowledged the support of the many stakeholders and promised that the contractor will do their best to make sure they do a good job. He also added that they were going to observe all the rules and regulations to ensure that they safe guard the environment.

#### **Minute 4 /30/11/2016/ ESIA/ Scope of Work (ESIA)**

The ARE invited the ESIA Consultant to give the scope of the ESIA study. The Consultant team (Renaissance Planning Ltd) coordinator, started off by introducing the consultant team. She informed the members that that they were engaged by the proponent who is KeRRA to conduct an ESIA for the proposed Kamatira - Cheptongei road covering 81 kilometers from Kamatira Junction, Chainage 000 to Cheptongei. The Consultant took the members through the ESIA process and emphasized that public participation was a key component in the ESIA process and it is for this reason that the stakeholder meeting had been convened.

#### **Minute 5/30/11/2016/ ESIA/ Plenary Discussion**

A member wondered if the outcomes of the ESIA study can lead to the termination of the road improvement especially if negative impacts were many. He also said as a community they welcomed the project and assured the Contractor of their support. Issues of health concerns emerging from the project such as dust and pollution of water sources were raised by Mr. Kakuri Richard; he appreciated the fact that if the ESIA study had been done before the project construction commenced the impacts being experienced currently would have been mitigated.

The representative from Travelers' Sacco (Matatu sector) raised the issue of diversions which are not passable especially during the rainy season, he also wanted to know if this road improvement project will have impact on the environment as was the case of a water project referred to as Muruny water project where there was destruction of water catchment since many trees had been cut down.

The Ward Administrator for Chepareria informed the members that there were rumors that had been going around that the project had been stopped and he sought a clarification on this issue. The ARE informed the member that the road construction was currently ongoing after negotiations with NEMA. The Sub-county Admin West Pokot informed the members that the desire of the community was to have the road Improved; he added that that all developments have side effect which can be mitigated. He also noted that the project is lagging behind as per the construction schedule.

#### **Minute 6/30/11/2016/ ESIA/ FEEDBACK**

The ARE commented that is a legal requirement to conduct an ESIA for the road but they were delayed by the tender process. Negotiation was done between the proponent and NEMA to allow the contractor to continue as they proceeded with acquiring the expert to undertake the ESIA. ARE informed the members that work were ongoing and people should ignore politics.

On the issue of project delays; the ARE informed the stakeholders that this was due to the rains during month of August, he also informed the members that in Chebyamit and Kamatira; the road is passing through a forest and it took time for proponent to get approval for cutting down trees in the forest, as a result; it became hard to create diversions. Some parts of the road are narrow and they do not give space for diversions an example is at Daraja Mungu.

The consultant also informed the members that NEMA is the Authority mandated to be the custodian of the Environment and they have the powers to stop a project whose impacts are adverse. She also told the members that NEMA has the mandate to protect the environment and they are not restricted to any project be it government or private

The Sub-county Administrator for Pokot South suggested the use of Kapchila Road as a diversion that connects to Kabichbich to avoid interfering with the road construction. Mr. Kakuri requested the contractor to minimize dust from the construction activities through watering the dusty areas. The MCA Chepareria ward requested the Contractor to liaise with the Chiefs in identifying the exact points for dumping to protect the soil from being washed downstream and cause sedimentation of rivers. The Chief Kapyongen location requested the contractor to ensure that all feeder road are passable i.e. Ket-Chepokoro which had become impassable.

He said that the impacts that are being felt are normal because the road construction is on the existing road, the road will help reduce accidents experienced in the past from sharp corners. The chief Kaisakat location asked if there were funds set aside for compensation, he also wanted to know the length of the road that falls in West Pokot County. He also noted that the contractor had not complied with the agreement on employment, also the schools affected like Kapkecha should be helped to make their access road passable. RM informed the member that the road on west Pokot side covers 39.5 km and there is money set aside for compensation but only if they deviate from the road reserve.

The chief Kapenguria asked if there will be a fly over in Chepyomit. The ARE informed them that it will be risk having a fly over in that area, but he assured them that the Contractor was going to do a back slope in Chepyomit, Loiloi Corner to reduce slope gradient and put bumps. He also informed the members that previously they have had meeting on this issue of employment.

### AOB

There being no any other business the meeting ended at 1.00 P.M with a prayer from Mr. William. The members then took a group photo after which they had a common lunch within the venue.

Chairman: KHALIF ABDULAH Secretary: [Signature]

DEPUTY COUNTY COMMISSIONER  
WEST POKOT SUB-COUNTY

[Signature]



## Appendix 2: Minutes of the Stakeholders Workshop – CDF Hall, Iten

### MINUTES OF THE STAKEHOLDERS WORKSHOP HELD AT CDF HALL, ITEN ON 5<sup>TH</sup> DECEMBER, 2016 FOR THE KAMATIRA –CHEPTONGEI ROAD IMPROVEMENT PROJECT

#### Represented Stakeholders

NO	NAME	DESIGNATION
1.	Albert Kigen	Village Elder
2.	Eng. E. C. Mutai	RE (KeRRA RM/RE)
3.	Charles K. Kulien	CHIEF
4.	Duncan Osale	EO (NEMA)
5.	Faustina Saka	Chairlady (Opinion Leader)
6.	Shadrack .K. Serem	Opinion Leader
7.	Leona N Waydo	CPPO
8.	Wilson K Kimengich	Chief
9.	Simon K Cheptot	County Director(Meteorological Department)
10.	Timothy Cheboi	Data Manager
11.	Chepkwong Kiprotich Bore	ARE(KeRRA)
12.	Luka M. Chemoiywo	Education
13.	Michael Komen	Education Officer
14.	Moses K Kisang	Snr. Chief
15.	Alice Kibor	Ag. Chief
16.	James R Kibowem	Chief
17.	Sylvia Kimutai	Re-Secretary(KeRRA)
18.	George Kubai	ACCI
19.	Naomi Komol	Sociologist- Renaissance Planning Ltd
20.	Wilson Omenei	
21.	Francis Kwambai	Opinion Leader
22.	William Chemorlo	Assistant Chief
23.	Richard Kchuoblelion	Assistant Chief
24.	Vitali Kipyegon	Matatu Representative
25.	Abraham Kipkoech Kibet	Opinion Leader
26.	Cedric Chengwony	Assistant Chief
27.	Felix Kigen	Assistant Chief
28.	Peter C Kiplagat	Chief
29.	Faith Chebet Sialuk	Data Analyst- Renaissance Planning Ltd

#### Absent with Apology

1. M.P, Marakwet West
2. MCA, Marakwet West

### **Minute 1/5/12/2016/ ESIA/ Welcome Remarks**

The Regional Manager welcomed all the members in the meeting. He informed them that the meeting was very important; he asked them to feel free and contribute for the benefit of the community

### **Minute 2/5/12/2016/ ESIA/ Opening Remarks**

The Deputy County Commissioner, Elgeyo Marakwet North appreciated the members for attending the meeting. He explained to the stakeholders that the function was very important and they should articulate issues as they know since they represent the community interests. He acknowledged that the terrain of Elgeyo Marakwet is bad and the area has been inaccessible for a long time, thus upgrading the road would be the greatest achievement. He then declared the meeting open.

### **Minute 3/5/12/2016/ ESIA/ Overview of the Project**

The RE informed the members that the road was being upgraded to bitumen standard, thus the need for the workshop to allow the stakeholders air their views on the road project. He explained to the stakeholders that, the meeting was the initial one and there would be two more meetings (barazas) in the affected areas. He called on the stakeholders to freely air their concerns on the proposed road project when called upon to do so. He further explained that the section of the road in Elgeyo Markwet County is 41.5km long. He outlined the contract details as summarized in the table below:

#### **Summary of Contract Details**

Project title	Upgrading to bitumen standard of Kamatira – Cheptongei roads
Project funding	Government of Kenya
Employer	The Director General, Kenya Rural Roads Authority (KeRRA), P.O Box 48151-00100, Nairobi. Kenya
Implementing agency	Kenya Rural Roads Authority KERRA, P.O Box 48151-00100, Nairobi. Kenya
Engineer	General Manager Special Projects, KeRRA
Supervision	General Manager Special Projects, KeRRA
Contractor	Sinohydro Tianjin Engineering Company ltd
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Defects liability period	12 months
Maintenance period	36 months
Amount certified to date	Kshs 272,512,511.62 10 of contract sum-advance payment
Time elapsed	6 months - 16.67% of contract period
Overall physical progress	4.53%

#### **Minute 4 /5/12/2016/ ESIA/ Scope of Work (ESIA)**

The RE introduced the consultant to the stakeholders and explained that KeRRA is implementing this project and they have engaged Renaissance planning Lt to undertake the ESIA study on behalf of the authority. He invited the consultant's team leader who introduced the consultant team. She explained that ESIA is a study that capture environment and social issues of a project and is a mandatory exercise for all development projects as provided in EMCA 1999, amended. She further explained that there was a procedure to be followed in undertaking the ESIA study which entailed various public consultation forums. She informed the participants that in writing the ESIA report, they had to consider the various Acts and Policies in relation to the project. She requested all the stakeholders to participate in the discussions by highlighting the issues that may arise during the construction and operational phases of the project.

#### **Minute 4/30/11/2016/ ESIA/ Plenary Discussion**

Chief from Lelan, wanted to know what does it meant to upgrade to bitumen standard. RE informed him that the current road is murrum and what will be done is tarmacking the road, put culverts and proper drainages on the road.

Francis Kwambai, thanked the current Government for the project but noted that certain things would be affected by the project for example people's property, trees among other assets. He then requested for prompt and fair compensation for any of the affected assets.

Meteorological department representative explained that the road had both positive and negative impacts on environment as there will be soil erosion due to the land terrain. He inquired on what would happen to people's farms where surface run off would be directed as well as the plight of the plots for people living on the road reserve.

Leona Oundo sought to find out the various mitigation measures to be put in place to ensure safety at the towns where the road passes through.

The RE informed the stakeholders that if someone had encroached on the road reserve, he/she would be given notice to vacate and compensation would only be done in instances where the road would deviate from the original route due to necessary alignments. With respect to soil erosion, he assured the stakeholders that they will adopt various soil erosion curbing measure. They will also try to divert water through the existing channels and if need be, introduce new channels after negotiations/consultations with the public. With respect to the safety of the towns where the road passes through, the RE informed the members that bumps and road signs will be

erected to ensure the people's safety. Trees will also be planted once the tarmacking process is over as part of the landscaping exercise.

Shadrack Seremu explained to the participants that when such projects are introduced in an area, many people come from various places outside the community. He however requested the contractor to consider the locals for employment to avoid conflict. He proposed the melting of tar to be done in the forest and during the day. He observed the need for a mediator between the community and the contractor proper sensitizing of the people on diseases people. He further requested the consideration of the local community for any cooperate social responsibility.

The consultant inquired from the members if there are any cultural sites along the way that may be affected. The members replied that they are far away from the road. She requested the community to form a committee that will handle some of the issues and in case of a borrow pit, the owner to make a binding agreement. The RE informed the members that where they will encounter blasting modern technology would be used and they will also ensure that all the points leading to people homes should be made accessible. He further explained to the stakeholders that the road is a 6m carriage way with no special provision for pedestrians, however, basic access will be provided. Minute 5/5/12/2016/ ESIA, Closing Remarks

The officer from NEMA was requested to give the closing remarks. He commented that the project will be issued with a licence once the ESIA process is complete. He also asked the community not to worry about blasting as it was being undertaken by the Geology Department and with NEMA's supervision in all stages of the project. There being no any other business the meeting ended at 3.00 Pm with a word of prayer from one of the stakeholders.

Chairman: Moses K. Misongy  


Secretary:  .....



### Appendix 3: Minutes of Public Participation- Siyoi, Kamatira junction

#### MINUTES OF PUBLIC PARTICIPATION MEETING HELD AT SIYOI- KAMATIRA JUNCTION ON 1<sup>ST</sup> DECEMBER, 2016

The meeting began at 10.00 AM with the Snr. Chief Michael Tikol of Kaisakat location opening the meeting and welcoming all those present. He started off by inviting the elders from the various villages to give an update on the progress in the areas they represent.

The Chief then invited the ESIA Consultant to take the participants through the meeting's agenda. The consultant team leader started by introducing members of the consultant team. She then took the participants through the steps involved in carrying out ESIA study and informed them of the need for public participation in the ESIA process.

She then opened the meeting for a plenary discussion that was chaired by the Snr. Chief. The discussions focused on the concerns from the people living along the road improvement project route. The consultant then responded to the concerns raised. Below is a presentation of concerns / comments raised and the response / feedback.

**Table A3: Concerns and comments from stakeholders meeting**

Concern/comments	Response/feedback
<ul style="list-style-type: none"> <li>• The road had made a cultural site at Chebyamit inaccessible</li> <li>• They requested for a flyover that would link the community to the cultural site across the road.</li> <li>• Disrespect for the local culture by the contractor for example cutting down a sacred tree called <i>Simotwo</i>.</li> <li>• The contractor to construct bumps at appropriate points.</li> <li>• Water pollution as a result of soil dumpsites</li> <li>• Soil eroded into water sources.</li> <li>• Conflicts between the contractors and the community on issues of employment(for example, ladies with young children are not given employment)</li> <li>• Sexual harassment among the women by the Contractor</li> <li>• Gender discrimination in employment, the Contractor prefers to give jobs to men other than women.</li> <li>• The contractor does not honour the agreement made during employment on issues of wages, because he pays lower wages than what is agreed upon.</li> <li>• The community requested for a mediator who will handle issues between the contractor and the community</li> <li>• The workers are not provided with (PPE) in the construction site</li> <li>• The road is causing a lot of dust pollution and this has affected the health of those living along this road</li> </ul>	<ul style="list-style-type: none"> <li>• The consultant responded by reminding the members of the community present in this meeting that, the main objective of ESIA was to ensure that projects implementation is done sustainably.</li> <li>• An ESIA is supposed to be conducted before a project commences, so that mitigation measures for any predictable impacts can be put in place.</li> <li>• She went on to inform them that mitigation for the impacts expressed by the community was going to be given by the consultant and the contractor was going to adhere to it. Consequently, these impacts will either be eliminated or reduced.</li> <li>• She also advised that a proper agreement should be drawn between land owners and the Contractor where the dumpsites or borrow pits are located. The</li> </ul>

<ul style="list-style-type: none"> <li>• The contractor has been destroying fences without any prior information</li> <li>• Diversions provided are not adequate and there are no road signs to show any diversion or road barriers.</li> <li>• The contractor does not consult the community on issues touching on their land for example at chainage 11, the contractor went beyond the area allocated for a dumpsite without prior notice to the land owner</li> <li>• Lack of toilets for use by the road workers, this has led to open defecation.</li> <li>• Fear of disease outbreaks due to poor human waste disposal was raised</li> <li>• The community believe there should have been a committee formed to oversee issues affecting them</li> <li>• Lack of early notices for property demolition</li> <li>• Lack of compensation for property destroyed</li> <li>• The contractor should allow church attendance on Sundays.</li> <li>• A road that passed through the forest had been cutoff there will be a lot of run-off when the road is tarmacked and so they requested the contractor to create a cut-off drain to prevent soil erosion</li> <li>• When the road construction is completed the area will open up to a lot of business opportunities</li> <li>• The livelihood of the local will improve when the road is completed</li> <li>• Some of the diversions have encroached into people's land and no compensation has been made.</li> <li>• Fear of inter-race children being born by the local women, because the contractor is Chinese and this workers were already relating with the locals</li> <li>• The community should be involved in dumpsite selection since their impacts affect them</li> <li>• The construction works continue into the night thereby causing a lot of noise disturbance at night to those living along the road</li> <li>• There will be more accident when the road construction is complete</li> <li>• Precautions should be taken to ensure road safety.</li> </ul> <p>In conclusion, the community welcomed the road improvement project and said that the implementation should be speeded up.</p>	<p>agreement should be explained to the land owner in a language they understand to avoid future conflicts.</p> <ul style="list-style-type: none"> <li>• She also recommended that workers to be provide with PPE.</li> <li>• She also advised that the flyover the community was requesting at Chebyamit may be risky in the long run especially to the children.</li> <li>• She concluded by assuring the community that all the issues will be captured in the report and advice given appropriately.</li> </ul>
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#### Appendix 4: GPS Mapping

Way Points	Northings	Eastings
Kamatira intersection with A1 Lodwar - Kitale Road	1° 16' 17.82" N	35° 8' 45.03" E
Previous route Safari Yote	1° 16' 18.06" N	35° 8' 44.62" E
Intersection with A1 Kamatira Forest	1° 16' 16.06" N	35° 8' 44.58" E
Drainage valley 1	1° 16' 1.82" N	35° 9' 0.76" E
Abandoned KFS check point	1° 15' 42.45" N	35° 9' 27.79" E
Corner YaLotodo	1° 15' 29.35" N	35° 9' 43.35" E
Kwa Ranger Site	1° 15' 18.98" N	35° 10' 4.21" E
Kapkecha Centre	1° 15' 11.79" N	35° 10' 26.98" E
Kapkecha Centre	1° 15' 18.87" N	35° 10' 42.73" E
Stage 106 Chembomiat	1° 15' 28.04" N	35° 11' 24.83" E
Chebromet Centre	1° 15' 25.06" N	35° 11' 41.69" E
End of Kamatira forest section	1° 15' 23.92" N	35° 11' 57.29" E
KwaLotodo, junction to project camp site	1° 15' 26.12" N	35° 12' 26.65" E
Paraywa Trading Centre	1° 15' 30.52" N	35° 12' 35.41" E
Paraywa Health Centre	1° 15' 31.1" N	35° 12' 50.62" E
Paraywa Trading Centre	1° 15' 30.16" N	35° 12' 52.72" E
Paraywa Lutheran Church	1° 15' 53.38" N	35° 13' 28.4" E
Chepokoror prehistoric resting place for community after trading and also a view point for the community	1° 16' 1.52" N	35° 13' 57.39" E
Chepokoror project borrow pits	1° 16' 0.19" N	35° 14' 0.4" E
Daranja Ya Mungu depression; end of West Pokot Sub County, entry to Pokot South Sub County	1° 15' 54.67" N	35° 14' 14.16" E
Takam	1° 15' 25.19" N	35° 14' 16.09" E
Chepkono community milk cooler	1° 15' 19.15" N	35° 14' 20.96" E
Presidents launch Plaque at Chepkono	1° 15' 19.92" N	35° 14' 21.25" E
Chepkono Market Centre	1° 15' 4.63" N	35° 14' 21.01" E
Chepkono Dispensary	1° 15' 2.2" N	35° 14' 42.24" E
Chepinat Centre	1° 14' 19.01" N	35° 15' 42.18" E
Kalotwari Centre	1° 13' 38.16" N	35° 16' 0.05" E
St Joseph's Kalotwari Mixed Day Secondary	1° 13' 38.16" N	35° 16' 2.17" E
Corner	1° 12' 43.85" N	35° 16' 31.32" E
Kabichbich Health Centre	1° 12' 36.26" N	35° 16' 36.25" E
Kabichbich Trading Centre	1° 12' 7.32" N	35° 17' 2.41" E
St. Lumumba Secondary	1° 11' 49.53" N	35° 17' 6.22" E
Kabibia Primary	1° 11' 44.69" N	35° 17' 17.49" E
St Elizabeth BabichBich Girls High School	1° 11' 37.69" N	35° 17' 24.2" E
Centre Kwanza	1° 11' 6.32" N	35° 17' 50.07" E
Kipat Academy	1° 18' 31.35" N	35° 18' 17.94E
Junction To Ring Ring	1° 10' 18.49" N	35° 18' 36.66" E
Kapsait Primary	1° 9' 32.96" N	35° 20' 17.72" E
Kapsait Centre No. 1 in West Pokot	1° 9' 26.49" N	35° 20' 21.14" E
Murkokoi	1° 8' 29.79" N	35° 20' 47.91" E
Pokwa Plekwa Primary	1° 8' 11.92" N	35° 21' 17.97" E
Entry To Elgeyo Marakwet County	1° 7' 59.62" N	35° 21' 34.51" E
Kapsait Trading Centre 1st Town on Elgeyo Marakwet side	1° 7' 55.38" N	35° 21' 48.7" E

Chemulany;Marakwet West	1° 5' 49.62" N	35° 23' 41.28" E
Makutano	1° 5'21.74" N	35° 24' 56.94E
Kapchir	1° 4' 27.35" N	35° 25' 19.39" E
Lobot Centre; Marakwet East	1° 4' 11.75" N	35° 24' 50.69" E
Junction to Kapkochar Primary	1° 3' 16.51" N	35° 25' 14.47" E
Kaisungur Forest	1° 2' 51.37" N	35° 25' 22.6" E
Kaisungur Forest	1° 2' 3.26" N	35° 25' 24.65" E
Kokwongoi Trading Centre	1° 1' 14.71" N	35° 25' 49.83" E
Juction to Kokwongoi Primary	1° 1' 11.03" N	35° 25' 55.07" E
Kimnai Primary	1° 1' 44.61" N	35° 26' 42.89" E
Kimnai Centre	1° 1' 47.1" N	35° 27' 20.14" E
Kuserwo Primary	1° 1' 24.25" N	35° 27' 28.89" E
Tempor Forest	1° 0' 55.42" N	35° 27' 37.69" E
Kamasat Primary	1° 0' 32.09" N	35° 27' 31.08" E
Junction to Kitunget Primary and Meibewo Primary	0° 59'15.95" N	35° 27' 27.64" E
Junction to Yemtin	0° 59'4.65" N	35° 27' 27.6" E
Yemtin Boys and Primary School	0° 58'53.48" N	35° 28' 13.44" E
Yemtin Girls High School	0° 58'43.75" N	35° 28' 13.98" E
Cheboit Forest	0° 57'24.42" N	35° 29' 47.82" E
Junction To Kapsogoria and Cheptulon	0° 57'17.14" N	35° 30 ' 16.58" E
Moiben river crossing	0° 56'37.13" N	35° 30' 43.49" E
Cheptongeï Trading Centre	0° 56'30.71" N	35° 30' 51.06" E
Cheptongeï Junction	0° 56'30.78" N	35° 30' 51.02" E

# **Appendix 5: Community Questionnaires**

# **Appendix 6: Key Informants' Questionnaires**

# **Appendix 7: Public Baraza Attendance Lists**

# **Appendix 8: Renaissance Planning Ltd**

## **Registration Documents**

- i. Certificate of Incorporation**
- ii. PIN/VAT Certificate**
- iii. Tax Compliance Certificate**
- iv. NEMA Registration Certificate**
- v. NEMA Practicing License**