



**Ministry of Energy and Petroleum**

**Kenya Electricity Transmission Company (KETRACO)**

**Environmental and Social Impact Assessment for**

**70KM Menengai- Ol Kalou-Rumuruti 132/133kV double circuit Transmission Line  
under package II**

**Final Report**

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**EMC Consultants**  
ENVIRONMENTAL KNOWLEDGE IN PRACTISE

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## GENERAL INFORMATION

<b>Project</b>	<b>Environmental and Social Impact Assessment for Menengai – Olkalau-Rumuruti 70Km double circuit 132kV Transmission Line</b>
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## ACRONYMS

AAAC	- All Aluminium Alloy Conductor
AEWA	- African-Eurasian Water-bird Agreement
AIDS	- Acquired Immuno Deficiency Syndrome
AoI	- Area of Influence
BFD	- Bird Flight Diverter
BOD	- Biochemical Oxygen Demand
C-ESMP	- Construction Environment and Social Management Plan
CBD	- Convention on Biological Diversity
CBOs	- Community Based Organisations
CCVT	- Coupling Capacitor Voltage Transformers
CDF	- Constituency Development Fund
CEC	- County Executive Committee
CEDAW	- Convention on the Elimination of All Forms of Discrimination Against Women
CIA	- Cumulative impact assessment
CIDP	- County Integrated Development Plan
CLOs	- Community Liaison Officers
CMS	- Convention on Migratory Species
COD	- Chemical Oxygen Demand
EBA	- Endemic Bird Area
ECD	- Early Childhood Development
EE	- Energy Efficiency
EHS	- Environmental Health and Safety
EMCA	- Environmental Management and Coordination Act
EMF	- Electromagnetic Field
ENSO	- El Nino/Southern Oscillation
EPRP	- Emergency Prevention and Response Plan
ESIA	- Environmental and Social Impact Assessment
ESMP	- Environmental and Social Management Plan
FGDs	- Focus Group Discussions
FPE	- Free Primary Education
GBV	- Gender Based Violence
GDC	- Geothermal Development Company
GDP	- Gross Domestic Product
GHG	- Greenhouse Gas
GIIP	- Good International Industry Practice
GoK	- Government of Kenya
GWP	- Global Warming Potential
HIV	- Human Immuno Virus
HR	- Human Resources
HVDC	- High-Voltage Direct Current
IBA	- Important Bird Area
ICTZ	- Intertropical Convergence Zone
IFC	- International Finance Corporation

ILO	- International Labor Organization
KALRO	- Kenya Agricultural Research Organization
KCC	- Kenya Cooperative Creameries
KenHA	- Kenya National Highways Authority
KESIP	- Kenya Electricity System Improvement Project
KETRACO	- Kenya Electricity Transmission Company
KFS	- Kenya Forest Service
KNBS	- Kenya National Bureau of Statistics
KPLC	- Kenya Power and Lighting Company
KTBH	- Kenya Top Bar Hive
KWFT	- Kenya Women Finance Trust
LCPDP	- Least Cost Power Development Plan
LDV	- Light Duty Vehicles
LPG	- Liquid Petroleum Gas
MIR	- Minimum Internal Requirements
MOEP	- Ministry of Energy and Petroleum
MVA	- Mega Volt Amp
MW	- Megawatts
NBSAP	- National Biodiversity Strategy and Action Plan
NEC	- National Environmental Council
NEMA	- National Environment Management Authority
NG-CDF	- National Government Constituency Development Fund
NGOs	- Non-Governmental Organizations
NOX	- Oxides of Nitrogen
OHTL	- Overhead Transmission Line
OPGW	- Optical Ground Wire
OSRP	- Oil Spill Response Plan
PAHs	- Project Affected Households
PAPs	- Project Affected Persons
PCB	- Printed Circuit Board
PCB	- Polychlorinated Biphenyls
PDO	- Project Development Objective
PM	- Particulate Matter
PPE	- Personal Protective Equipment
RAP	- Resettlement Action Plan
RoW	- Right of Way
RPF	- Resettlement Policy Framework
RPM	- Respirable Particulate Matter
RTI	- Respiratory Tract Infections
RVWSB	- Rift Valley Water Services Board
SEA	- Sexual Exploitation and Abuse
SEP	- Stakeholder Engagement Plan
SF6	- Sulfur Hexafluoride
SGBV	- Sexual and Gender Based Violence
SGR	- Standard Gauge Railway
SMEP	- Small and Micro Enterprise Program

SOX	- Sulphur Oxides
STDs	- Sexually Transmitted Diseases
TL	- Transmission Line
TVETA	- Technical Vocational Education and Training Authority
VAC	- Violence against Children
VEC	- Valued Environmental and Social Components
VMGF	- Vulnerable and Marginalized Groups Framework
WB	- World Bank
WHO	- World Health Organization

## EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (ESIA) Study Report presents an assessment of the potential environmental and social impacts associated with the proposed construction of the High Voltage (HV) Menengai-Olkalau-Rumuruti 132kV double circuit transmission line ('the Project') to ensure that environmental and social aspects are diligently considered and managed during the Project lifecycle. This Environmental and Social Impact Assessment (ESIA) Study report has been prepared by **EMC Consultants Limited** for Kenya Electricity Transmission Company (KETRACO) (Proponent) which is to put up an approximately 70km long, 30-meter-wide, 132kV double circuit transmission line that will be energized upon completion to the national grid via linking of Menengai geothermal power plant and Rumuruti sub-station.

The proposed project is financed by the World Bank (WB) through the Kenya Electricity System Improvement Project (KESIP). The development of KESIP is driven by the imperative to dramatically improve reliability of electricity supply to underpin economic activity and to sustain electrification. Electricity service interruptions in recent years have been due to a number of factors that include: inadequate generation capacity (especially during dry periods when hydropower availability is reduced); congestion in the transmission infrastructure that constrains power transfers from where there is surplus generation capacity to regions where there is a deficit; scheduled interruptions for line work and unscheduled interruptions due to a weak network; inadequate preventive maintenance; vandalism; inadequate automation, etc.

KESIP is designed to address the transmission and distribution aspects of electricity to ensure reliable power supply by building resiliency into the network so as to enable it to react to unexpected events by isolating problematic elements while the rest of the system is restored to normal operation. This will also be achieved through minimizing the impact of scheduled network maintenance on the fewest number of customers possible. Ultimately, the transmission and distribution projects will provide reliability, enhance security of supply to the existing demand hubs in the country, expand transmission and distribution capacity necessary to enhance electrification initiatives, and reduce technical losses in areas currently served by long medium voltage lines.

Kenya is seeing large scale expansion in many infrastructure sectors including energy. In year 2007, the Government of Kenya unveiled "Vision 2030". Vision 2030 is the country's economic blueprint that aspires to transform the country from a low income, agrarian economy into a newly industrialized middle-income country, providing a high quality of life to all its citizens by the year 2030. The vision identifies energy as one of the enablers for sustained economic growth and a key foundation of Kenya's envisaged national transformation. Expansion of Energy Sector was seen as critical in order to achieve the GDP growth target of 10% which was targeted for 2015.

Accordingly, the Government of Kenya has formulated Least Cost Power Development Plan (LCPDP) in 2011 and updated further in 2013. As per LCPDP updated in 2013, transmission development plan indicates the need to develop approximately 21000 km of new high voltage transmission lines. This Plan encapsulates three key areas viz. load

forecasting, generation planning, transmission planning. As per LCPDP, the peak load demand is projected to rise to 21,075 MW by Year 2033 from existing 1606 MW during 2013. For this, addition in generation capacity to the tune of 22,000 MW has been planned. In the present scenario of power supply arrangement in Kenya, the electrification has been achieved up to approximately 30% of its population.

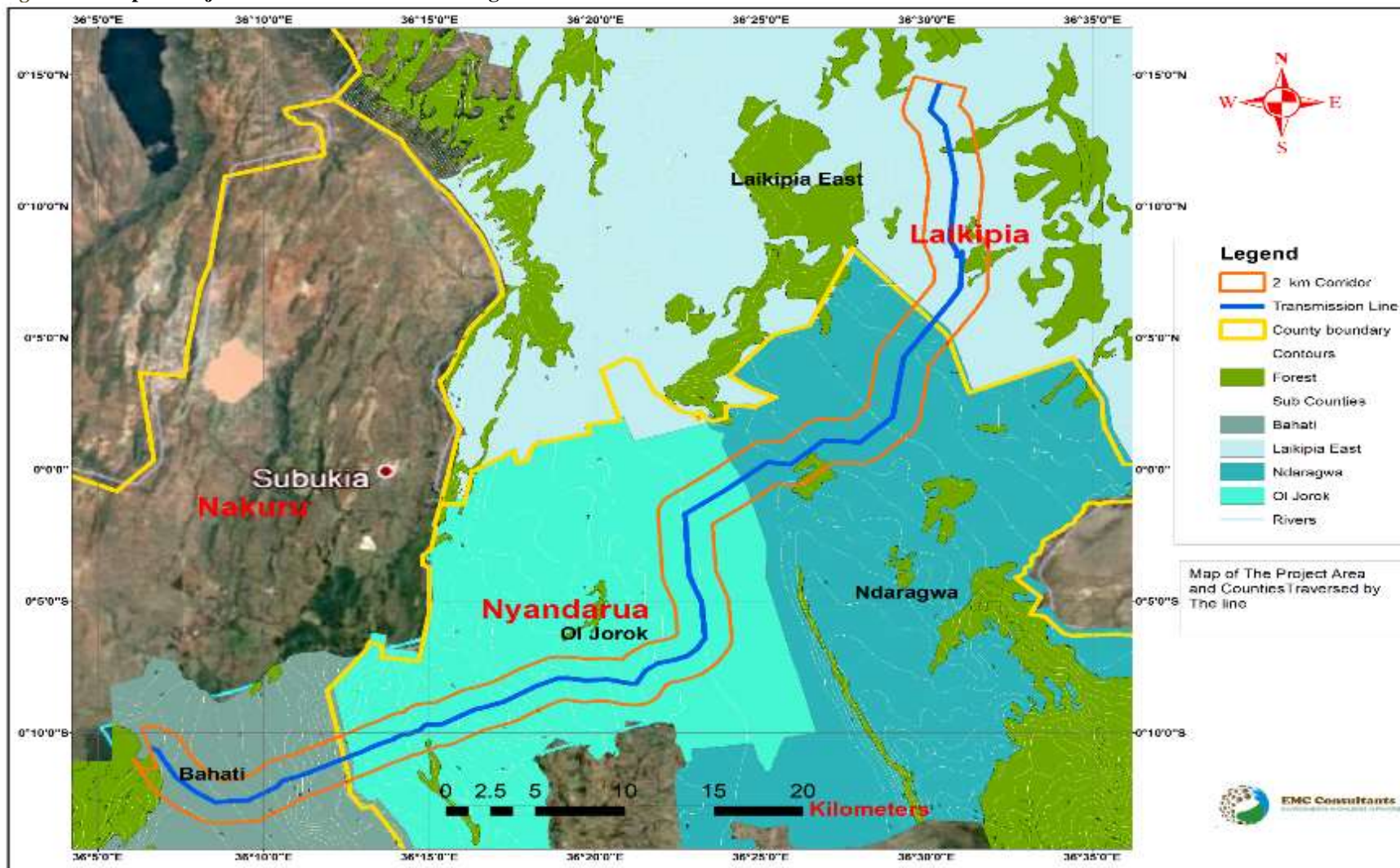
## **PROJECT PROPONENT**

Kenya Electricity Transmission Company Limited (KETRACO) was incorporated on 2nd December 2008 and registered under the Companies Act, Cap 486 pursuant to Sessional paper No. 4 of 2004 on Energy. KETRACO is 100% Government owned and being a state corporation, it is regulated under the State Corporations Act, Cap 446. KETRACO was established to develop new high voltage electricity transmission infrastructure that will form the backbone of the national transmission grid, in line with Kenya Vision 2030. Its core business is to plan, design, build and maintain electricity transmission lines and associated substations. The voltage rating of the transmission lines includes 132kV, 220kV, 400kV and 500kV. KETRACO's mandate is to plan, design, construct, own, operate and maintain high voltage electricity transmission grid and regional power interconnectors that will form the backbone of the national transmission grid.

## **PROJECT LOCATION**

The proposed high voltage transmission line traverses three counties i.e. Nakuru county starting at the Menengai Geothermal Power Plant, geographic coordinates 0°10'33.44"S 36° 6'32.85"E and terminating in Laikipia county at Rumuruti sub-station geographic coordinates 0°14'44.78"N 36°30'23.60"E. It is expected that upon completion, the 132kV double circuit Transmission Line of approximately 70 Km will be energized and become part of the national grid. Figure 0-1 below highlights the transmission line route including the project Area of Influence (AoI) which is a corridor of 2km on both side of the transmission line. The proposed Right of Way (RoW) for the transmission line will be a 30 metres wide corridor with a total length of 70km running from Menengai Geothermal Power Plant in Nakuru County, through Nyandarua County and terminating at the existing Rumuruti substation in Laikipia County. As a result of the 30metre wide corridor, physical and economic displacement of Project Affected Households (PAHs) in this ESIA study has been identified as an impact likely to occur along the transmission route. The approximate acreage of land to be affected is **375.78** acres based on the Resettlement Action Plan (RAP) report prepared for this line and informed and recommended during the ESIA scoping phase. The RAP has been prepared in accordance with the KESIP's Resettlement Policy Framework (RPF) which is the overall framework document providing guidance on how to appropriately identify, address and mitigate adverse socio-economic impacts that may occur due to the implementation of sub-projects that involve the involuntary acquisition of land and the subsequent resettlement of affected households.

Figure 0-1. Map of Project Transmission Line Routing Area



## **ESIA STUDY OBJECTIVES**

The purpose of this study was to undertake an Environmental and Social Impact Assessment study for the 132kV transmission line. The ESIA study has been developed in compliance with the Environmental and Social Impact Assessment/Audit Regulation, 2003 and relevant World Bank (WB) environmental and social safeguard policies with emphasis on O.P 4.01. The purpose of an ESIA is to provide information to regulators, the public and other stakeholders to aid the decision-making process. The objectives of the ESIA are to:

- Define the scope of the project and the potential interactions of project activities with the environment (bio-physical and socio-economic).
- Identify relevant national and international legislation, standards and guidelines and to ensure that they are considered at all stages of project development.
- Provide a description of the proposed project activities and the existing environmental and social conditions that the project activities may interact with.
- Predict, describe and assess impacts that may result from project activities and identify mitigation measures and management actions to avoid, reduce, remedy or compensate for significant adverse effects and, where practicable, to maximize potential positive impacts and opportunities.
- Provide a plan for implementation of mitigation measures and management of residual impacts as well as methods for monitoring the effectiveness of the plan.

## **ESIA METHODOLOGY AND APPROACH**

The approach taken in this study is guided by the principles of integrated environmental management. The approach is therefore guided by the principles of transparency which is aimed at encouraging decision making. The underpinning principles of integrated environmental management are:

- Informed decision making;
- Accountability for information on which decisions are made;
- Consultation with stakeholders;
- Due consideration of feasible alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts associated with the proposed project;
- An attempt to ensure that social costs of the development proposals are outweighed by the social benefits;
- Regard to individual rights and obligations;
- Compliance with these principles during all stages of planning, implementation and decommissioning of the proposed development; and
- Opportunities for public and specialist input in the decision-making process.

The study has also been guided by the requirements of the EIA Regulations set out in terms of the Environment Management and Coordination Act, 1999 and (amendment) 2015.

### **a) Literature Review**

Numerous literatures were reviewed as part of the ESIA study and included policy and legal related secondary data as well as non-statutory literature. A number of documents were reviewed including: -

- KESIP's Environmental and Social Management Framework
- KESIP's Resettlement Policy Framework
- KESIP's Vulnerable and Marginalized Groups Framework
- Relevant Kenyan legal statutes, policies and regulations
- Relevant project area baseline biophysical and socio-economic documents
- World Bank's safeguards policies
- Detailed design report

## b) Field Site Surveys and Stakeholder Consultations

Field site surveys formed part of the preparation of the ESIA report. The main objective of this activity was to carry out on-site field assessments of the expected effects of the project on the physical, biological and socio-economic environment. During these site surveys, consultations with key informants and the project affected persons and other interested stakeholders were conducted using a variety of appropriate tools. Direct observation was also used as a technique.

## WORLD BANK SAFEGUARDS POLICIES TRIGGERED

The World Bank (WB) is a recognized international leader in the sphere of development and implementation of environmental and social sustainability policies. WB uses a set of environmental and social safeguards policies to assess proposed projects. The table below highlights the relevant WB safeguards policies that have been triggered by the KESIP. OP. 4.01, 4.04, 4.11 and 4.12 are applicable to this sub-project.

Table 0-1. Safeguard policies triggered by the Project

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP 4.01)	[X]	[ ]
Natural Habitats (OP 4.04)	[X]	[ ]
Cultural Property (OP 4.11)	[X]	[ ]
Involuntary Resettlement (OP 4.12)	[X]	[ ]
Indigenous Peoples (OP 4.10)	[X]	[ ]
Forests (OP 4.36)	[ ]	[X]
Safety of Dams (OP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP 7.60)	[ ]	[X]
Projects on International Waterways (OP 7.50)	[ ]	[X]
Pest Management (OP 4.09).	[ ]	[X]

## WORLD BANK PROJECT CATEGORIZATION

KESIP is considered to have “significant, adverse environmental impacts that are ‘sensitive,’ diverse or unprecedented”, may be irreversible or raise significant issues reflected in various safeguard policies relating to natural habitats (e.g., lead to loss of major natural habitat), involuntary resettlement, impacts on indigenous peoples or physical cultural resources and may affect an area broader than sites or facilities subject to physical works. It is this categorized as a Category **A** project. For this reason, the proposed construction of the transmission line and sub-station falls under the same category and hence requiring a full ESIA.

## Applicable WB/IFC Guidelines

The WB/IFC EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are normally acceptable to the IFC and are generally considered to be achievable in new facilities at reasonable costs using existing technology. The IFC EHS Guidelines comprise both general and industry-specific guidelines. The IFC General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. It is designed and should be used together with the relevant industry sector specific guidelines. IFC Environmental, Health and Safety (EHS) Guidelines applicable to the Project are:

- General EHS Guidelines, 2007.
- EHS Guidelines for Electric Power Transmission and Distribution, 2007

## PROJECT ACTIVITIES

The proposed works associated with the construction of the transmission line will include the following activities:

1. Site preparation
2. Excavation works
3. Assembling of towers
4. Raising of towers
5. Unreeling and installing the conductors
6. Installing the counterpoise wires
7. Stringing
8. Restoring the site

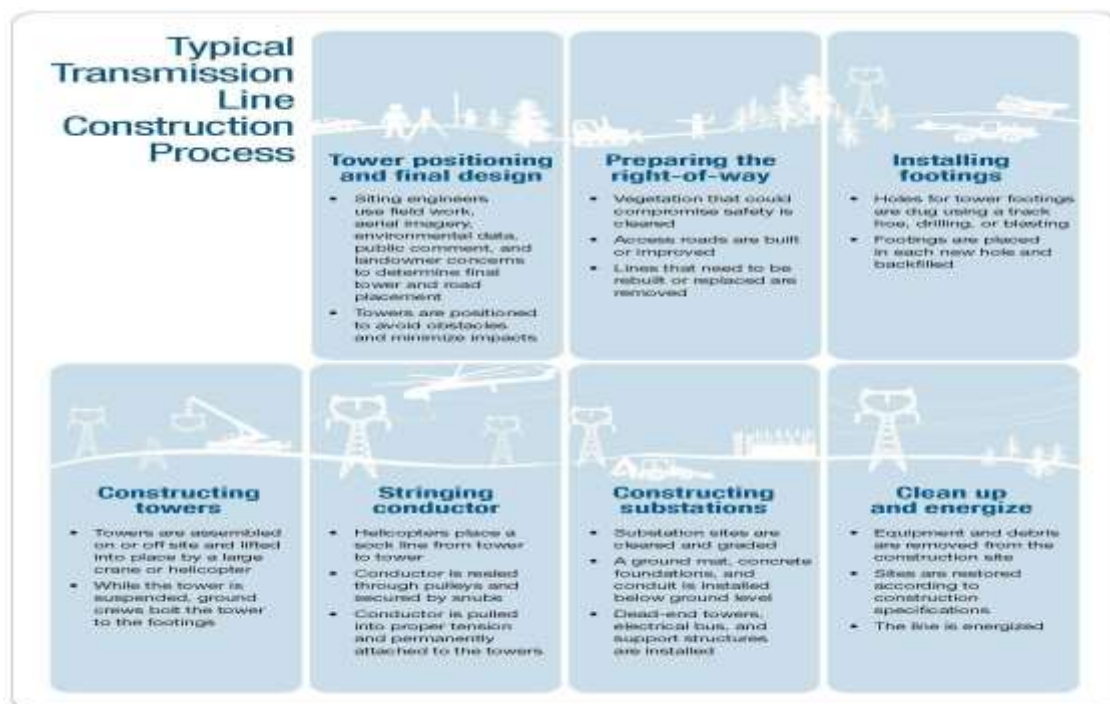


Figure 0-2. Summary of Transmission Line Construction.

## **PROJECT AREA ENVIRONMENTAL AND SOCIAL BASELINE**

### ***Bio-Physical Environment***

Nakuru County covers an area of 7,495.1 Km<sup>2</sup> and is located between Longitude 35° 28' and 35° 36' East and Latitude 0° 13' and 1° 10' south. It lies in the central part of the Great Rift Valley. It has a diverse background comprising of urban and rural set-ups as well as a rich multi-ethnic, economic and cultural diversity. Nakuru County is divided into 11 administrative Sub-Counties with a total of 31 divisions and 55 electoral wards. Nyandarua County is divided into five Sub-Counties (constituencies) namely Kinangop, Kipipiri, Ol'Kalou, Ol'Joro Orok and Ndaragwa. Kinangop is the largest Sub-County covering 822 km<sup>2</sup> with 8 electoral Wards is the largest. Laikipia County lies between latitudes 0° 18' South and 0° 51' North and between longitude 36° 11' and 37° 24' East.

With a mean annual precipitation of 600mm to 800mm in the rifts and about 1300 mm annual precipitation in the plateau, Nakuru County's average monthly temperature ranges from 15.9°C to 17.8°C. The rain seasons are from April to May and October to November. Nyandarua County experiences two rainy seasons: Long rains from March to May with a maximum rainfall of 1600 mm and short rains from September to December and with a maximum rainfall of 700 mm and experiences moderate to low temperatures. Laikipia County's rainfall pattern is bimodal, with long rains being received in March to June while the short rains are experienced in October to December. The county experiences a relief type of rainfall due to its altitude and location. The annual mean temperature of the county ranges between 16°C and 26° C.

The geology of Nakuru County is composed of volcanic rocks, ranging in age from tertiary quaternary to recent, basically consisting of pyroclastic rocks of recent volcanoes. Three main soil classification comprises of Latosolic soils, Planosolic soils and Alluvial and Lacustrine deposits. Nyandarua County has majorly igneous rocks, volcanic, and alluvium. The oldest volcanic units are Late Miocene plagioclase-rich basalts of the Aberdare and Mount Kipipiri. The soils in Nyandarua County are of volcanic origin and vary in both fertility and distribution. The landscape in Laikipia County has red volcanic soils, clay loam, black cotton soil, sandy soils and sandy loam soils. The main topographic features in Nakuru County are the Mau Escarpment covering the Western part of the county, the Rift Valley floor, Ol Doiyo Eburru Volcano, Akira plains, Menengai Crater and various rivers, streams and inland lakes. The Nyandarua County mainly consists of the Kinangop plateau, Ol kalou/Ol Joro Orok Plateau and Ol Kalou/Ol Joro Orok Salient.

Nakuru County has an elaborate closed drainage system basin, drainage and relief system comprising of rivers and lakes. A large number of the rivers and streams systems in the county are permanent and drain into the either Lake Nakuru, Lake Baringo or Lake Naivasha. There are eight permanent rivers in Nyandarua County; Malewa, Ewaso Narok, Pesi, Turasha, Chania, Kiburu, Mkungi and Kitiri. The main drainage feature in Laikipia County is Ewaso Nyiro North basin and is the lifeline of the County to the North. The transmission line crosses part (s) of the Ewaso Ng'iro tributaries at the intersection point Lon 36°24'23.77"E, lat 0° 0'23.13"S.

Nakuru County has characteristic natural vegetation of grassland, acacia, and forest, cedar forest with thin undergrowth, reeds, swamp grass, *Themeda-pennisetum* grasses and floating macrophytes in its wetlands. Nyandarua County has 499.2 km<sup>2</sup> of forest area which is concentrated on the western side of the Aberdare Mountain range with four forest stations in South Kinangop, North Kinangop, Geta and Ndaragwa. Laikipia County is in a transition zone for three major vegetation types; ‘Somalia-Masai Semi-desert Grassland and Shrubland’ and is recognized as one of the most important areas for conservation in East Africa for numerous reasons including the diversity of its wildlife, the number of endangered species it holds (including wild dogs, Grevy zebras and half of the population of Kenya’s black rhinoceros) and having one of the largest contiguous areas under conservation. Laikipia County has a network of 10 main forests and has gazetted forest area totaling to 580km<sup>2</sup> comprising of both the indigenous and plantation forests. Forests provides essential services to people, livestock and wildlife in the county.

The transmission line traverses Bahati Forest in Nyandarua County for a distance of approximately 1.75km of forest area (2.5 acres). The transmission line also crosses the Leshau Forest in Nyandarua County which was previously a reserve but has since been cleared and converted into farmlands is not considered a forest anymore, even though the map recognises the area as a forest. The distance is 1.14km with no forest cover. Ol bolossat Forest in Nyandarua County is approximately 400 metres from the proposed transmission line. The Ol bolossat forest is not a wildlife corridor and hence the transmission line route will not affect wildlife movement. There are Endemic Bird Areas (EBAs) that are traversed by the transmission line namely Serengeti Plains and Kenya Mountains that are zones/ranges where avi-fauna species roam and thus would be impacted adversely by the transmission line. The Ol bolossat Forest is categorised as an Endemic Bird Area (EBA)<sup>1</sup> and there are no Important Bird Areas (IBA)<sup>2</sup> sites within the 3 Counties crossed by the transmission line.

### ***Socio-Economic Characteristics***

**Nakuru County’s** population according to the 2019 National Population and Housing Census was approximately 2,162,202 with 1,077,272 males and 1,084,835 females. By 2030, the population is estimated to grow to 3.1 million people. Nakuru is generally multi-cultural individuals originating from all of Kenya’s chief tribes. The leading tribes are the Kalenjin and the Kikuyu making around 70% of the entire population. Nyandarua County is home to 596,268 people (male -49% and female - 51%), according to the 2019 National Census. The Kikuyu people are the dominant community in Nyandarua, making at least 90% of the county’s population and the three major settlement patterns identified in the

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<sup>1</sup> An area which encompasses the overlapping breeding ranges of restricted-range species, such that the complete ranges of two or more restricted-range species are entirely included within the boundary of the EBA. This does not necessarily mean that the complete ranges of all of an EBA’s restricted-range species are entirely included within the boundary of that single EBA, as some species may be shared between EBAs. The natural habitat in most EBAs (83%) is forest, especially tropical lowland forest and moist montane forest.

<sup>2</sup> Important Bird Areas are distinct areas that provide essential habitat for one or more species of birds in breeding, wintering, or migration. Important Bird Areas are identified for their value to species that are: Threatened or endangered; Restricted to a particular biome or region; Restricted to one habitat type; Occurring at high densities during some portion of the year.

County are clustered settlements, dispersed settlements, and linear/ribbon settlements. Laikipia County is cosmopolitan with about 23 communities comprising of Maasai, Samburu, Rendile, Somali, Pokots, Kalenjins, Meru, Kikuyu, and Turkana among others and largely rural in settlement. The pockets of high population density include Nanyuki and Nyahururu towns, which are the commercial, administrative, and transportation hubs of the county. There are no categories of communities along the transmission line who meet the criteria for indigenous peoples based on the screening conducted during the ESIA scoping exercise. In Nyandarua, Laikipia and Nakuru County, the ethnic communities where the line passes are pre-dominantly Kikuyu with no Vulnerable and Marginalised Groups found to be present on the ROW.

Land use in Nakuru County is primary for agriculture mostly subsistence farming, large scale establishment (horticultural and wheat) and livestock rearing (beef and dairy). The main crops grown around Nakuru and marketed in the town include maize, grass, flowers, wheat, barley and beans. The land tenure systems operatives in Nyandarua County have been characterized as private/modern, communal/customary, public/state and open access except for some few cases and is majorly for agriculture and livestock farming. Livestock breeds are both indigenous and exotic. Of the total landmass in Laikipia County, arable land constitutes of 1,984 square kilometers. There are 6 distinct land use patterns heavily influenced by the climatic conditions and the ecological zones. These include among others; pastoralism, mixed farming, ranching, agro-pastoral, marginal mixed farming and formal employment/trade/business.

The total size of land to be acquired by the project is approximately **375.78** acres in size based on the findings of Resettlement Action Plan report that has been prepared following ESIA scoping that identified involuntary resettlement as an impact that would lead to physical and economic displacements of PAHs along the 30m wide RoW. Land losses in terms of severity will be experienced in the following locations namely Kirimangai, Gatumbiro, Karagoini, Thayu, Oraitutia, Sabugo, Gatimu and Muruku where the number of PAHs losing land is significant. The number of PAHs losing over 90% of their land is only 5 % of the number of PAHs. The loss by the PAHs is mostly economic in terms of displacement accounting for over 90%, with physical displacement accounting for only 10%. It should be noted however that some land-requirement information is not available at this stage such as land required for access roads or the potential establishment of a new workers camp. When such information become available, the RAP will be updated, or stand-alone RAP reports prepared.

The Project impacts include loss of private residential structures, community facilities (churches, stadium, chief's office) as well as loss of cultivable and grazing land due to land acquisition along the proposed transmission line. Forest land owned by Kenya Forest Service will also be lost as a result of the project since the line passes through a gazette forest. The project will adversely affect **639** households consisting of **1,661** individuals (PAPs) and 4 community institution. There are two (2) national government entities to be affected by the project. These are a section of Bahati Forest located in both Nyandarua County and an Assistant Chief's office in Thayu location in Nakuru County. The project will also partially affect a community facility (Mutanga Stadium) managed by Nyandarua

County Government. Three (3) public institutions in the form of churches will also be affected by the project. The churches are located in Nyandarua County. A total of **176** structures are affected as a result of the project. All identified impacted structures are located within RoW and will require dislocation to clear the RoW limits and will be compensated to entirety due to functional non-viability of these structures.

Nyandarua County is categorized as a water scarce area. The main source of water in the county is rainwater which ends up in dam sand rivers. Main source of water for domestic use is dams and shallow wells. The main form of disposal for human waste is pit latrines. Laikipia County is drained by the Ewaso Ng'iro River and its tributaries, which originate from Mt. Kenya and the Aberdares. Boreholes, pans, dams, shallow wells, springs and sub surface dams are also a common feature in the county for domestic and irrigation purposes. The main form of disposal for human waste is pit latrines.

The three major sources of energy for cooking in Nakuru County are LPG (Liquid Petroleum Gas), firewood and charcoal. A total of 64.4% of residents in Nakuru County use electricity as their main source of lighting. Main source of cooking energy is firewood while electricity covers 10.5 % of Nyandarua County and is mainly found in urban centres of Mairo-inya, Ol'kalou, Njambini and Engineer and several trading centres located in different parts of the county. Majority of people in Nyandarua County 82.7 %, use paraffin for lighting. In Laikipia County, the households using electricity for lighting constitute 17.7 percent of the total households largely due to the Last Mile Connectivity Program for the rural households.

Nakuru County has about 440 health facilities inclusive of 22 level 4 and 5 hospitals. GoK hospitals are 16 and contribute to 36% of the total health facilities in the county. There are two level four public health facilities in Nyandarua County, one mission hospital, three nursing homes, seven level three health facilities, 32 level two facilities and 50 private clinics. Laikipia County's health infrastructure consists of four sub county hospitals at Doldol, Rumuruti, Nanyuki and Nyahururu. The county has eight public health centres and 34 public dispensaries. The five most prevalent diseases for under 5 in the counties include; Respiratory Tract Infections (RTI), diarrhoea, clinical malaria, eye infections and Pneumonia.

The entire road network in the Nakuru County is approximately 12,491km. Out of which paved roads are 993.7 Km and gravel roads are 4,500 Km and earth roads are 6,998Km. The county has an old railway line traverses through the County to Uganda which transports cargo mainly from the port of Mombasa to Malaba border. Nyandarua County has 3 airstrips which operate for strategic purposes only. There is an old railway, constructed in 1927 which is in disuse and some of its infrastructures have been vandalized. Laikipia County has a road network that covers 1,038.1km out of which over 80 per cent are feeder roads. It also has an old railway network covering 23 kilometers serving Nanyuki Town and a small stretch of about 2 kilometers in Nyahururu Town and 1 airstrip near Nanyuki Town.

## Public Consultations

Stakeholders were identified, mapped and consulted as part of the ESIA study in line with the OP. 4.01 with respect to stakeholder consultations and in accordance with the NEMA's EIA/EA regulations (2003) which require public consultations during ESIA preparation. The consultations targeted communities who were in the project Area of Influence (AoI) and hence likely to be directly or indirectly affected adversely by the project. Consultations also targeted key institutions in the national and county governments as well as civil society organisations who were identified to have a stake or interest in the project. Tables 0-2, 03 and 0-4 below shows the dates, venues and number of stakeholders consulted by county.

**Table 0-2. Nakuru County Consultations Venues, Dates and Number of Participants**

DATES	VENUE	NO. OF PARTICIPANTS
4 <sup>TH</sup> June 2019	Public Consultation – GDC Grounds, Kirima Location	65
5 <sup>TH</sup> June 2019	Public Consultation – Chiefs Camp - Bahati Location	51
8 <sup>TH</sup> June 2019	Public Consultation – Chiefs Camp-Wendo and Sabugo Location	47
19 <sup>TH</sup> June 2019	County Commissioner Office – Nakuru County	04
19 <sup>th</sup> June 2019	Deputy County Commissioner – Nakuru North Sub County	04
19 <sup>th</sup> June 2019	Kenya Forest Service–Bahati Station, Nakuru County	03
20 <sup>th</sup> June 2019	Deputy County Commissioner, Nakuru West Sub County	03
20 <sup>th</sup> June 2019	Lands Office – Nakuru County	03
20 <sup>th</sup> June 2019	CEC – Energy & Environment, Nakuru County	03
<b>Total</b>		<b>183</b>

**Table 0-3. Nyandarua County Consultations Venues, Dates and Number of Participants**

DATES	VENUE	NO. OF PARTICIPANTS
20 <sup>TH</sup> June 2019	Kenya Forest Services - Ol Kalou Station	03
24 <sup>TH</sup> June 2019	County Commissioner, Nyandarua North Sub County	03
25 <sup>TH</sup> June 2019	Deputy County Commissioner, Nyandarua County	05
25 <sup>TH</sup> June 2019	Deputy County Commissioner, Nyandarua County	04
26 <sup>TH</sup> June 2019	CEC Transport & Energy Nyandarua County	05
5 <sup>TH</sup> August 2019	Public Consultation-PCEA Church-Gecaka Location	32
6 <sup>TH</sup> August 2019	Public Consultation–Kirimangai Grounds-Kirimangai Location	114
7 <sup>TH</sup> August 2019	Public Consultation - Hospital Hill Primary School-Lesirko Location	27
8 <sup>TH</sup> August 2019	Public Consultation - Chief's Camp-Gatumbiro Location,	71
9 <sup>TH</sup> August 2019	Public Consultation- Chief's Camp-Gatumbiro Location	55
13 <sup>TH</sup> August 2019	Public Consultation - Baari Secondary School-Mairoinya Location	31
14 <sup>TH</sup> August 2019	Public Consultation - Waka Junior School Hall-Karagoini Location	67
14 <sup>TH</sup> August 2019	Public Consultation-Ndivai Baptist Church-Ndivai Location	61
<b>Total</b>		<b>478</b>

**Table 0-4. Stakeholder Consultations Venues, Dates and Number of Participants – Laikipia County**

DATE	VENUE	NO. OF PARTICIPANTS
26th June 2019	County Commissioner's Office-Laikipia County	03
20th June 2019	Deputy County Commissioner's Office-Laikipia West Sub County	03
15th August 2019	Public Consultation – Melwa Chiefs Camp-Melwa Location	32

15th August 2019	Public Consultation – Mohotetu Chiefs Camp Mohotetu Location	34
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The key issues and concerns emanating from the consultations are highlighted below and were incorporated in the ESIA in relation to mitigation measures.

- Waste Management during construction
- Community Health and safety during construction and operation
- Impacts of the transmission line on avi fauna
- Noise pollution during construction
- Air emission impacts during construction
- Land acquisition impacts
- Influx of workers and associated impacts

### Potential Beneficial Impacts

The major beneficial long-term impact of the project will be during the operational phase from: -

**Table 0-5. Summary Beneficial Impacts**

Beneficial Impacts		
Expected Impact on Poverty Alleviation	on	With the implementation of the project across the 3 Counties, the power supply will be stable and reliable hence more customers will be connected to the system. The communities under power supply will engage in income generating activities in order to improve their economic status.
Local Material Supplies		It is expected that the project will generate new income revenues for the local population across the Country in harvesting and transportation of sands, ballast, stones, concrete/wooden poles and gravel. The new income revenues received will create demand for other goods and services causing a trickledown effect to the entire economy.
Up Scaling Electricity Access to the Poor		According to Kenya Power's annual report of 2012/2013, electricity access stood at 4.8million customers as at June 2016. This translates to about 60% of the total population accessing electricity. In the project area, over 70% of the communities do not have access to electricity.
Health benefits of the project		The project will result in many households replacing kerosene lamps for lighting with electricity there-by reducing disease burden at the family level and on the government. Kerosene emits PM which do not disperse, so burning a lamp for four hours can result in concentrations several times the World Health Organization standard. The health risks posed by indoor air pollution mainly include acute lower respiratory infections, but also low birth weight, infant mortality, and pulmonary tuberculosis. According to the socio-

	economic survey, households in the project areas used lantern lamps and using tin lamps for lighting.
Benefits to education	Access to constant and reliable electricity supply at the household level and schools will create opportunities for children to study.
Improved standard of living	Access to stable and reliable electricity will change the standard of living of the people as they can use domestic appliances like iron boxes, fridges, television sets, washing machines etc.
Security	There will be enhanced security arising from well-lit social, commercial, individual premises and use of electrical surveillance gadgets that use broadband data services. With the implementation of the project, the level of security will improve.
Communications	Access to reliable electricity will lead to improved communication. This will be enabled by the fact that charging of mobile phones will be easier and cheaper. Access also to mass media like radio and T.V will provide opportunity for people to access a wide range of information which is useful for decision making.
Gender Considerations	Access to modern electricity will go a long way towards alleviating the daily household burdens of women, giving them more time, improving their health and enhancing their livelihoods. Lighting and television will improve access to information, the ability to study, and extend the effective working day.

### Potential Negative Impacts and Mitigation Measures

The potential negative impacts during construction, operation and decommissioning are generally short-term, reversible impacts which can be reduced or eliminated by appropriate construction mitigation and application of best practice in construction and operation of transmission lines. Many of the adverse impacts will only occur within the construction site footprint (along the transmission line route) and therefore move with the works such that many locations will only be impacted for a few days at a time rather than the duration of the project. A summary of the results of the impact assessment is provided in table below. Table 0-6 illustrates the potential impact along with what the impact significance of the impact is before and after proposed mitigation measures. Mitigation measures that are included in this report are commitments which will be implemented by KETRACO (including subcontractors). The Environmental and Social Management Plan (ESMP) details roles and responsibilities that will be assumed by all the responsible agencies during project implementation phase. KETRACO has already acknowledged its commitments in this regard and have indicated that they also understand their responsibilities in this regard given their prior involvement with World Bank funded projects.

Environmental / social variable	Project activities/impacts	Phase	Predicted significance	
			Before mitigation	With mitigation
Air Quality	Road traffic exhaust emissions	Construction/Operation/Decommissioning	Negligible	Negligible
	Dust and pm10 from unpaved roads during construction activities	Construction/Operation/Decommissioning	Major	Negligible
Noise emissions	Noise from construction activities affecting nearby dwellings	Construction/Operation/Decommissioning	Negligible	Negligible
Soil erosion and Contamination	Loss of soil resources due to erosion	Construction/Operation/Decommissioning	Minor	Negligible to minor
Surface and subsurface water	Availability and quality of water resources	Construction/Operation/Decommissioning	Minor	Negligible to minor
Flora and vegetation	Disturbance to vegetation during construction works	Construction/Operation/Decommissioning	Minor	Negligible
Fauna	Disturbance to fauna species and degradation to environment during construction	Construction/ Decommissioning	Minor	Negligible
Avi-fauna	Loss of habitat as a result of RoW, Bird strikes, electrocutions	Operation	Minor	Minor
Solid and liquid waste	Release to environment	Construction/Operation/Decommissioning	Moderate	Minor
Access to infrastructure	Disruption to traffic and transportation	Construction/Decommissioning	Moderate	Minor
Landscape and visual amenity	Deterioration of visual amenity	Construction/Operation/Decommissioning	Negligible	Negligible
Worker's health and safety including child labour	Effects of workers health and safety and labour rights; and child labour impacts	Construction/Operation/Decommissioning	Moderate	Minor
Community health and safety	Community safety (road accidents, trespass,)	Construction/Operation/Decommissioning	Moderate	Minor
	Environmental health (noise and air)	Construction/Operation/Decommissioning	Moderate	Minor
Labour Influx and related impacts	An influx of in-migrants may lead to Gender-Based Violence (GBV); Sexual Exploitation and Abuse (SEA); Sexual Harassment (SH), child labor, crime, competition for resources etc.,	Pre-construction/ Construction/Operation/Decommissioning	Minor	Minor
Unplanned events	Reduction in local soil/ground water quality	Construction/Operation/Decommissioning	Minor	Negligible
Economy and employment	Local employment opportunities, capacity building and economic development	Construction/Operation/Decommissioning	Negligible	Minor

Land Acquisition and Involuntary Displacement Impact	The loss of access to land associated with the 30m OHTL footprint corridor, temporary tower sites working areas, and maintenance corridor will result in the loss of land used for seasonal crops, removal of trees, and restrictions to animal grazing. There will also be loss of structures as a result of the project.	Pre-Construction	MODERATE	Minor
Archaeology and Cultural Heritage	Disturbance to grave sites during vegetation removal and construction activities	Construction /Decommissioning	Minor	Negligible to minor
Violence against Children	Recruitment of children under the age of 18 during the construction of the transmission line (child labour).	Construction/Decommissioning	Major	Minor
Air Navigation and Safety	Compromise on aircraft operation safety, directly through collision, or indirectly through radar and radio interference	Operation	Minor	Minor
Employment and Job Creation	The construction of the transmission lines including operation and maintenance activities will provide employment opportunities—directly and indirectly—to skilled as well as unskilled manpower primarily to local manpower.	Construction/Operation/Decommissioning	POSITIVE	POSITIVE
Compensation Benefits	PAHs will receive cash compensation	Pre-Construction	POSITIVE	POSITIVE
Knowledge/Skills Transfer	Local workers will benefit in terms of knowledge transfer especially from external skilled workers who when paired with the local workers will transfer on-the job skills to them. Further, local workers may undergo certain training as part of skill enhancement prior to employment	Construction/Decommissioning	POSITIVE	POSITIVE
Increased Electricity Access	The project will increase electricity access in the country and improve standards of living, enhance security, increase education uptake and reduce gender inequality.	Operation	POSITIVE	POSITIVE
Health Benefits	The health risks posed by this indoor air pollution mainly include acute lower respiratory infections (due to the use of	Operation	POSITIVE	POSITIVE

	kerosene of firewood) but also low birth weight, infant mortality, and pulmonary tuberculosis.			
Environmental Benefits	The proposed project may contribute to reduction in Green House Gaseous (GHGs) emissions due to the fact that beneficiaries may not continue to rely on biomass as a main source of energy at the domestic level which leads to felling of trees and hence contributing to the green-house effect.	Operation	POSITIVE	POSITIVE

Table 0-6. Summary of the results of the impact assessment

## **ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

This ESIA includes an ESMP which details the mitigation measures, environmental monitoring activities, institutional responsibilities, and environmental management capacity building. The relevant ESMP provisions are included in bid documents for contractors. During construction, the project management team will closely monitor the works contractors' environmental performance and overall ESMP implementation.

### **Construction Environment and Social Management Plan**

For an effective integration of environmental and social safeguards into the project implementation the Contractor will need to adopt this ESMP and prepare a comprehensive Construction Environment and Social Management Plan (C-ESMP) that will provide the key reference point for compliance. The environmental supervision will also adopt the C-ESMP. The C-ESMP is an upgraded ESMP illustrating realities of the project works to be prepared by the Contractor.

The Contractor is expected to finalize the work plan and upon approval, list the works items and for each item present practical actions that will be undertaken to realize achievement of the ESMP. The actions on works items should address environmental and social aspects associated with the works and in line with guidelines from the ESMP. Based on these ESMP outline, the Contractor will be instructed to develop a Construction Environment and Social Management Plan (C-ESMP) for each component of the project and submit these plans to KETRACO.

### **KETRACO Project Management Team**

The project implementation arrangements have been established and the proponent has appointed the KETRACO project implementation team including: -

- Project Manager
- Environmentalist
- Socio-Economist/Social Specialist
- Land Surveyor
- Land Economist
- Civil Engineer
- Electrical Engineer
- Community Liaison Officer

The core functions of the team will be to coordinate and facilitate oversight for technical, environmental, and social safeguards, health and safety and social risks supervision.

### **Project Supervision Engineer**

The Project Supervision Engineer will be required to recruit a qualified Environmental and Social Expert who will be charged with the responsibilities of supervision, review of site reports, preparation of monthly progress reports, prepare and issue appropriate instructions to the Contractor and monitor ESMP implementation.

### **Contractor**

The Contractor will ensure that the established mitigation measures are integrated and implemented throughout the project works as per the C-ESMP. The Contractor will internalize the C-ESMP, prepare monthly progress reports and implement instructions issued by the Supervision Consultant. The Contractor, therefore, will engage qualified Environmentalist and Social Specialist to ensure compliance with the C-ESMP and Community Liason Officer (link between contractor and community) on full time basis to interpret the C-ESMP and advice on the implementation of the same, as well to the counterpart personnel for the supervision expert.

### **National Environment Management Authority**

The National Environment Management Authority (NEMA) is responsible for ensuring environmental compliance in the country and has offices in Nakuru, Nyandarua and Laikipia counties with staffing who will further ensure that the ESMP is implemented as part of their mandate, functions, and responsibilities. NEMA will undertake surveillance on the project implementation and review compliance performance based on the supervision monitoring reports.

### **Grievance Redress and Management**

World Bank safeguards policies and procedures require establishment of grievance redress mechanisms to provide a structured way of receiving and resolving grievances during project implementation. Complaints should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities and is at no cost and without retribution. The mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both the company and stakeholders. The mechanism must not impede access to other judicial or administrative remedies.

### **ESMP Operationalization Budget Estimate**

Table 0-7 presents budget estimate proposed to operationalize the ESMP. The supervising engineers who has a key role in ensuring compliance to the ESMP by the contractor will during the bidding stage present the actual budget for ESMP supervision. Similarly, at the bidding stage for the works contractor, bidders will be required to submit a detailed budget for ESMP implementation.

**Table 0-7. Approximate ESMP Budget**

<b>Activity</b>	<b>Budget Estimate (USD)</b>
ESMP Implementation	300,000

### **CONCLUSION**

The anticipated benefits of the construction and operation of the Project are immense. The project will provide a reliable supply electricity to the region and national grid, which will go along with many benefits including bringing stability in the national grid. All negative impacts can be mitigated following the ESMP.

# I INTRODUCTION

## I.1 Background of the Project

The proposed construction of the Menengai-Olkalou-Rumuruti 132kV double circuit transmission line (the “Project”) is to be financed under the Kenya Electricity System Improvement Project (KESIP) which is a World Bank project. KESIP aims to improve the power systems and electricity access and reliability, in line with the Kenya Growth and Development Strategy. The Project Development Objective (PDO) of KESIP are to: (i) increase the capacity, of transmission system; and (ii) increase access to electricity in Kenya.

This Environmental and Social Impact Assessment (ESIA) report has been prepared for the construction and operation of the Menengai-Olkalou-Rumuruti 132kV double circuit transmission line (the “Project”), which has been proposed to address the need to evacuate energy from Menengai geothermal power plant in Nakuru county, passing through Nyandarua county from where it will connect to the Rumuruti sub-station in Laikipia county. The project involves the construction of a power transmission line traversing through three counties i.e., Nakuru, Nyandarua and Laikipia in Kenya. The Project will be energized upon completion as part of the national grid. The 70 Km Transmission Line (TL) will traverse land and structure belonging to private landowners and a section of a gazetted forest land (Bahati Forest) in Nyandarua County. Leshau Forest is located in Nyandarua County and traversed by the line, however, it has been converted into farm and settlements and is not a forest anymore. The proposed Right of Way (RoW) for the Transmission Line will be approximately 30 metres wide. The project consists of the following components:

1. Construction of a 70km, 132 kV double circuit overhead transmission line.

## I.2 Project Proponent

Kenya Electricity Transmission Company Limited (KETRACO) was incorporated on 2nd December 2008 and registered under the Companies Act, Cap 486 pursuant to Sessional paper No. 4 of 2004 on Energy. KETRACO is 100% Government owned and being a state corporation, it is regulated under the State Corporations Act, Cap 446.

The Company was established to develop new high voltage electricity transmission infrastructure that will form the backbone of the national transmission grid, in line with Kenya Vision 2030. Its core business is to plan, design, build and maintain electricity transmission lines and associated substations. The voltage rating of the transmission lines includes 132kV, 220kV, 400kV and 500kV (HVDC). Arising from that mandate, KETRACO’s core functions include:

1. Planning the national electricity transmission grid
2. Financial resource mobilization for operations and financial sustainability
3. Design of power transmission infrastructure
4. Construction of power transmission infrastructure
5. Operation of the transmission system
6. Maintenance of high voltage power transmission infrastructure

7. Maintenance of power transmission infrastructure
8. Power management and trade.

KETRACO's mandate is to plan, design, construct, own, operate and maintain high voltage electricity transmission grid and regional power interconnectors that will form the backbone of the national transmission grid. In carrying out this mandate, the Company is expected to develop a new and robust grid system in order to:

1. Improve quality and reliability of electricity supply throughout the country
2. Transmit electricity to areas that are currently not supplied from the national grid
3. Evacuate power from planned generation plants
4. Provide a link with the neighbouring countries in order to facilitate power exchange and develop electricity trade in the region
5. Reduce transmission losses that currently cost the country heavily every year and
6. Reduce the cost of electricity to the consumer by absorbing the capital cost of transmission infrastructure.

### **1.3 Project Justification**

Access to electricity has a wide range of social and economic benefits. For example, access to electricity can increase quality of life as well as spur economic development. The proposed project is in line with Vision 2030, which identifies energy and electricity as a key element of Kenya's sustained economic growth and transformation. The country aims at enhancing and diversifying national power generation and supply by improving and expanding the transmission network to match up the rising demand hence the development of the proposed transmission line.

The country is seeing large scale expansion in many infrastructure sectors including energy. In year 2007, the Government of Kenya unveiled "Vision 2030". Vision 2030 is the country's economic blueprint that aspires to transform the country from a low income, agrarian economy into a newly industrialized middle-income country, providing a high quality of life to all its citizens by the year 2030. The vision identifies energy as one of the enablers for sustained economic growth and a key foundation of Kenya's envisaged national transformation. Expansion of Energy Sector is critical in order to achieve the Gross Domestic Product (GDP) growth target of 10% by year 2015.

Accordingly, the Government of Kenya has formulated LCPDP in Year 2011 and updated further in year 2013. As per LCPDP updated in 2013, transmission development plan indicates the need to develop approximately 21000 km of new high voltage transmission lines. This Plan encapsulates three key areas viz. load forecasting, generation planning, transmission planning.

As per LCPDP, the peak load demand is projected to rise to 21,075 MW by Year 2033 from existing 1606 MW during 2013. For this, addition in generation capacity to the tune of 22,000 MW has been planned. In the present scenario of power supply arrangement in Kenya, the electrification has been achieved up to approximately 30% of its population. The Government of Kenya is aiming to achieve electrification on rural area up to 40% by 2020.

Some of the components of this program include establishment of 400kV, 220kV and 132kV lines and construction of associated substations which will be implemented by KETRACO. KETRACO, responsible for implementing and maintaining the high voltage transmission system in the country, endeavors to support the country's objectives and is aggressively working towards undertaking/implementing various grid expansion and reinforcement projects. KETRACO has deliberated efforts towards the said objectives and has prioritized the transmission line and substation projects to be undertaken in the country.

The growth in electricity demand in Kenya increased from 3.2% in 2009/10 to 8.9% in 2010/11 and then decreased to 3.6%. It is observed that the electricity demand closely follows the economic growth patterns. The unusual growth rate in 2010/2011 could be linked to the high GDP growth for that particular year along with other contributing factors. An accelerated customer connection program, improved hydrology translating to low tariffs and increased rural electrification through Rural Electrification Program (REP). The peak load forecast of 2013 is projected to be 1,606 MW while the projection for 2033 is forecast close to 21,075 MW.

#### **1.4 Legal Framework and Applicable World Bank Policies**

The World Bank is a recognized international leader in the sphere of development and implementation of environmental and social sustainability policies. In accordance with its Safeguards Policies and Procedures, WB uses a set of environmental and social safeguards policies to assess proposed projects. The table 1-1 highlights the relevant WB Safeguards Policies that have been triggered by KESIP under which the project is implemented.

**Table 1-1: Safeguard Policies Triggered**

<b>Safeguard Policies Triggered by the Project</b>	<b>Yes</b>	<b>No</b>
Environmental Assessment (OP 4.01)	[X]	[ ]
Natural Habitats (OP 4.04)	[X]	[ ]
Cultural Property (OP 4.11)	[X]	[ ]
Involuntary Resettlement (OP 4.12)	[X]	[ ]
Indigenous Peoples (OP 4.10)	[X]	[ ]
Forests (OP 4.36)	[X]	[ ]
Safety of Dams (OP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP 7.60)	[ ]	[X]
Projects on International Waterways (OP 7.50)	[ ]	[X]
Pest Management (OP 4.09)	[ ]	[X]

##### **1.4.1 Project Categorization**

KESIP is considered to have “significant, adverse environmental impacts that are ‘sensitive,’ diverse or unprecedented”, may be irreversible or raise significant issues reflected in various safeguard policies relating to natural habitats (e.g., lead to loss of major natural habitat), involuntary resettlement, impacts on indigenous peoples or physical cultural resources and may affect an area broader than sites or facilities subject to physical works. It is this categorized as a Category **A** project. For this reason, the proposed construction of the transmission line and sub-station falls under the same category and hence requiring a full ESIA.

#### **1.4.2 Applicable WB/IFC Guidelines**

The International Finance Corporation (IFC) Environmental Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are normally acceptable to the IFC and are generally considered to be achievable in new facilities at reasonable costs using existing technology. The IFC EHS Guidelines comprise both general and industry-specific guidelines. The IFC General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. It is designed and should be used together with the relevant industry sector specific guidelines. IFC (EHS) Guidelines applicable to the Project are:

- General EHS Guidelines 2007.
- EHS Guidelines for Electric Power Transmission and Distribution, 2007

#### **1.4.3 Kenyan Legal Framework**

The principal national legislation governing issues of environmental concern in Kenya is the Environmental Management and Coordination 1999 and Environmental Management and Coordination (Amended) Act of 2015 typically referred to as EMCA. EMCA calls for Environmental Impact assessment (EIA) (under Section 58) to guide the implementation of environmentally sound decisions and empowers stakeholders to participate in sustainable management of the natural resources. Projects likely to cause environmental impacts require that an environmental impact assessment study to be carried out. It is under this provision that the current study has been undertaken. Other legislation adhered to during this study are the Environmental Impact Assessment and Audit Regulations 2003; Waste Management Regulations 2006; Water Quality Regulations 2006; Noise and Excessive Vibration Pollution Control Regulations 2009 (Legal Notice 61), Air quality Regulations 2009, Water Act (2016), Constitution of Kenya (2010), Public Health Act (CAP. 242), Employment Act (2007), Children's Act (2012), Sexual Offences Act (2006), Traffic Act (Chapter 403) among others.

### **1.5 Objective and Scope of ESIA**

The purpose of this study was to undertake an Environmental and Social Impact Assessment study for the 132kV dual-county transmission line. The ESIA study has been developed in compliance with the Environmental Impact Assessment/Audit Regulation, 2003 and relevant World Bank (WB) environmental and social safeguard policies with emphasis on O.P 4.01. The purpose of an EIA is to provide information to regulators, the public and other stakeholders to aid the decision-making process. The objectives of an EIA are to:

- Define the scope of the project and the potential interactions of project activities with the environment (natural and social).
- Identify relevant national and international legislation, standards and guidelines and to ensure that they are considered at all stages of project development.
- Provide a description of the proposed project activities and the existing environmental and social conditions that the project activities may interact with.

- Predict, describe, and assess impacts that may result from project activities and identify mitigation measures and management actions to avoid, reduce, remedy or compensate for significant adverse effects and, where practicable, to maximize potential positive impacts and opportunities.
- Provide a plan for implementation of mitigation measures and management of residual impacts as well as methods for monitoring the effectiveness of the plan.

## 1.6 Report Structure

In order to provide clear presentation of the ESIA procedures including their results, conclusions and recommendations, this report is structured as follows:

1. **Chapter 1. Project Overview** (this chapter). The chapter introduces the Project by providing details of its location, scope, owner, and developer.
2. **Chapter 2. ESIA Methodology**. This chapter provides an overview of the overall process of environmental and social impact assessment and applicability of the international methodology for the ESIA procedure. The chapter further addresses: definitions of key terms; identification of potential environmental and social impacts (through consultation and scoping process); description of the criteria used to determine the significance of impacts for various environmental and social topics; and how mitigation measures are considered within the assessment process.
3. **Chapter 3. Project Description**. This chapter describes the background and phasing of the Project, including descriptions of the main and auxiliary facilities, infrastructure, associated facilities, as well as definition of the Project boundaries in the form of the Project area of influence. Tentative project implementation timeline is provided.
4. **Chapter 4. Policy Legal and Institutional Framework**. This chapter provides an overview of the national and international legal framework, within which the Project is to be developed and implemented. Environmental and social legal requirements of the Republic of Kenya is considered together with the applicable World Bank safeguards policies.
5. **Chapter 5. Baseline Environmental and Socio-Economic Conditions**. The existing environmental and socio-economic baseline is described and characterized in this chapter.
6. **Chapter 6. Stakeholder Engagement**. This chapter describes the stakeholder engagement process adopted by the Project. It describes the results of consultation activities undertaken earlier and as part of the ESIA process. It also provides stakeholder identification.
7. **Chapter 7. Analysis of Project Alternatives**. The key process solutions are presented as they are seen at the current stage of planning, alongside with considered alternatives and justification of the preferred alternative.
8. **Chapter 8. Assessment of Potential Risks and Impacts**. This chapter presents the assessment of potential environmental and socio-economic impacts, including identification of mitigation measures and monitoring requirements. Impacts of the Project are assessed for each component of the environment. Impacts during the Project implementation are assessed on a topic-by-topic basis. This chapter addresses potential cumulative impacts of the Project and other third-party economic activities in the region.

9. **Chapter 9. Environmental and Social Management.** This chapter describes the approaches to environmental and social management across all Project activities and recommends the management procedures and plans to be adopted to ensure compliance with the applicable international requirements throughout the life of the Project.
10. **Chapter 10. Grievance Redress**
11. **Chapter 11. Conclusion** provides summary of the key significant impacts, mitigations, and monitoring, as well as recommendations for further studies to remove uncertainties.

## 2 ESIA APPROACH AND METHODOLOGY

### 2.1 ESIA Approach

The Project ESIA is intended to provide an accurate and comprehensive assessment of adverse impacts, benefits, and potential risks of the planned operations, and develop prevention, mitigation, and remediation measures for the identified environmental and social impacts, as well as the approaches to monitor and control them.

This chapter provides a structured description of the ESIA methodology including:

- Main stages of ESIA process
- ESIA scoping
- Baseline studies
- Impact identification and evaluation of significance; and
- Mitigation measures.

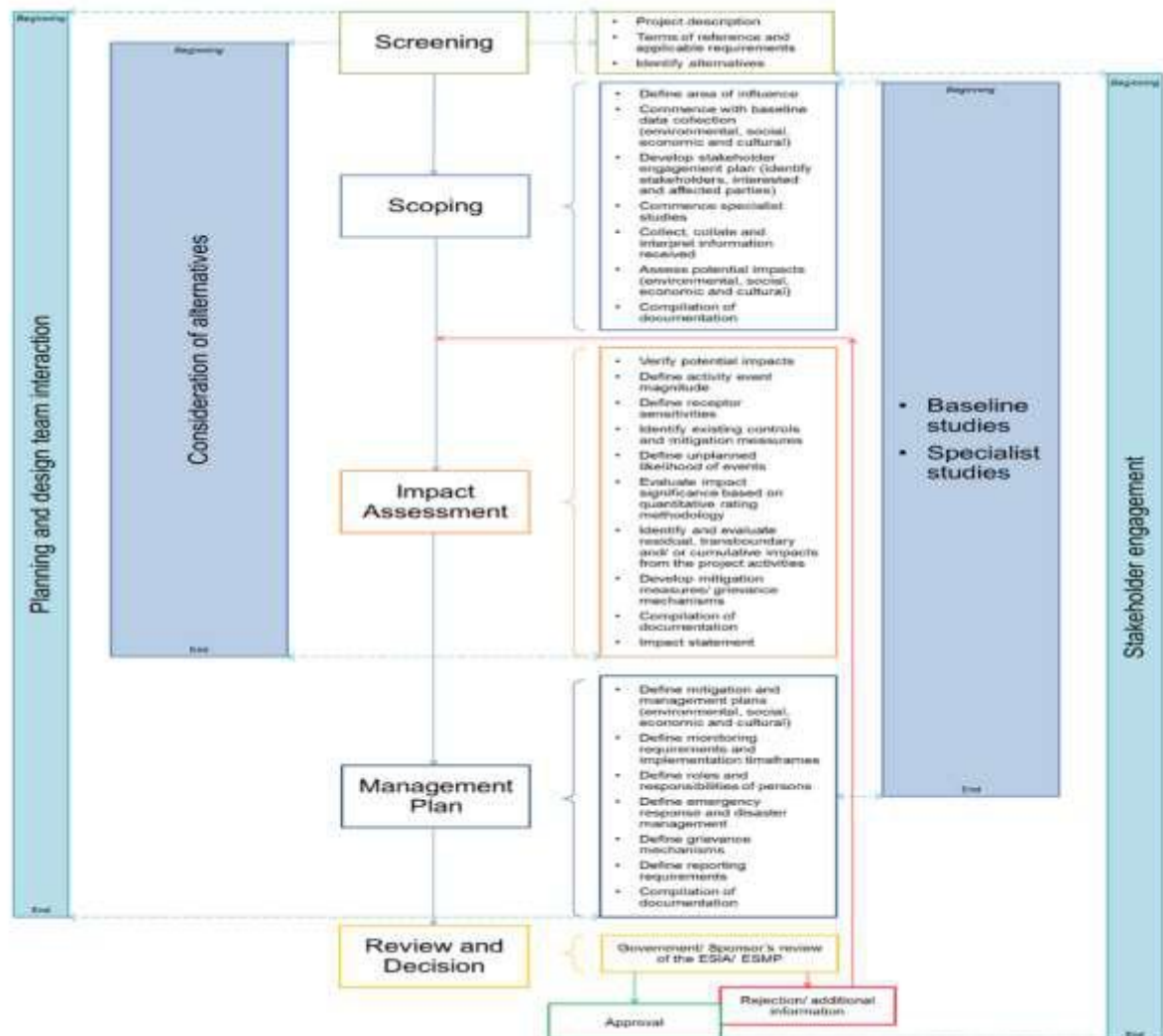
The ESIA study is informed by the relevant survey reports, environmental impact assessments, design and other documentation which have been prepared so far for the Project components and associated activities, as well as scientific publications, statutory reports, etc. listed in more detail in the reference chapter of this report. Specific recommendations are to be prepared as part of the ESIA process for implementation of management, mitigation and remediation measures, additional studies, as well as approaches to monitoring and control, in order to make sure that Project activities are fully compliant with the applicable requirements (refer to chapter 3) at all stages of its life cycle.

### 2.2 ESIA Process

To ensure a robust and comprehensive impact assessment, the ESIA process is structured around a series of progressive and iterative stages (Figure 2-1). Stakeholders, entities and individuals responsible for development/implementation of the Project design, the ESIA team provide inputs to these stages. Public engagement is maintained at all stages of the ESIA process.

This ESIA shall cover all required stages: from scoping, stakeholder identification and consultations, review of alternatives, identification and assessment of benefits and adverse impacts of the Project, to development of mitigation and remediation measures, and proposals for the control and monitoring to be undertaken.

Figure 2-1: ESIA Process



## 2.3 ESIA Scoping

Scoping of studies to be conducted for assessment of the Project impacts is a vital element of ESIA preparation. Scoping is the process of determining the content and extent of the matters that should be covered in the ESIA and associated documentation as well as identifies methods for assessment of impacts. The scoping process is intended to identify the types of the environmental and social impacts to be examined and documented by the ESIA, considering the most significant potential aspects and risks. The main objectives at the scoping stage are:

- Preliminary review (screening) of documents provided by the client regarding proposed operations and potential alternatives
- Collection and high-level analysis of the available information of the environmental and social conditions at the Project site and wider area, and identification of the most sensitive (vulnerable) receptors
- Identification of the applicable local and international requirements and standards
- Identification of similar projects for benchmarking of the proposed operations
- Preliminary identification of stakeholders and initial consultations with them; and

- Initial identification of the Project impacts.

## **2.4 Baseline Studies**

Baseline studies are primarily undertaken at two key stages, i.e., scoping and impact assessment. However, as shown in Figure 2-1, they are an ongoing activity throughout the ESIA Process. During scoping work, relatively ‘high-level’ baseline data are required to assist identification of likely gaps and key impacts to be considered in more detail at later stages. Where gaps are identified between available baseline data and data required for the ESIA at the scoping stage, then additional surveys or studies are undertaken to collect the required data. The work included desk-based studies and the site visit conducted by environmental and social teams of EMC Consultants.

It is important to ensure that receptors are identified and analysed, and their sensitivity is determined during scoping and baseline studies. Receptors are environmental and social components that may be affected, adversely or beneficially by the proposed operations.

Three high-level categories of receptors can be identified:

- Environmental (such as air quality, water bodies, landscapes, terrestrial soils, marine sediments, etc.)
- Biodiversity and biological resources (such as habitats, species, and ecosystem services, for example, flood protection provided by nearby wetlands); and
- Social (such as residents of local communities, businesses, land and other resource users, cultural heritage resources).

Details of receptor categorization and the approach to assessment of their sensitivity to identified impacts are provided in Section 2.5.6.

## **2.5 Impact Identification and Evaluation of Significance**

### **2.5.1 Identification of Impacts**

The following approach supports identification of environmental, social, and cumulative impacts:

- Review of previous studies, surveys, impact assessments, environmental monitoring data in the proposed location area (transmission route) and associated facilities within the scope of the Project
- Review of the design documentation, including potential alternatives, as well as characteristics of the proposed operations (separately for construction, operation, decommissioning) and associated activities which may cause environmental, social, and human health impacts
- Consideration of the local area development plans and strategic development programmes for the region
- Review of applicable national and international requirements and standards, and requirements of the World Bank
- Stakeholder consultation, including their input to identification, mitigation, and control of Project impacts. Stakeholder engagement should be initiated early in the Project, to ensure open access to all relevant information

- "Source-Path-Receptor" Analysis. Potentially significant social and environmental impacts are also identified by structured analysis of potential sources of impacts, ways they can impact the environment and human health (e.g., direct impact or transport of pollution emissions/discharges in the environment), and sensitivity of potentially affected receptors.

Potential impacts on individual components of the environment are identified for all phases of the planned operations, and their magnitude is assessed.

### 2.5.2 Project Implementation Phases

A phase of any project is a period of time when certain activities are implemented that collectively shape a stage in the Project life cycle. The following phases are considered by the ESIA Report:

- Pre-construction
- Construction and commissioning
- Operation; and
- Decommissioning (including demolition/dismantling).

The above project phases may be combined (integrated) for assessment, or they may be separated for a more detailed review, as appropriate.

### 2.5.3 General Approach to Impact Assessment

An impact is any change to an environmental or social (including community health and safety) receptor, whether direct or indirect, expected to result from the construction, operation and decommissioning of a proposed Project. Impacts on individual receptors may be negative (adverse) or positive (beneficial).

The actions undertaken to determine and evaluate the significance of potential project impacts is illustrated in figure 2-2 and involves four key steps:

- **Prediction:** What will happen to the status of specific receptors as a consequence of this Project (direction, extent, duration, reversibility)?
- **Evaluation of significance:** How significant is the impact? What is its relative significance when compared to other impacts?
- **Mitigation:** If there are impacts of concern (adverse), can anything be done to avoid, minimise, or offset the impacts? Or to enhance potential beneficial impacts? and;
- **Residual impact assessment:** After mitigation, are the impacts still of concern?

If yes, the process needs to be repeated at least once before the 'final' determination of residual impact significance occurs. A residual impact is the impact that remains following the application of mitigation measures. Once mitigation and enhancement measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation and enhancement measures

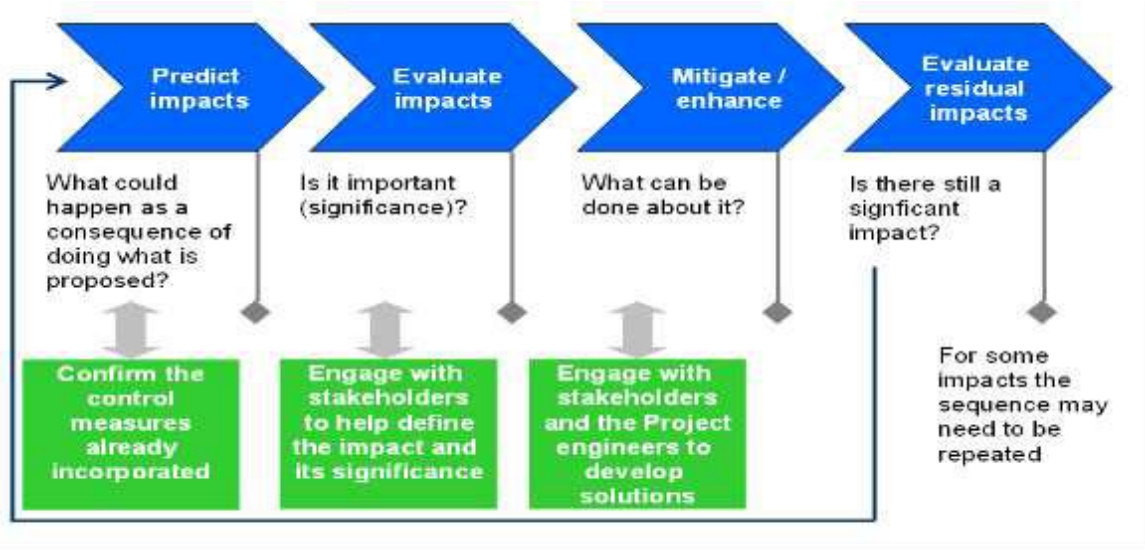


Figure 2-2: Impact Evaluation Process

### 2.5.4 Prediction

Impact prediction involves determining the magnitude or extent of a change or changes in the status of a receptor or linked receptors resulting from the planned operations, through application of forecast models, analysis of experience of similar operations, or environmental science. Impact prediction provides valuable information to determine the broader characteristics of impacts.

### 2.5.5 Impact Types

Impacts can be divided into types, and also exhibit a number of characteristics. The degree to which an impact may be managed or modified by the mitigation measures is dependent upon the impact type and its characteristics. Table 2.1 provides definitions of key impact types. All of these impact types exhibit certain characteristics in terms of:

- Reversibility;
- Extent;
- Duration; and
- Frequency.

Table 2-1: Classification of Project Impacts

Classification of Impacts	Definition	Characteristics
By overall effect	Beneficial	Impacts expected to result in positive changes at the identified receptors
	Adverse	Impacts expected to result in negative changes at the identified receptors
By origin	Direct	An impact that results from a direct interaction between a planned activity and the receiving environment (receptors)
	Indirect	An impact that follows on from the primary interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g. increased demand for resource as a result of workforce drift to the area of planned

		activities from other regions, or feedback effects in ecosystems affected by direct impacts)
By the nature of secondary effects	Cumulative	Project impacts which may be amplified if combined with impacts caused by third party operations (projects) on the same resources and/or receptors

Cumulative impacts include impacts on the receptors identified for the Project, as well as other existing, planned or reasonably defined projects (in the studied area) and activities which are not directly related to the Project and its associated facilities. The approach to assessment of cumulative impacts is provided in Section 2.7.

#### 2.5.6 Evaluation of Significance: Planned Events

Impacts significance is assessed in this Report using the qualitative, and where possible quantitative methods applicable for major project ESIAs. The quantitative methods provide an outlook of the measurable changes induced by the Project, based on available design documentation or experience of similar facilities. Quantitative assessment of the Project impacts on receptors can be also provided using the official Kenyan methodologies for estimation of potential damage which may be caused by specific impacts.

The qualitative methods are based on expert estimations, experience of other projects of similar nature and scale, and follow a structured format to produce consistent and logical projections. It should be noted that environmental impacts are sometimes difficult to evaluate in quantitative terms, due to their intangible nature (e.g. emotional impacts or sensitivity), or due to interrelation of the change and specific local situation (e.g. scale of migrant inflow compared to the baseline population).

The impacts are assessed in a structured and coordinated manner throughout the ESIA process. The approach adopted enables attribution of potential impacts to specific environmental and social aspects. For adverse impacts, significance is assigned based on determining impact magnitude and receptor sensitivity, after which mitigation is identified depending on impact characteristics.

Beneficial impacts are identified, assessed and evaluated, making use of impact magnitude (as per the guidance below), but not receptor sensitivity. Instead, beneficial impacts are described and evaluated based on available data, alignment with government policies/targets, stakeholder inputs and professional expert judgement. Measures to enhance them will be identified to try to maximize the expected benefits.

The magnitude of an impact is a measure of the scale of a change from baseline conditions for a receptor. This measure of change can be described by considering the following criteria in combination:

- **Reversibility:** Restoration of the pre-impact status of a receptor.
- **Extent:** Spatial extent (e.g., pollution dispersion or habitat impacted) or population/community extent; and
- **Duration:** Period of time over which an impact will interact with a receptor. This factor may also cover the frequency and regularity criteria, or they can be considered separately.

The magnitude of each impact is assessed using the above criteria and the characteristics provided in Table 2-2.

**Table 2-2: Description of impact criteria**

Criterion	Description	Definition
Reversibility	Irreversible	Impacts that cause a permanent change in the affected receptor
	Reversible	Restoration of the pre-impact status of a receptor due to mitigation/reinstatement measures and/or natural recovery. Duration of an impact and a subsequent recovery period should be considered
Extent (spatial)	Site	Within the boundaries of land and water area allocated for the Project and associated use-restricted zones (sanitary protection, security, etc.)
	Local	Within the boundaries of local municipality
	Regional	Within the boundaries of a region, territory, republic
	National	Impacts that affect more than one region or constituent entities of Kenya's water flows/bodies of national significance
	Transboundary	Impacts that affect receptors beyond the boundaries of the country in which the project is located and producing transboundary/ global effects (e.g. impacts of greenhouse gas emissions)
Duration	Short-term irregular or occasional	Impacts caused by short-term single or recurrent events
	Mid-term regular or associated with a phase of activities	Impacts with duration equal or nearly equal to that of certain activity or a phase of the planned operations
	Long-term	Impacts with duration equal or comparable to the Project lifetime. Impacts of this category may cease after completion of Project activities

Assessment of duration of an impact also considers its frequency (e.g. single, rare, periodic, and constant) for a more detailed characterization of duration of time when impact is felt. All characteristics listed above are factored into the assessment of impact magnitude.

Table 2-3 provides generic criteria to be used to determine the impact magnitude. Taking the results derived from the previous step a decision can be made on impact magnitude (negligible, low, moderate, high). Discipline specific criteria have been determined if appropriate and presented in Chapters 8 and 9, respectively.

**Table 2-3: Impact Magnitude**

Impact	Criteria
Negligible	No persistent discernible impact. The change is essentially indistinguishable from natural background variation.
Minor	Limited impacts that can be identified by the available means of monitoring, with no effect on functions of ecosystems and communities <b>Extent:</b> Local <b>Duration:</b> Short / medium term <b>Reversibility:</b> Reversible

Moderate	<p>Noticeable impacts which may result in quantitative changes in ecosystems, however without their quality transformation, and without loss (partial or complete) of their natural functions.</p> <p><b>Extent:</b> Local/regional</p> <p><b>Duration:</b> Medium/long term</p> <p><b>Reversibility:</b> Reversible/irreversible</p>
Major	<p>Prominent impacts that may result in temporary or permanent transformation of ecosystems, with loss of their functions, and transformation of communities' lifestyle and quality.</p> <p><b>Extent:</b> Regional/national/transboundary</p> <p><b>Duration:</b> Medium/long term</p> <p><b>Reversibility:</b> Reversible/irreversible</p>

Once the respective magnitudes of each impact have been allocated the next step is to determine receptor sensitivity. Receptor sensitivity is based on two components: the degree to which a receptor is resilient to a change and the value attributed to the receptor by stakeholders or applicable regulations/policies.

Receptor resilience takes into consideration not only activity-receptor-impact pathways, but also the characteristics of a receptor that might make it more or less resilient to change. As such, a receptor can be considered as existing within a spectrum of 'vulnerable' to 'resilient'. Receptor value considers importance represented by conservation status, socio-cultural importance and/or economic value. Certain receptors are deemed to be of greater importance than other receptors.

The final step is to combine the impact magnitude and receptor sensitivity results to determine impact significance in relation to its receptors. For known (planned) impacts, significance is determined by their intensity, based on the impact magnitude and sensitivity of the receptor. For example, an impact of low magnitude affecting a receptor of moderate sensitivity is an impact of low/moderate significance (the actual significance determination -low or moderate-in this case can be made by the ESIA team) or an impact of high magnitude affecting a receptor of moderate sensitivity results in an impact of high significance. Table 2-4 provides an account of the key features (definitions) of each of the impact significance classifications (from Not Significant to High); specifically linking them to need for mitigation measures.

**Table 2-4: Impact Significance Matrix**

		Receptor Sensitivity			
		Negligible	Low	Moderate	High
Impact Magnitude	Negligible	Not Significant	Not Significant	Not Significant	Not Significant / Low35
	Minor	Not Significant	Low	Low / Moderate	Moderate
	Moderate	Not Significant	Low / Moderate	Moderate	High
	Major	Low	Moderate	High	High

Definitions of the above significance ranks adopted in international ESIA practice are provided in Table 2-5.

**Table 2-5: Project impacts ranking by significance**

Impact Significance	Description
Negligible	Impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.
Low	Impacts with a “Low” significance are expected to be noticeable changes to baseline conditions, beyond natural variation, however well below the applicable standards (e.g. environmental quality standards, and are not expected to cause hardship, degradation, or impair the function and value of receptor. These impacts warrant the attention of decision-makers and should be avoided or mitigated where practicable.
Moderate	Impacts with a “Moderate” significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of a receptor, although the overall function and value of a receptor is not disrupted. These impacts must be mitigated to avoid or reduce the impact.
High	Impacts with a “High” significance are likely to disrupt the function and value of a receptor and may have broader systemic consequences (e.g. ecosystem or social well-being). They may also result in a failure to maintain adverse effects within the permissible regulatory levels. These impacts are a priority for mandatory mitigation to avoid or reduce the significance of the impact.

This method is applied at least twice: to both pre- and post-mitigation scenarios for all impacts identified. In general, residual impacts classed as “Not Significant” or “Low Significance” are not considered to be of concern for the assessment. For adverse impacts of “Moderate” and “High” significance, an iterative process is undertaken to further investigate opportunities for mitigation, according to the hierarchy above.

Where the significance cannot be further reduced, an explanation is provided of why further reduction is not practicable. Monitoring may be required to confirm the measures used to mitigate adverse impacts are working properly and that the impact is not worse than predicted. Monitoring requirements are presented in Chapters 8 and 9.

### 2.5.7 Risks and Unplanned Events

Where there is uncertainty about occurrence of an event (e.g. intrinsically occasional event during normal operation and/or where impacts are caused by unplanned/emergency situations), the magnitude of risk associated with such event is determined as a function of its occurrence probability and intensity of potential impact. Probability criteria applicable to this ESIA are described below (Table 2-6). They are set for the whole ESIA process and are equally applicable to all types of impact.

**Table 2-6: Risk Occurrence Criteria**

Likelihood	Qualitative assessment of impact / event probability
High	Impacts/events which are observed in the sector (studied operations or region) and reoccur more than once a week

Moderate	Impacts/events regularly observed in the sector and region, including seasonal cycling, which can be considered as very likely for the design lifetime of the planned operations
Low	Impacts/events which are rarely observed in the sector and region, or regularly observed in other sectors. These would generally occur 1 to 2 times per year
Not significant	Impacts/events that have never been observed in a wider range of sectors or in the region. Impact/event which can be considered as unlikely for the design lifetime of the proposed operations

The criteria of general risk/impact (change) occurrence risk are shown in Table 2.7.

**Table 2-7: General risk / event occurrence risk criteria**

	Impact intensity			
	Not significant	Low	Moderate	High
High	Insignificant	Medium / Minor	Medium / high	Critical
Moderate	Insignificant	Minor	Medium	High
Low	Insignificant	Minor	Medium / minor	Medium / high
Not significant	Insignificant	Insignificant	Minor	Medium

Unplanned events will often result in a high impact significance, even with mitigation/remedial measures in place e.g. oil spills. In such cases, not only the specific measures must be in place to manage an unplanned event, but the probability has to be minimised to levels seen to represent good industry practice. In this table, unplanned events with high residual impact significance would need to be minimized to extremely unlikely ("Improbable") events. Sometimes, if such events can be assessed quantitatively, a special analysis of risks is required to define numeric value of the event probability. In this case the probability value should be less than  $1 \times 10^{-6}$ .

## 2.6 Impact Mitigation

Mitigation measures are developed as necessary or appropriate to minimize the risk intensity and/or impact probability, and therefore make the impact or risk less significant. Assessment of significance of potential impact/risk has been assessed during the ESIA process based on potential and residual impacts, using the criteria mentioned in Section 2.5.6. As part of the ESIA process, when adverse impacts are identified, measures for mitigation, minimization and control of risks, and monitoring of residual impacts are developed (as necessary or appropriate). A residual impact is the impact that remains following the application of mitigation measures. The process of identifying design controls and mitigation measures must follow the sequence of the mitigation hierarchy (Figure 2-3) which is widely regarded as the best practice approach to managing impacts.

First, efforts are made to avoid or prevent, then minimize or reduce adverse impacts. If the impact cannot be fully avoided by application of design controls, they are supplemented by further engineering measures for minimization and mitigation of the adverse impacts. These measures are supplemented by additional mitigation measures to be applied through the effective management of project-related activities during construction, operation and de-commissioning. Any remaining residual impacts are then addressed via mitigation

measures such as restoration and remediation (e.g. at the end of construction) and/or offsetting and compensation. The measures are developed and implemented in the same order as they are listed above.



Figure 2-3: Mitigation Hierarchy

Development of mitigation measures will be primarily focused on minimization of the impacts of “High” significance. However, where possible and appropriate, mitigations are also proposed for the impacts of “Moderate” and “Low” significance, in order to reduce environmental and social effects/risks to the lowest level.

## 2.7 Cumulative Impacts

### 2.7.1 Definition and Applicable Guidelines

Cumulative impact assessment (CIA) is one of the requirements set for a comprehensive ESIA. Area of Influence is defined as the encompassing “cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned, or reasonably defined developments at the time the risks and impact identification process is conducted.” The CIA methodology is mainly based on the six steps approach outlined in the Good Practice Handbook on Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets (2013). This document is a supplement to the IFC Performance Standards and Guidance Notes and provides recommendations relating to practical assessment of cumulative impacts recognizing some of the uncertainties and constraints faced by private sector proponents. It also introduces the concept of valued environmental and social components (VEC) in the assessment of cumulative impacts.

### 2.7.2 CIA goals

The CIA analysis has two goals:

- To determine if the combined impacts of: the project, other projects and activities, future developments and natural environmental drivers will result in VEC condition that may put the sustainability of a VEC at risk (i.e., exceed a threshold for VEC condition which is an unacceptable outcome); and
- To determine what management measures could be implemented to prevent unacceptable VEC condition, this may include additional mitigation of the project being assessed, additional mitigation of other existing or predictable future projects, or other regional management strategies that could maintain VEC condition within acceptable limits.

### **2.7.3 CIA Methodology**

A six-step process described in the IFC's Good Practice Handbook that should be used in conducting a CIA for the project includes the following steps:

- Scoping phase I–VECs, spatial and temporal boundaries
- Scoping phase II–Other activities and environmental drivers
- Establish information on baseline status of VECs
- Assess cumulative impacts on VECs
- Assess significance of predicted cumulative impact
- Management of cumulative impacts-design and implementation.

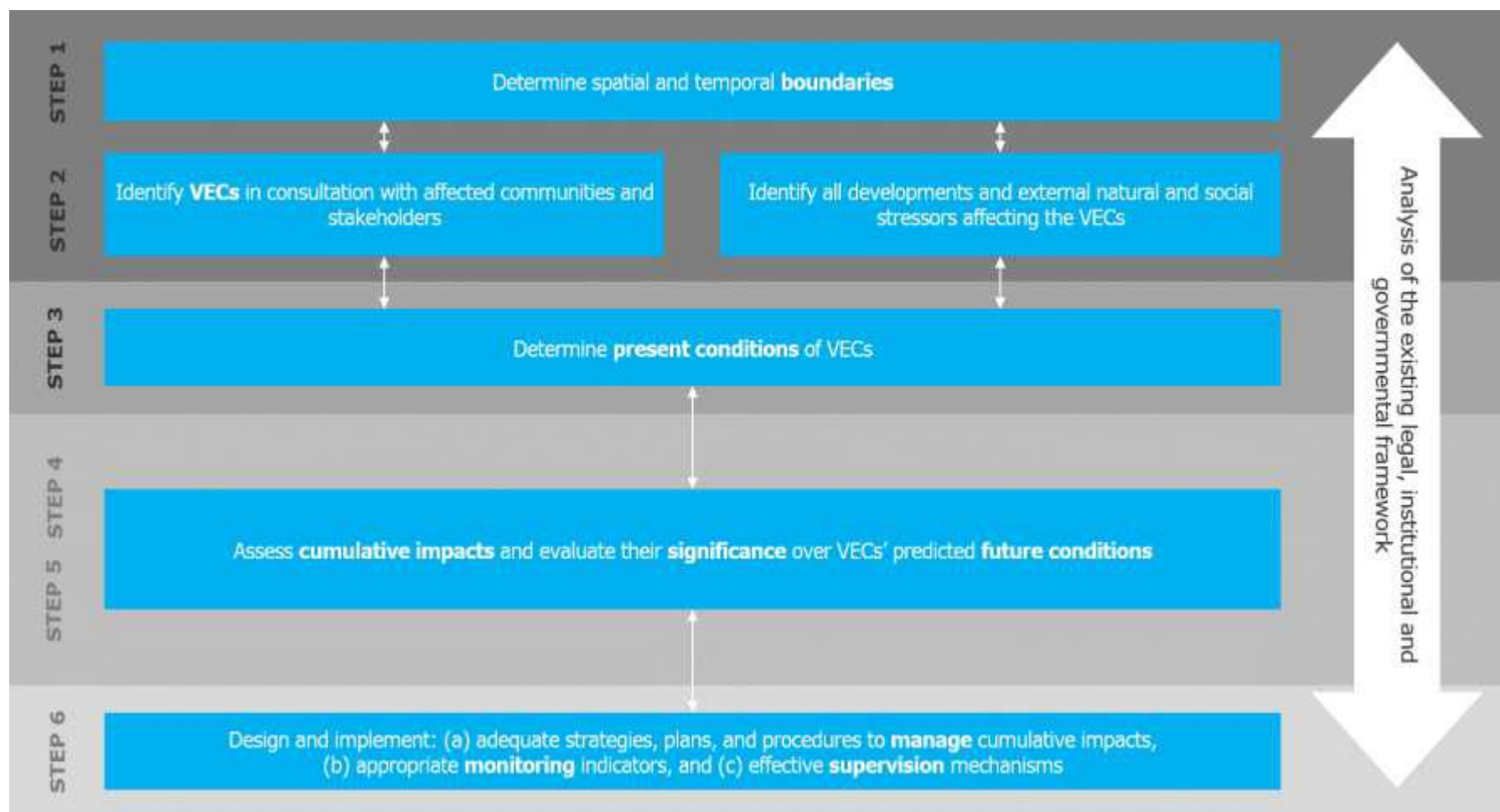


Figure 2-4: IFC Six Steps Rapid Cumulative Impact Assessment Approach

Source: Good Practice Handbook–Cumulative Impact Assessment and Management

## **Step 1. Scoping Phase I – VEC's, Spatial and Temporal Boundaries**

The first stage of the CIA is aimed at identifying potential VECs and defining the spatial and temporal boundaries.

### **VECs**

VECs are those receptors that are considered to be important when assessing the risks posed from cumulative impacts. VECs have been identified throughout the ESIA process, including consultations undertaken with stakeholders and reviews and assessments undertaken as part of the ESIA.

Consistent with the above-mentioned guidance, the assessment is limited to impacts generally recognized as important on the basis of scientific/expert concerns and concerns from Affected Communities and excludes any potential impacts that would occur without the Project or independently of the Project. In addition, only those environmental and social receptors on which the Project itself is assessed to have potentially significant effects are included in the CIA. In practical terms, this means that:

- If the impact of the Project on a receptor has been assessed negligible then it is not considered as a VEC in the CIA (i.e., scoped out in all cases);
- Receptors on which the assessed Project impact is low are considered on a case-by-case basis for inclusion as a VEC in the CIA.

### **Spatial Boundaries**

The CIA considers a larger spatial area outside of the Project AoI. The precise spatial boundaries are defined on the basis of the geographic range of specific VECs as well as the spatial distribution of other third-party activities, future developments or influences that might impact the VECs.

### **Temporal Boundaries**

The temporal boundary is therefore defined based on the availability and quality of information about existing and reasonably foreseeable projects or projects with a conceptual plan. The overall Phase I scoping is undertaken through consideration of the VECs, spatial and temporal boundaries, in a systematic manner, taking the assessed Project impacts to each social and environmental receptor identified in the course of ESIA and taking into account the following aspects:

1. All the different types of Project impacts on those receptors and the assessed significance of the residual Project impact
2. Spatial extent of a receptor in this particular region
3. Consideration of how the spatial extent of the receptor may overlap with the influence of other industrial activities and future developments identified through the Phase II Scoping process
4. Consideration of the relative temporal boundaries of the different stressors (e.g., whether or not such stressors are concurrent, consecutive etc.) and the duration of such impacts
5. Other non-industrial influences that may affect a receptor (within the determined spatial and temporal boundaries).

The above aspects are determined, and the potentially affected receptors identified in the CIA process are taken into consideration for the above factors, which are then considered as VECs. In the “Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions” (1999), it is indicated that normally most of project proposals are associated with too many uncertainties outside of a period of 5 years. It is recommended, therefore, to assume a time limit of maximum 5 years.

## **Step 2. Scoping Phase II – Other Activities and Environmental Drivers**

This part of the scoping exercise identifies historical, existing and planned future activities and the presence of natural influences and stressors that have the potential to affect the VECs identified in Step 1 that will require further assessment within the CIA. Natural influences and stressors that are unrelated to the Project activities are also considered, for example, the potential impact of climate change in terms of the climatic extremes and impacts on migratory and predatory animals. Given the inherent uncertainty and variability associated with climate change projections, these factors are only considered in terms of a high-level and qualitative assessment.

## **Step 3. Baseline Conditions**

Baseline data for the Project AoI is based on detailed studies and survey works undertaken by the Project and as described in baseline chapters of ESIA (Chapters 5 and 6). These Project-specific studies are supplemented by readily available information at the regional scale beyond the Project AoI. Project and as described in Chapters 5 and 6. These Project-specific studies are supplemented by readily available information at the regional scale beyond the Project AoI.

## **Step 4. Assessment of Cumulative Impacts**

The Project CIA has adopted a VEC centric approach, i.e. VECs and their resilience have been identified/determined then the impacts from various activities on these VECs were assessed. The assessment presented in this Chapter considers only the residual impacts associated with the Project, i.e. the impacts that will persist after implementation of the planned mitigation measures. The VECs, potentially affected according to the assessment to an insignificant degree, should not necessarily be included in the cumulative impact assessment (Table 2-8).

**Table 2-8: Criteria for including valued environmental and social components**

Residual impact			
Insignificant	Low	Moderate	High
Not included in CIA	Considered for assessing the potential cumulative impact	Included in CIA	Included in CIA

Predicted future conditions for VECs are analyzed taking into consideration all impact factors, including the contribution of this Project to the overall cumulative impacts. Due to the inherent uncertainties in the nature of cumulative impacts, the CIA has by necessity been performed in a qualitative manner, but nevertheless provides useful context for determining the significance of the Project's contribution to the overall impacts.

## Step 5. Significance of Cumulative Impacts

The methodology described in Section 2.4 was developed primarily for assessing Project-specific impacts, although can be broadly applied to cumulative impacts.

## Step 6. Management of Cumulative Impacts

Many of the mitigation measures defined during the assessment of Project impacts will also be applicable to the mitigation of cumulative impacts. However, it is also recognized that the cumulative impact assessment may generate additional mitigation measures and strategic or long-term actions, for example, the need to share findings of assessments and cooperate with third parties such as future developers and regional authorities or local government bodies. Consistent with the approach taken elsewhere in the ESIA and described in Section 2.5, the mitigation hierarchy, which broadly requires that consideration be given to avoidance, minimization, mitigation and offsetting in that order of preference, has been applied.

## Step 7. Management of Cumulative Impacts

Many of the mitigation measures defined during the assessment of Project impacts will also be applicable to the mitigation of cumulative impacts. However, it is also recognized that the cumulative impact assessment may generate additional mitigation measures and strategic or long-term actions, for example, the need to share findings of assessments and cooperate with third parties such as future developers and regional authorities or local government bodies. Consistent with the approach taken elsewhere in the ESIA and described in Section 2.5, the mitigation hierarchy, which broadly requires that consideration be given to avoidance, minimization, mitigation and offsetting in that order of preference, has been applied.

### 2.7.4 Presentation of ESIA Results

The table below contains a form of a summary table which is designed to provide a visual presentation of the environmental and social impact assessment, including types of activities, impacts and their receptors, description of mitigations and assessment of the residual impact. A key to the alphabetical symbols of stages of the Plant Project, receptors sensitivity, impact significance and risk category is provided under the summary table form.

**Table 2-9: Evaluation of impact significance: a form of a summary table**

Impact	Direction	Receptor	Receptor Sensitivity	Stage	Impact significance	Risk Significance	Mitigation measures	Residual significance		
								Likelihood	Impact Rating	Risk Rating

**Table 2-10: Impact Parameter**

Parameter	Abbreviation	Description	Parameter	Abbreviation	Description
Stage	C	Construction	Risk	Cr	Critical
	O	Operation		H	High
	Cm	Commissioning		M	Medium
	DCm	Decommissioning		Mr	Minor
Recipient Sensitivity	H	High	Impact Significance	I	Insignificant
	M	Moderate		H	High
	L	Low		M	Moderate
	N	Negligible		L	Low
Sign	P	Positive		N	Insignificant
	N	Negative			

## 3 PROJECT DESCRIPTION

### 3.1 Project Location

The proposed high voltage transmission line ('the Project') traverses three counties i.e. Nakuru county starting at the Menengai Geothermal Power Plant, (geographic coordinates 0°10'33.44"S 36° 6'32.85"E) and terminating in Laikipia County at Rumuruti sub-station (geographic coordinates 0°14'44.78"N 36°30'23.60"E). It is expected that upon completion, the 132kV double circuit transmission line of approximately 70 Km will be energized and become part of the national grid. The proposed Right of Way (RoW) for the transmission line will be approximately 30 metres wide.

### 3.2 Project Area of Influence

For the purposes of this impact assessment, the definition of the Area of Influence (AoI) given in IFC Performance Standard 1 is used. The AoI encompasses<sup>3</sup>:

The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which affected communities' livelihoods are dependent.

Associated facilities are facilities that would not have been constructed or expanded if the project did not exist and without which the project would not be viable. Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.'

For the Project, the **direct** AoI is the spatial extent of the Project footprint and related facilities as well as on the associated effects on the receiving environment (*Figure 3-2*). This encompasses the transmission line RoW as follows:

- 1000 m either side of line for the 132 kV (i.e., 2000 m in width).

Note that some direct impacts may not affect receptors within the entire AoI and will instead be confined to within the Project footprint, but this 1000 m zone is considered to be the composite AoI for direct impacts from the project. The **indirect** AoI encompasses areas potentially affected by cumulative impacts as well as areas that could be impacted indirectly by Project activities. The indirect AoI will differ between various resources and receptors.

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<sup>3</sup> IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, January 1, 2012.

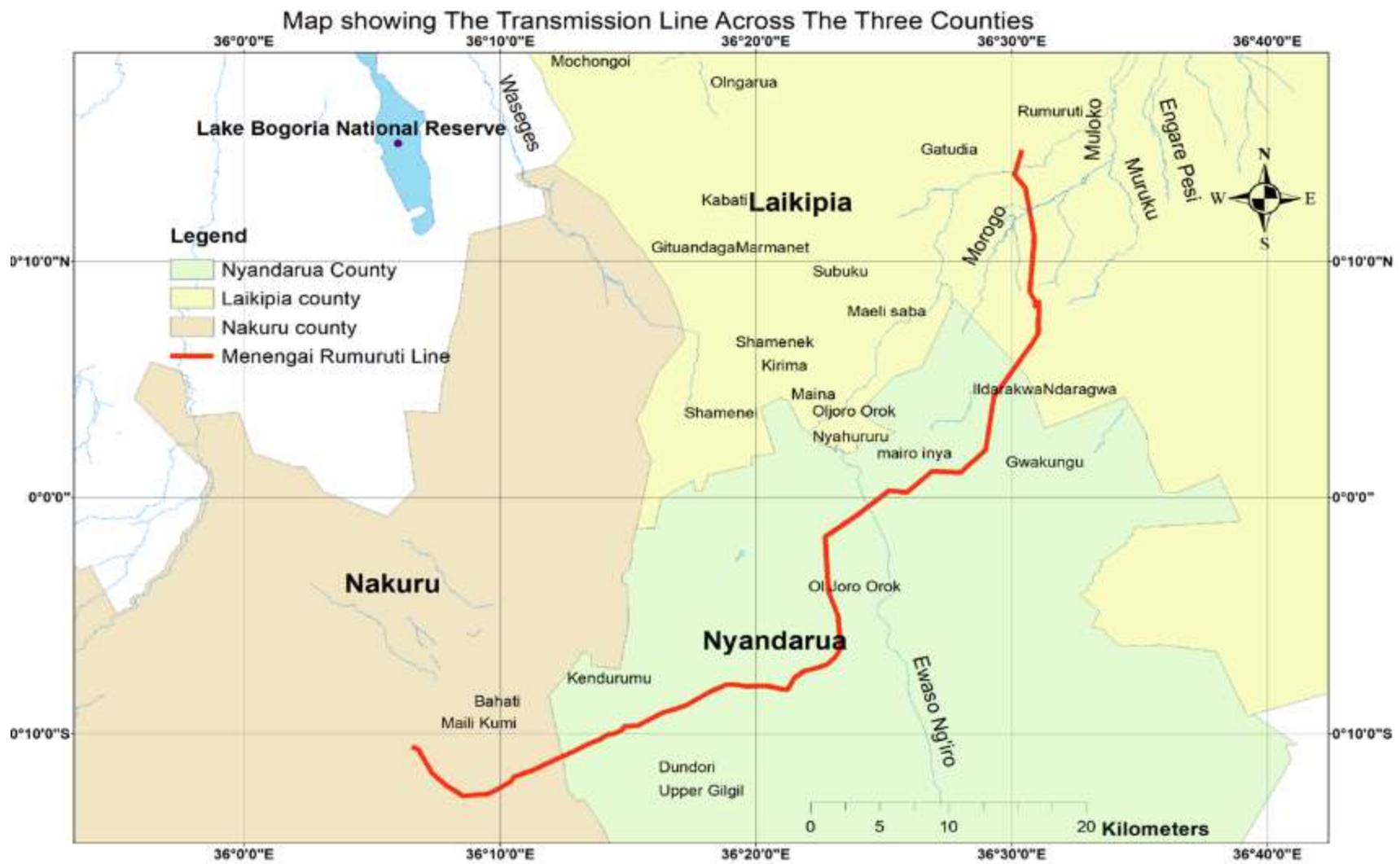


Figure 3-1: Transmission Line Route and Counties Traversed

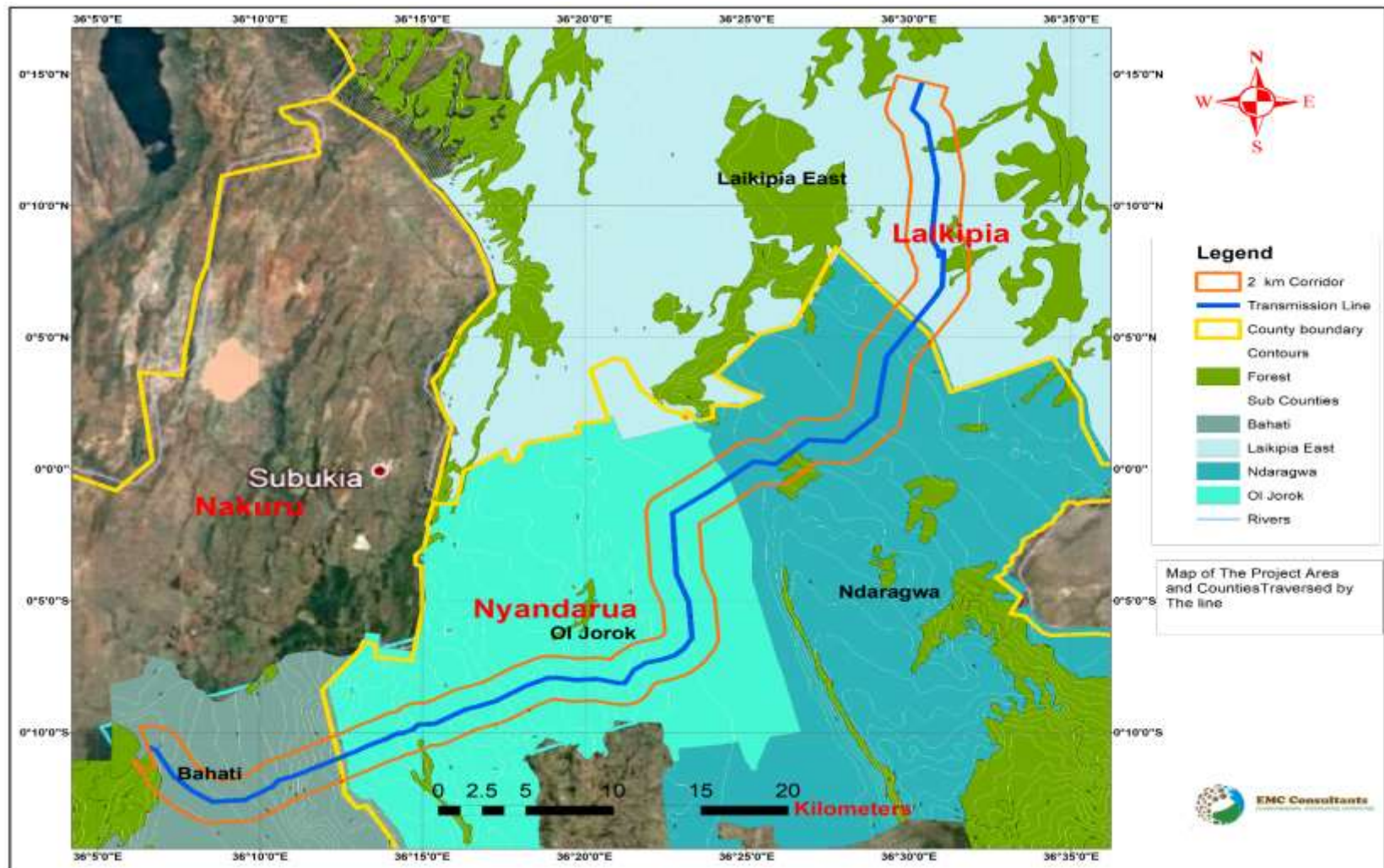


Figure 3-2: Transmission Line Route Area of Influence along 3 Counties

### 3.3 Project Components

The project components include the following:

- Construction of 70km 132kv/133kV transmission line from Menengai Crater in Nakuru County to Rumuruti Town in Laikipia County passing through Ol Kalou Town in Nyandarua County.

#### 3.3.1 Component I. High Voltage Transmission Line

The main purpose of this project will be to evacuate 132kV (high voltage) power from the already existing Menengai Geothermal Power Plant to connect to the Rumuruti sub-station from where it will be energized into the national grid. This is typically referred to as electricity transmission. Transmission is the process by which large amounts of electricity produced at power plants or sub-stations (such as in this case), is transported over long distances for eventual use by consumers. Due to the large amount of power involved, and the properties of electricity, transmission normally takes place at high voltage (132-kilovolt or above) to reduce losses that occur over long distances.

##### 3.3.1.1 Transmission Pylons

Transmission pylons are the most visible component of the electricity transmission system. Pylons support high-voltage conductors (cables that transmit the electricity, otherwise known as lines) above the ground and separate them from other lines, buildings, and people. Pylons vary in design and dimensions. The proposed transmission pylons for this project are lattice steel between 33.5 and 46 meters tall. A minimum of 30-metre right-of-way is needed for the area around the pylons and the spans between the pylons. Spans between individual towers are typically about 1,150 feet, with about five towers needed for each mile of line. Towers would be made of galvanized steel and may appear shiny for 2 to 4 years before they dull from weathering. The actual number of towers would depend on the length of the action alternative selected and the actual span length between towers. A transmission line tower could be purpose designed for a particular project. However, prototypes would need to be manufactured and expensive type testing (usually destructive) would need to be carried out before it used. The configuration shown below is a barrel type tower in commonly used in Kenya and considered suitable for this application.





Figure 3-3: Typical designs of transmission pylons

Two types of towers would be used for both single- and double-circuit towers: suspension towers and dead-end towers (see Figure 3-4). Suspension towers would be used to hold the conductors along a straight path. Dead-end towers would be used where the line takes a turn or enters a substation. Dead-end towers are stronger and heavier than suspension towers, and more expensive. Most towers proposed for this project would be suspension towers. The expected tower height be in the region of 40m. The base width and weight is expected to range from about 4.5m and 3 metric tons for a line (tangent) tower to about 9m and 6.5 metric tons for the heavy angle tower. Possible dimensions of a typical tower are shown below: -

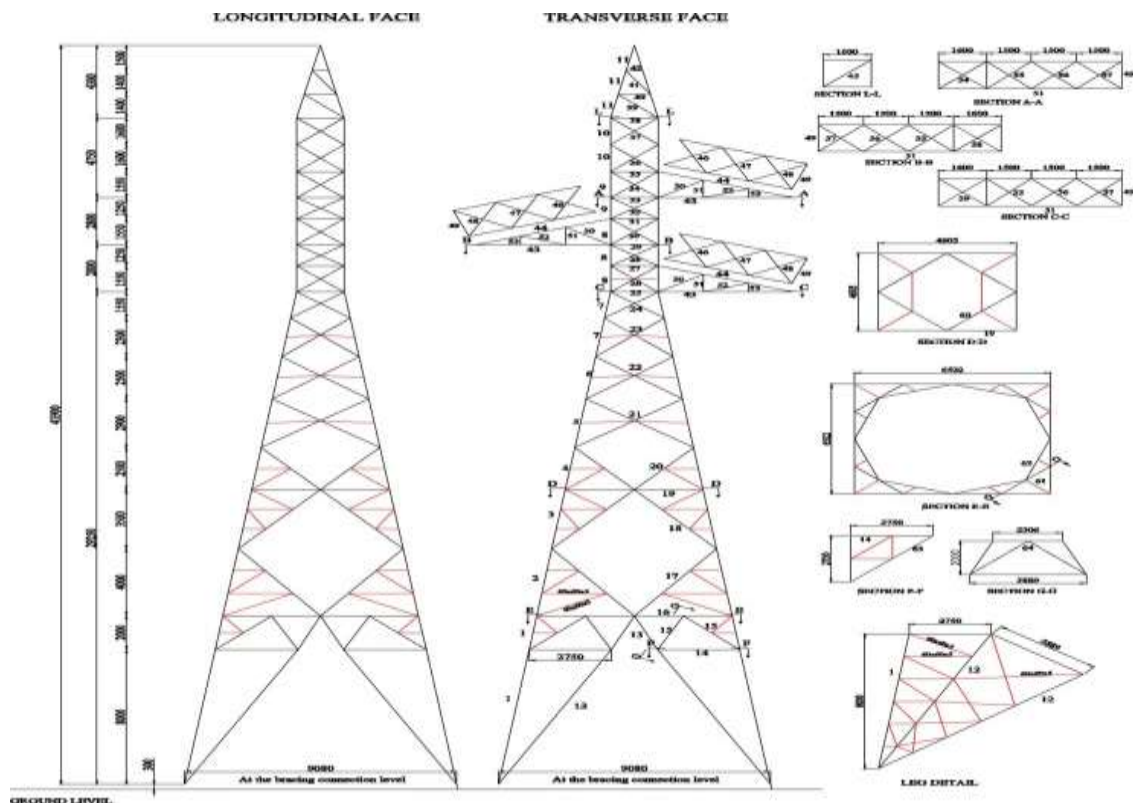


Figure 3-4: Typical 132kV Tower Dimensions

### 3.3.1.2 Transmission Angle Points Coordinates

The coordinates for the proposed angle points are as indicated in the table below.

**Table 3-1: Project Coordinates**

<b>132Kv DOUBLE CIRCUIT MENENGAI-OLKALAU-RUMURUTI ANGLE POINTS COORDINATES</b>				
Serial No.	AP-NAME	EASTINGS	NORTHINGS	ZONE
1	AP 1	172155.9	9978283.97	ARC 1960, 37S
2	AP 2	178083.3	9980804.29	ARC 1960, 37S
3	AP 3	178532.3	9980620.29	ARC 1960, 37S
4	AP 4	178996.3	9979694.29	ARC 1960, 37S
5	AP 5	179542.3	9978743.29	ARC 1960, 37S
6	AP 6	180632.3	9977719.29	ARC 1960, 37S
7	AP 7	181770.3	9976975.29	ARC 1960, 37S
8	AP 8	183634.4	9977114.64	ARC 1960, 37S
9	AP 9	185247.3	9978075.28	ARC 1960, 37S
10	AP 10	185537.8	9978478.88	ARC 1960, 37S
11	AP 11	186574.3	9978851.27	ARC 1960, 37S
12	AP 12	189561.3	9980312.26	ARC 1960, 37S
13	AP 13	190879.3	9981041.26	ARC 1960, 37S
14	AP 14	191809	9981429.48	ARC 1960, 37S
15	AP 15	192145.5	9981686.42	ARC 1960, 37S
16	AP 16	192395.8	9981801.84	ARC 1960, 37S
17	AP 17	192639.1	9981811.82	ARC 1960, 37S
18	AP 18	193244	9982084.34	ARC 1960, 37S
19	AP 19	193516	9982422	ARC 1960, 37S
20	AP 20	194477.3	9982452.25	ARC 1960, 37S
21	AP 21	196288.3	9983514.24	ARC 1960, 37S
22	AP 22	196921.2	9983637.58	ARC 1960, 37S
23	AP 23	197931.3	9984043.24	ARC 1960, 37S
24	AP 24	199686.3	9985160.23	ARC 1960, 37S
25	AP 25	200931	9985715	ARC 1960, 37S
26	AP 26	201544.3	9985689.23	ARC 1960, 37S
27	AP 27	202466.3	9985536.23	ARC 1960, 37S
28	AP 28	203765.3	9985575.22	ARC 1960, 37S
29	AP 29	204953.3	9985289.22	ARC 1960, 37S
30	AP 30	205337.9	9985318.25	ARC 1960, 37S
31	AP 31	205828.3	9986175.22	ARC 1960, 37S
32	AP 32	206483.3	9986730.21	ARC 1960, 37S
33	AP 33	207515.3	9986955.21	ARC 1960, 37S
34	AP 34	207992.3	9987176.21	ARC 1960, 37S

35	AP 35	208170.3	9987216.21	ARC 1960, 37S
36	AP 36	208764.3	9987764.21	ARC 1960, 37S
37	AP 37	209166.3	9988427.21	ARC 1960, 37S
38	AP 38	209008.7	9990980.87	ARC 1960, 37S
39	AP 39	208307	9992924.5	ARC 1960, 37S
40	AP 40	208075.3	9997237.19	ARC 1960, 37S
41	AP 41	210295.3	9998822.33	ARC 1960, 37S
42	AP 42	212713.3	10000812.2	ARC 1960, 37S
43	AP 43	213977.1	10000666.7	ARC 1960, 37S
44	AP 44	215809.3	10002324.2	ARC 1960, 37S
45	AP 45	217885	10002225	ARC 1960, 37S
46	AP 46	219723.4	10003979.3	ARC 1960, 37S
47	AP 47	220295.3	10008080.2	ARC 1960, 37S
48	AP 48	223144.3	10012441.1	ARC 1960, 37S
49	AP 49	223242.5	10020411.9	ARC 1960, 37S
50	AP 50	222663.1	10024466.2	ARC 1960, 37S
51	AP 51	221783.3	10025476.7	ARC 1960, 37S
52	AP 52	222390	10027455	ARC 1960, 37S

### 3.3.1.3 Electrical Transmission Lines

The wires that carry the electrical current on the transmission line are called conductors. Conductors are the cables on the transmission pylons that carry the electricity to substations. Conductors are constructed primarily of twisted metal strands, but newer conductors may incorporate ceramic fibres in a matrix of aluminum for added strength with lighter weight. Most high-voltage conductors are made of aluminum with a steel core that gives the cable its required strength. Conductors are often modified to reduce their reflectivity and brightness. The conductors are attached to the towers using insulators (see Figure 3-5). Insulators are bell-shaped devices that prevent the electricity from jumping from the conductors to the tower and down to the ground. The insulators are made of porcelain or fiberglass and are non-reflective. The conductor would need to be fitted together where one reel of conductor ends, and a new reel begins. Conductor fittings would be made using hydraulic compression. Hydraulic compression uses a press that compresses the fittings on the conductor. Nine conductors (three bundles each with three conductors) would need to be fitted once about every 1.5 to 2 miles, depending on the length of conductor on the reel.



**Figure 3-5: Aluminium Conductor with a steel core**

The design criteria as adopted for the conceptual design are based on KETRACO's current practices, based on studies of recently composed specifications and in-situ inspections of existing transmission lines. The main criteria when concluding on the adopted conceptual design has been to ensure that the various line components are designed in a safe, cost effective and reliable manner. Project design includes the following elements:

- **Lightning Arrestors:** for the lightning arrestor there are two ground wires, on top of the power line, for the entire length of the 70km line and over the conductors, to produce an umbrella effect to protect conductors. The lightning current will be grounded using the ground cables connected to every tower steel structure. The structure is connected to the ground by specific ground connection cables and network in order to meet KETRACO specifications.
- **Aircraft Signalling Beacons:** The project includes beacons for aircraft signalling as per the regulations of the country.
- **Bird Flight Diverters:** Devices for avifauna "BFD" (Bird Flight Diverter), consisting of spirals 30cm in diameter, will be attached to the guard cables at regular intervals of suitable length in each situation. BFD devices are helically shaped, constructed of plastic, white or orange, and fit to the guard cable by winding. At one end these devices have a larger diameter ring protruding from the cable profile. This ring combined with the colour of the device significantly increases the visibility of the cables by the birds, without giving it a bulky appearance and not introducing any significant increase in relation to the area exposed to the wind.
- **Dampers:** Vibrations dampers are considered in the project, averaging one every 200m in every cable (conductors, OPGW and Ground cable).

#### **3.3.1.4 Right-of-Way**

The right-of-way for a transmission corridor includes the land set aside for the transmission line and associated facilities, and land set aside for a safety margin between the line and nearby structures and vegetation. Having the safety margin helps avoid the risk of fire and other accidents. The right-of-way width for proposed transmission lines will be 30 metres, which is within the recommended range of 30 to 65 metres. The right-of-way will also be used for access roads where there is none. On the right-of-way, low-growing vegetation is allowed to grow after construction and subsequently maintained at an optimum level.

#### **3.3.1.5 Temporary Tower Laydown and Assembly Areas**

An area of approximately 40 by 50 meters on each site tower site will be demarcated as a temporary tower lay down and assembly area, in order to allow for towers to be installed. The total area could include disturbance from vehicles, construction equipment, crane pads, etc. Compacted soils in most of this disturbance area would be broken up and reseeded after project construction to reestablish close to original conditions. While the area directly below and immediately next to the tower is also reseeded, it is considered unavailable for other uses and therefore a permanently disturbed area and a permanent impact.

#### **3.3.1.6 Tower Footings**

**Tower Footings** Transmission towers would be securely attached to the ground with footings. Footings are assemblies of metal in the ground at each of the four tower corners. There are different types of footings that could be used to secure the towers: plate, grillage, rock anchor, concrete shaft, and pile footings. Most towers on this project would use either plate or grillage footings. Plate footings are used for suspension towers. They consist of a 4-foot by 4-foot steel plate buried about 11 feet deep for each tower foot. Grillage footings are used for dead-end towers. They consist of a 15-foot by 15-foot assembly of steel I-beams that have been welded together and buried 14 to 16 feet deep for each tower foot. Spread footings with rock anchors are required when suspension towers are built on solid bedrock located less than 2 feet below the surface. Six-inch-diameter holes are drilled into the bedrock about 11 feet deep and steel anchor rods are secured within the hole with concrete. Concrete shaft footings are used at river crossings or in areas where towers must sustain a higher load and require additional support.

Concrete shaft footings can be built on solid bedrock or in soils unfavorable for grillage footings. Concrete shaft footings are engineered columns of concrete reinforced by steel rods about 4 to 10 feet in diameter. Footing depth depends on site-specific engineering requirements. Micropile footings are used in rare situations where the typically larger excavation for plate and grillage footings is not appropriate. Four to five 4-to-12-inch-diameter holes are augured for each footing so that steel rods can reinforce the base. Those rods are then grouped together and capped with a reinforced concrete pile cap. The tower can then be placed atop the concrete piles. For plate and grillage footings, a track hoe would be used to excavate an area for the footings.

The excavated area would be at least 2 feet larger than the plate or grillage footings to be installed (if the soil is loose or sandy, then a wider hole may be necessary). If the soil and rock removed for plate or grillage footings is suitable, it would be used to backfill the excavated area once the footings are installed. Otherwise, suitable soil would be brought in from another location for backfill. For spread footings or concrete shaft footings, a drill would be used to make appropriately sized vertical shafts for the footings. Soil and rock removed for rock anchor or concrete shaft footings would either be spread out onto an approved location or removed from the project area. Once foundations are set and cured, each tower would be assembled in multiple sections off-site. The tower sections would be flown in and installed via helicopter or by a large crane.

### 3.3.1.7 Access Roads

Access roads are the system of roads that KETRACO's construction and maintenance crews would use to get to the towers or tower sites along the transmission line route. Engineers will design the roads to be used by cranes, excavators, supply trucks, boom trucks, log trucks, and line trucks. Roads are to be built within the transmission line right-of-way as much as possible if terrain and land use allow. The road system used to access the transmission towers would be a mix of public, private. KETRACO will typically purchases 30m -wide easements for the right-of-way. Access will be needed to the transmission tower sites for both line construction and maintenance. Grading and clearing vegetation may be required in some sections of the project for access road construction. Vegetation removal could be required if roads have become overgrown or need to be widened. Improved roads typically require up to a 20-foot-wide disturbance area (including drainage ditches). Dirt roads often become slippery and impassible when wet. Depending on the season, roads would be graveled where needed for load bearing, stability, and dust abatement.

Currently, there are no details on access roads to be used during the construction phase as this will be determined by the contractor and thus this ESIA does not include the adverse impacts associated with access roads. It is assumed that any new roads will be located within the direct AoI and the inherent construction impacts should be similar to the impacts from general construction phase activities.

In this regard, among the specific mitigations and enhancement measures to implement through the project life cycle included in the ESMP is the requirement for the development and implementation of a separate ESIA and **Traffic and Transportation Management Plan**. This will include controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. It also includes specification for community awareness and safety programs that will be respected and once the works are finished the access may/will be closed and restoration to the original condition will be undertaken.

### 3.3.1.8 Contractor's Operational Site/Staging Areas and Workers' Camp

There is a likelihood that construction camps may be required for use by the contractors around the project site (s) for workers as well as serving as warehouse for materials and office space. Several temporary staging areas would be needed along or near the transmission line for construction crews to store materials and construction vehicles, and to assemble tower segments for helicopter erection. Staging areas can be from 5 to 15 acres depending on the amount of materials and number of locations needed. The contractors hired to construct the transmission line would be responsible for determining appropriate staging area locations. This is yet to be confirmed by KETRACO and contractor (not yet recruited) and therefore associated impacts are not included in this ESIA report since the potential sites are undetermined. However, this ESIA recommends that when a determination is made by KETRACO and contractor (s) to establish workers accommodation camp (s), ESIA for these establishments will be prepared in accordance with NEMA EIA regulations and World Bank OP. 4.01 and submitted to NEMA for approval and World Bank for clearance before commencement of construction.

### **3.4 Project Phase Activities**

#### **3.4.1 Planning (Pre-Construction Phase)**

Activities during the planning (pre-construction) phase will include:

- Design of towers type
- Design of foundations
- Plant and line profile
- Design of access routes
- Operational design
- Land acquisition (compensation and resettlement)

#### **3.4.2 Construction Phase Activities**

There will be several activities during the construction of the transmission line as outlined below.

##### **3.4.2.1. Site Preparation Activities**

KETRACO will set a number of method statements in order to safely construct and install the overhead transmission lines and sub-station. The construction phase involves a number of activities, which will be undertaken sequentially by simultaneous different construction crews. During this preliminary phase, path vertices and singular path points, identification and ground staking and clearance will be undertaken within a 30m corridor. The site preparation phase will include a number of activities as described below.

##### **3.4.2.1.1. Setting Out**

The construction teams will position the intermediate towers based on the approved profile. Where required, basic access tracks will be established to each structure position by moving obstacles such as rocks, levelling high points and filling in holes. The work will be undertaken in such a way to minimise the impact on the environment and surroundings. Existing tracks will be used where possible and new tracks will be made to pole positions where existing access is not available.

##### **3.4.2.1.2. Pulling and Tensioning Sites**

Pulling and tensioning sites are those areas from which the conductor and fiber optic cable are pulled and tightened to the correct tension once they are mounted on the transmission towers. Conductor is packaged and transported on reels that can hold up to 9,500 feet of conductor. Depending on the size of the reel, pulling and tensioning sites (or reel sites or conductor tensioning sites) can be from 1.75 to 3.5 miles apart. These sites are also dependent on the topography and typically disturb about 0.7 acre each (about 300 feet long by 100 feet wide). A flat area is needed at each pulling site for the large flatbed trailer with the reels of conductor and tensioning machine. Pulling sites are generally placed within the right-of-way; however, where the line takes a turn (at angle points), sites are often outside of the right-of-way. Depending on conditions, the site could be graded, graveled with crushed rock, reseeded, or a combination of these activities.

##### **3.4.2.1.3. Transmission Corridor Clearing**

Construction crews will begin clearing or trimming the transmission corridor where necessary. This includes clearing trees and structures to provide construction crews and

their equipment safe access to the work site and enough clearance for the reliable operation of the line. Where tree felling is required, all activities will be supervised by a trained member of staff in line with (Method Statement for Vegetation Clearance-to be developed by contractor prior to construction activities commencement). Tree clearing will be minimized and only removed as necessary. Where structures and crops are required to be removed, the Project Affected Persons (PAPs) as identified in the Resettlement Action Plan (RAP) report, will first and foremost be compensated in accordance with the document before clearing commences. Placement of transmission line structures will be undertaken on every tower site defined plot which is an area of 30 meters on average. Within the plot, the tower structure would be assembled before erection. To meet electric industry vegetation clearance standards, species of trees deemed non-compatible for transmission corridors must be permanently removed. These are trees that could become tall enough to grow or fall into the high-voltage transmission lines (the maximum height is 1.8m). Any tree (stable or unstable) outside of the acquired transmission line right-of-way deemed a present or future hazard to the transmission line is considered a danger tree and is removed prior to construction of the line. A tree would be identified as a danger tree if it could fall into, bend into, or grow into the conductor or be close enough to the conductor as it swings to cause a flashover of current from the conductor. When construction is complete, disturbed areas will be restored. Native shrubs and ground cover will be allowed to regrow.

For safe and uninterrupted operation of a transmission line, vegetation within a right-of-way is not allowed to grow above a certain height. If vegetation grows or falls close to a transmission line it can cause an electrical arc, which can start a fire, cause an outage of the line, and or injure or kill someone. Management of right-of-way vegetation varies depending on many factors, including; vegetation species, height, and growth rates; ground slope and topography; conductor elevation above ground and conductor swing; clearance distance required between the conductors and other objects; and electrical loading on the line.

#### **3.4.2.1.4. Excavations**

Foundation sizes are dependent on the soil conditions, tower type and height; with the biggest foundation footprint for steel lattice towers being 15.4 x 15.4 m. In this project, only steel lattice towers will be considered. Typical foundations for this project will be “Pila foundation type” using drillers. The drilling is the best solution to reduce the amount of ground as it consists of the extraction of a cylinder of 1meter diameter and 6 meters high, on average per leg. Excavations using drillers will be made for the foundations as well as to install the anchors of the towers. In some cases, the foundation is to be “Pad Chimney”. It needs excavators to open the ground to prepare the foundation solution. Typical excavation depths for lattice towers is six meters. Excess soil will be spoiled around the structure and excess dump rock will be uplifted and removed as required. Each excavation will be inspected and tested to confirm its suitability. The foundations are ultimately filled with concrete. Contractors are required to safeguard excavations; this may include erecting a temporary fence or warning solution around the excavation to protect the safety of people and animals. Concrete will be sourced from a ‘ready-mix’ truck which will access the site, or concrete will be mixed on site. Once the excavations have been filled, the concrete requires 28 days for total curing. Meanwhile, after eight days, 80% of the final concrete mechanical resistance is achieved and tower erection could begin after

this 8-day period if needed. Typical vehicles on site at all transmission lines include trucks for material and tools transportation, pick-ups for the crews, driller machine and retro excavators as well as light duty vehicles (LDV). The crews will be different depending on the activity to be performed, e.g. for foundations, tower erection or cable stringing.

#### **3.4.2.1.5. Structure Foundation Installation**

The next step in the construction process is to drill foundations for the new transmission structures. The workers will carefully set aside the topsoil, which will be reused. This involves drilling holes, which are then typically filled with concrete for structure foundations. Drilling operations occur for a few days at each new structure location. Once drilling is complete, a steel rebar cage is placed in each hole and concrete is poured to create a secure foundation for the new steel or lattice structure. Concrete trucks are used to deliver the concrete mix for the foundations. During excavation for the foundations that will stabilize the tower, pumping may be required to remove the water and dry the site (if done during rainy season). The size of the excavation site will depend on the type of soil and the type of tower and anchors will depend on the type of towers installed.

#### **3.4.2.1.6. Structure Installation**

Once the foundation is cured, transmission structure installation will begin. Steel poles often come in sections that are assembled on or near the foundation. Cranes and/or bucket trucks will be used to lift the poles and set them into position on the foundations. Construction crews will assemble or "lace" lattice structures at the site. The structure components will be delivered to the transmission corridor well in advance of this installation process. Generally, it takes one to three days to assemble and erect each new structure. After installation, the structure is grounded for safety purposes.

#### **3.4.2.1.7. Cable Stringing and Levelling**

Conventional stringing will be used throughout using custom built equipment. There are three kinds of cable: conductors, ground wire and OPGW. Cable drums carrying approximately 2000 to 4000 m of cable will be delivered to site. The conductors are made of full aluminium alloy (AAAC) or aluminium with a steel core for strength (ACSR). Power transfer is determined by the line voltage and the current. The area of aluminium in the conductors will define the conductivity. Conductors are used singularly, in pairs or in bundles of three, four or six per phase dependent on factors such as audible noise, corona and EMF mitigation. Large diameter running out blocks (pullers and brakes) will be fitted to all the conductor attachment points of the section to be strung and a pilot wire passed through the running out blocks. The pilot wire will be walked out from pole to pole and will then be used to pull the conductor into place. Conductor tension will be monitored throughout by a dynamometer. The puller and brake hydraulic machines apply tension to the cables to elevate them and finally adjust the tension to the design levels. The levelling process consists of elevating the cable's lowest point to the design height through topographic methods, using the leveling plan in the detailed engineering phase. Once the cables are levelled, the last process consists of connecting the different isolated systems between anchorage towers. Jumpers are applied to connect the tranches between anchored towers. These jumpers are simple cables cut in a curve with the shape to avoid possible short-circuits between the phases in the operational period. Once jumpers are applied, electrical test can begin.

#### 3.4.2.1.8. Restoration and Site Rehabilitation

Site reinstatement and rehabilitation are undertaken for each component of the construction phase, which include the following activities:

- Removal of excess building material, spoil material and waste;
- Repairing any damage caused as part of the construction activities;
- Reinstating existing access roads (where applicable);
- Replacing topsoil and planting indigenous grass (where necessary);
- Levelling the ground;
- Dismantling the temporary accesses; and
- Repairing any infrastructure that was damaged during the work (roads, fences, etc.).

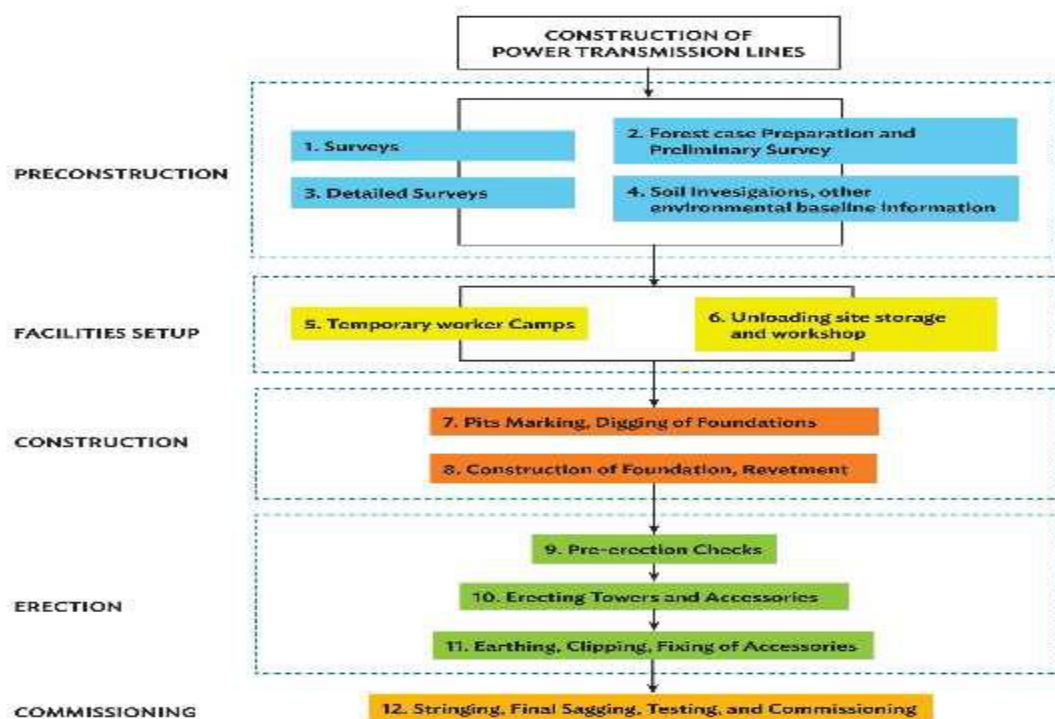


Figure 3-6. Construction Stages (Transmission Line)

### 3.5 Materials and Construction Equipment

The following equipment and materials will be required for use during the construction phase of the transmission line. It is expected that construction materials like cement, concrete, gravel, water, aggregate etc. will be sourced from local suppliers and will not

require the need for opening up material sites (quarries, borrow pits etc.). Other equipment including machinery, electrical wires etc. will be sourced locally or internationally.

**Table 3-2: Material and Equipment**

<b>Equipment</b>	<b>Source</b>
Trucks	Local and international suppliers
Excavators	Local and international suppliers
Pulleys	Local and international suppliers
Cable drum	Local and international suppliers
Reel and tensioner	Local and international suppliers
Materials	Local and international suppliers
Cement	Local suppliers
Sand	Local suppliers
Concrete	Local suppliers
Aggregate	Local suppliers
Counterpoise wires	Local and international suppliers
Cables	Local and international suppliers
Steel bars	Local and international suppliers
Surge arresters	Local and international suppliers
Breaks	Local and international suppliers
Switches	Local and international suppliers
BED buses	Local and international suppliers

### **3.5.1 Material Transportation**

As some construction equipment and materials will be probably sourced outside Kenya, sea shipping or air shipping will be used to transport the equipment to the country. Once construction equipment and materials are present in Kenya, terrestrial shipping (road transport) will be used to convey the equipment to site from Mombasa to the project site. A Traffic Management Plan will be developed by contractor to manage impacts associated with transportation of equipment from the port to project sites.

## **3.6 Operation and Maintenance Phase**

During the life of the project, KETRACO would perform routine, periodic maintenance and emergency repairs to the transmission line. For lattice-steel towers, maintenance usually involves replacing insulators. Once constructed, the transmission line will be operated year-round, transmitting electricity to the targeted areas. KETRACO will have responsibility to operate the line and will ensure that available paths allow for access to the towers for maintenance. Access will be directly from the main roads, along existing access roads or from the corridor of the transmission line. During normal operation, transmission lines require very little intervention. The only exception is periodic inspections and vegetation management, which are discussed below. Inspections are periodically done using tracked or other ground vehicles.

KETRACO typically conducts routine inspection patrols of its transmission lines. Patrols are essential to determine where line maintenance is needed and ensure the continued reliability of the transmission system. Patrol teams look for damaged insulators, damaged

support members, washed-out roads, hazardous vegetation, encroachments, and problems indicating that a repair may be needed. Maintenance vehicles would use access roads where established and maintenance workers may walk through agricultural fields to avoid damage to crops. In emergencies and some other situations, vehicles and equipment would need to be driven through fields and could cause damage to crops, vegetation, and other property. KETRACO determines the damages and, if appropriate, compensates landowners for these damages.

### **3.6.1 Wayleave Management**

Wayleave maintenance is used to assure safe clearance between conductors and vegetation and to allow passage for inspections on foot or by vehicles. Vegetation also would be maintained along the line for safe operation and to allow access to the line. The project area would need continual vegetation maintenance. Vegetation management is a critical function; failure to manage vegetation can potentially lead to black-outs resulting from a combination of heavy electrical loads, high ambient temperature and low wind speed allowing a critical line to sag close enough to a tree which can cause a ground fault to occur. The servitude will need to be cleared occasionally to ensure that vegetation does not interfere with the operation of the lines. KETRACO will ensure on-going maintenance from time to time, in conformance with transmission line maintenance processes. Although normal operation requires minimal intrusion into the wayleave, line or tower failures can result in the reintroduction of heavy equipment, work crews, excavation, and materials transport. The maintenance will include: -

#### **Maintenance Aspects**

- Routine RoW maintenance through clearing of vegetation
- Structure maintenance and repairs (pylons, electrical wires)
- Environmental maintenance
- Emergency works
- Property Management (sub-station)
- Network and assets management

### **3.7 Decommissioning Phase Activities**

The decommissioning procedure will be provided as part of the maintenance manual during handover of the completed Project. KETRACO, as per its policies will comply with the decommissioning process as per EMCA and international best practices. The decommissioning procedure will include site specific rehabilitation plans for the footprint of the project and will be executed by the KETRACO. The decommissioning activities will include: -

#### **Decommissioning Activities**

- Dismantling the pylons
- Dismantling the foundations
- Dismantling of electrical lines
- Rehabilitation of the disturbed areas

## **3.8 Resources required during construction and operation**

### **3.8.1 Land Requirements**

The approximately 70Km transmission line will traverse properties belonging to private landowners and sections of one gazetted forest i.e. Bahati Forest which traverse Nakuru, and Nyandarua Counties and are under the management of Kenya Forest Service (KFS). The land required for the wayleave will be approximately **570.17** acres based on the findings of the Resettlement Action Plan (RAP) which has been prepared based on the recommendation of this ESIA study.

### **3.8.2 Construction Staff**

It is typical for this kind of construction to have a mix of skilled, semi-skilled and unskilled workers as part of the workforce. Whereas the contractor will be at liberty to hire workers as per skills required, he/she will be encouraged to source for workers from the local community as much as possible. This will reduce instances of negative impacts related to labour influx, Gender Based Violence (GBV) as well as provide jobs and income to the local community. The contractor (s) will be required to develop in a consultative manner **Local Recruitment Plan** (s) consistent with KETRACO's Human Resources Policy (HRP) to guide recruitment of construction workers.

### **3.8.3 Water**

During the construction stage, contractor teams will require water for use during construction works (concrete mixing, slab, washing vehicles) as well as for drinking by the construction workers. As at now, no water sources for construction purposes have been identified in terms of location. The contractor (s) once procured will identify reliable sources of water to be utilized for construction. These sources may include use of piped water supply via water service providers (where applicable), from existing boreholes, drilling of boreholes or abstracting streams and or rivers. The abstraction of water for construction by the contractor will be expected to follow national regulations and guidelines and permitting requirements as provided by the Water Resources Authority (WRA). Contractor will be required to submit a **Water Use Plan** prior to commencement of construction activities. During operation phase, the water use requirements will be low and required by the staff managing the sub-station and periodically if required in maintenance works e.g., repairs on foundations that may need concrete mixing etc.

### **3.8.4 Material Sites/Borrow Pit**

Borrow pits and/or quarries will be identified during the detailed engineering design stage of the project. Borrow pits may be required for extraction of suitable material for the access road construction to the transmission line wayleave. In general, borrow pits are usually worked in strips to ensure that only enough material for the project is obtained, and to limit the impacts of the borrow pit to as small an area as possible. A borrow pit design and restoration plan should be produced prior to commencement of the work. Any topsoils and sub-soils will be separated and progressively stored in a temporary storage area. The storage mound should also be terraced, where possible, to ensure stability. All temporarily stored materials shall be utilized in the restoration of the borrow pit.

### **3.8.5 Electricity**

Electricity will be needed during for construction and also for lighting at night during construction and in the workers camp during the construction etc. During operation phase, the sub-station will require electricity for security and use by the limited number of staff. Electricity may be supplied using diesel generators or temporary electricity connections during the construction phase.

### **3.8.6 Reinstatement**

A detailed Reinstatement Plan will be agreed upon with the selected main contractor. For the purposes of this ESIA Study, the broad restoration measures proposed for the transmission line project are described below. General restoration will be required along the wayleave, construction camps and material laydown areas. Specific restoration will also be required around water crossings and borrow pits. As detailed in the various construction activities, the wayleave will be carefully cleared such that the excavated topsoil is neatly stored in windrows. Once the towers have been erected, construction camps have been demobilized and material laydown areas have been cleared, the stockpiled topsoil will be used for reinstatement. The stockpiles will be located away from surface water flows and their surfaces smoothed or covered to prevent erosion through rainfall. Excess sub-soils will be transported for use at other areas on site, i.e. reinstatement of borrow pits. The areas will be restored with the materials previously set aside as soon as reasonably practical.

Access roads will be dressed off once the ROW reinstatement is complete. Soils and vegetation will generally be kept within their natural habitat and any excess used to cover areas where available soils are minimal. The site compound will be removed to the original formation level with all imported rock, geogrids and geotextile removed. All slabs and drainage facilities will be removed and backfilled. Previously set-aside materials will be used to backfill the area. The reinstated areas will be protected so as to prevent any erosion while vegetation re-establishes.

### **3.8.7 Wastes and Emissions**

#### **3.8.4.1. Effluent Waste**

Construction effluent waste will emanate from construction camp (s) (if established) and from mobile toilet facilities that will be used by workers along the transmission line while at work and away from their area of residence. Wastewater will also emanate from activities related to washing/cleaning of equipment and vehicles. During operation, effluent waste is going to be minimal and will emanate from the cleaning activities at the sub-station.

#### **3.8.4.2. Solid Waste**

Construction waste will comprise general domestic waste from construction camp (s) (if established) including sanitary and food waste, office waste, organic material, small volumes of wastes arising from mobile plant, chiefly waste lubricating oil and packing materials (e.g. crates). Human waste will also emanate from the construction camp (s) if established and workers on site will also generate human wastes and will require mobile toilets. Construction wastes will include among others:

- Used electrical wires

- Cement waste
- Construction packaging materials (cement bags, packaging wastes,)

No significant solid waste streams are expected during operations apart from sub-station where domestic wastes will be generated by staff at the sub-station (how many staff in sub). Operation waste will comprise general domestic waste from sub-station including sanitary and food waste, office waste, small volumes of wastes arising from chiefly waste lubricating oil and packing materials (e.g. crates). Wastes from repairs and maintenance activities will include among others:

- Used electrical wires
- Cement waste
- Packaging materials

During the decommissioning phase, the primary waste will be the scrap metal from the steel lattice towers, insulators and cables. Several trucks will be required to transport wastes generated through the decommissioning phase to appropriate waste disposal sites. These vehicles will consume diesel and produce air emissions as a waste.

Contractors will be required to provide a **Site Waste Management Plan** which will include details on waste minimization, recycling and disposal of the waste streams. The requirements of this plan will be implemented on site as required. With respect to the control of ‘litter’ on site, all such waste will be collected and stored within sealed containers within the site compound and serviced by a NEMA licensed waste carrier. No disposal of litter will be permitted at other locations. All forms of wastes generated during the construction, operation and decommissioning phases will be disposed of in compliance with waste regulations in Kenya (Legal Notice 121: Environment Management and Coordination (Waste Management) Regulations, 2006).

#### **3.8.4.3. Fuels and Oils**

All construction plant will be in good condition with no excessive emissions of exhaust, oil, fuel or coolants. Plant operators will check machines daily for oil/fuel leaks and take appropriate remedial action. All re-fuelling will be by an approved mobile fuel bowser using a suitable pump and hose. Absorbent material (spill kits) will be available on site and will be deployed to contain drips and small spillages. All other fuels, oils and potential contaminants will be stored within the site compound in secure, fit for purpose containers within bunded containment as appropriate.

Used oil from the transformers will also generate hazardous wastes during operation. Highly refined mineral insulating oils are used to cool transformers and provide electrical insulation between live components. Sulfur hexafluoride (SF6) may also be used as a gas insulator for electrical switching equipment and in cables, tubular transmission lines and transformers. SF6 is a greenhouse gas with a significantly higher Global Warming Potential (GWP) than carbon-dioxide. For this project the proponent is advised to use mineral insulating oil for cooling and insulation and to minimize or completely stop the use of SF6. PCBs will not be used in this project.

#### **3.8.4.4. Gaseous Emissions**

The use of motorised equipment during construction will generate gaseous emissions in the project area of influence. Motorised vehicles and equipment including trucks, excavators etc will generate among others SO<sub>x</sub>, NO<sub>x</sub> and PM<sub>10</sub>. Dust will also be generated by movement of motorised vehicles. The gaseous emissions during the operation phase are not significant but will also include SO<sub>x</sub>, NO<sub>x</sub> and PM<sub>10</sub> that will be generated by operation and maintenance vehicular teams.

During the decommissioning phase, the primary waste will be the scrap metal from the steel lattice towers, insulators and cables. Several trucks will be required to transport wastes generated through the decommissioning phase to appropriate waste disposal sites. These vehicles will consume diesel and produce air emissions as a waste. Secondly, through servicing of these trucks, used oils will be generated which are hazardous wastes. Potentially there may be tires that will be replaced and old tires that come out of the trucks during the decommissioning of the transmission line may also be wastes.

#### **3.8.4.5. Noise Emissions**

The use of motorised equipment during construction will generate noise emissions in the project area of influence. Motorised vehicles and equipment including trucks, excavators etc will generate noise during construction, operation, and decommissioning phases of the project. Construction phase noise levels will be generated by construction plant and equipment such as excavators, lifting equipment, dumper trucks, compressors, generators, etc. Construction plant and equipment will be maintained in accordance with the preventive maintenance schedules indicated in the manufacturer's instructions to ensure that such equipment does not produce excessive noise and vibration.

### **3.9 Schedule for Implementation and Workforce**

The timeframe needed for construction of the project is about 18-24 months. Under the current schedule, if a decision is made to proceed with the project after completion of the NEMA process, construction could begin as early as 2020. Line construction generally would occur after road construction. Construction work would be staged with one type of activity taking place in one area (such as road construction) and another activity taking place in another area where roads exist (such as vegetation removal and tower construction).

A typical crew can usually construct about 10 miles of transmission line in 4 months. In areas where terrain is steep, progress may be slower. Construction of roads and tower pads (if required) usually takes about 3 to 5 months including close-out repairs of any roads damaged during construction. The remainder of the construction period would include connecting the new line and other existing lines into the substations, and tower site restoration work. The transmission line would be constructed by two or more construction contractors. A typical transmission line construction crew and equipment for a 132-kV line would include the following:

- 20 to 30 construction workers (70-100 at the peak of construction; actual workforce numbers would vary over time).
- 45 vehicles (pickups, vans, trucks)

- Bucket trucks
- 1 conductor reel machine
- 3 large excavators (bulldozers, backhoes) 1 line tensioner, 1 puller, 1 reel trailer
- Helicopters (small helicopter and skycrane; size dependent on lifting required) 1 to 2 large (210-ton) and mid-sized (50-ton) cranes
- Road construction equipment (dump trucks, rollers, graders, dozers, excavators, water truck)

## 4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter sets out the standards to which the legal, policy and administrative framework within which the Project will be developed. It identifies the applicable lender requirements and national standards. The proponent through this ESIA will conform to the Kenyan legislative and regulatory framework and the WB safeguards policies and General Environmental, Health and Safety (EHS) Guidelines (2007). Where there is a difference between national Kenyan standards and WB's environmental and social safeguards policies, the latter will prevail.

### 4.1 National Policies and Legislation

**Table 4-1: Summary of National Policies**

Policy	Description
National Environment Policy, 2013	<p>The goal of the policy is to ensure a better quality of life for present and future generations through sustainable management and use of the environment and natural resources.</p> <p>The objectives of the Policy are inter alia to:</p> <ul style="list-style-type: none"> <li>• Provide a framework for an integrated approach to planning and sustainable management of Kenya's environment and natural resources;</li> <li>• Strengthen the legal and institutional framework for good governance, effective coordination and management of the environment and natural resources; and</li> <li>• Ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems, for national economic growth and improved livelihoods.</li> </ul> <p>Some of the guiding principles in the implementation of the policy include:</p> <ul style="list-style-type: none"> <li>• Environmental Right: Every person in Kenya has a right to a clean and healthy environment and a duty to safeguard and enhance the environment;</li> <li>• Right to Development: The right to development will be exercised taking into consideration sustainability, resource efficiency and economic, social and environmental needs;</li> <li>• Sustainable Resource Use: Environmental resources will be utilized in a manner that does not compromise the quality and value of the resource or decrease the carrying capacity of supporting ecosystems; and</li> <li>• Public Participation: A coordinated and participatory approach to environmental protection and management will be enhanced to ensure that the relevant government agencies, county governments, private sector, civil society, and communities are involved in planning, implementation and decision-making processes.</li> </ul>
Wetlands Policy of 2013	The wetlands policy is intended to promote protection of wetlands in Kenya. The policy sets out strategic measures for the protection of existing wetlands in Kenya.
Economic Recovery for Wealth and	The overall goal of the strategy is to ensure clear improvement in the social and economic wellbeing of all Kenyans; thereby giving Kenyans a better deal in

Employment Creation Strategy, 2006	<p>their lives, and in their struggle to build a modern and prosperous nation. The key areas covered in the strategy are:</p> <ul style="list-style-type: none"> <li>• Expanding and improving infrastructure;</li> <li>• Reforms in trade and industry;</li> <li>• Reforms in forestry;</li> <li>• Affordable shelter and housing;</li> <li>• Developing arid and semi-arid lands; and</li> <li>• Safeguarding environment and natural resources.</li> </ul>
Gender Policy, 2011	The overall goal of this Policy is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya.
HIV/AIDS Policy, 2009	<p>In summary, the policy provides a mechanism for:</p> <ul style="list-style-type: none"> <li>• Setting Minimum Internal Requirements (MIR) for managing HIV and AIDS;</li> <li>• Establishing and promoting programs to ensure non-discrimination and non- stigmatization of the infected;</li> <li>• Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS;</li> <li>• Ensuring adequate allocation of resources to HIV and AIDS interventions; and</li> <li>• Guiding human resource managers and employees on their rights and obligations regarding HIV and AIDS.</li> </ul>
The National Land Policy (Sessional Paper No. 3 of 2009)	The overall objective of the national land policy is to secure land rights and provide for sustainable growth, investment, and the reduction of poverty in line with the governments overall development objectives
National Forest Policy 2014	The policy aims to ensure there is a sustainable conservation of forests and increase tree cover to 10%.
Energy Policy	The Energy Policy seeks to ensure an adequate, quality, cost effective and affordable supply of energy to meet development needs, while protecting and conserving the environment, with a bias towards the exploitation of green energy.
National policy on gender and development 2000	The policy framework is geared towards ensuring gender equality and women empowerment in the social, economic, political and cultural spheres as envisaged in the Constitution.
Kenya National Youth Policy 2016	This Policy aims at ensuring that the youth play their role alongside adults in the development of the Country. The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential. Proposed transmission line will provide direct employment to the youth as required by the Policy.
Environment and Sustainable Development Policy, Sessional Paper No. 6 of 1999	This Policy aims to harmonize environmental and developmental goals for sustainability. It also provides comprehensive guidelines and strategies for government action on the environment and development.
The National Biodiversity Strategy of 2000	The National Biodiversity Strategy and Action Plan (NBSAP) was formulated in order to enable Kenya address national and international commitments defined in Article 6 of the Convention on Biological Diversity (CBD). The strategy is a national framework of action for ensuring that the present rate of biodiversity loss is reversed, and present levels of biological resources are maintained at sustainable levels for posterity.
Wildlife Policy, Sessional Paper No. 3 of 1975	This Policy governs wildlife management in Kenya and its goal is “to optimize returns from this resource, taking account of returns from other land use”. The policy not only recognizes economic benefits from tourism and consumptive uses but also the intangible benefits that include the aesthetic, cultural and

	scientific gains that accrue from conservation of habitats and the fauna within them.
The Kenya National Climate Change Response Strategy	The vision of the Strategy is for a prosperous and climate change resilient Kenya. The mission is to strengthen and focus nationwide actions towards climate change adaption and greenhouse gas (GHG) emission mitigation. The following measures are proposed to counter potential threats to the energy sector in Kenya: -Accelerate the development of geothermal energy; -Accelerate the development of green energy including wind, solar and renewable biomass; and -Energy efficiency.
The National Water Policy 2012	The Policy is built on the achievements of the sector reform commenced with the Water Act and based on the sector principles lined out in the National Water Policy 1999. On water resources management, the policy seeks the management of water resources along natural catchment/basin boundaries following the Integrated Water Resource Management approach. It aims to ensure a comprehensive framework for promoting optimal, sustainable, and equitable development and use of water resources for livelihoods of Kenyans.
Big 4 Agenda.	The Big 4 Agenda includes ensuring food security, affordable housing, manufacturing, and affordable healthcare and prioritizes public investments towards their realization in the current budget and aligned to the MTP III of the Vision 2030.
Vision 2030	Long-term development blueprint for the country. It aims to transform Kenya into “a newly industrialized, middle-income country providing a high quality of life to all its citizens.
Least Cost Power Development Plan 2011- 2031	The policy aims at ensuring that the national electric power supply exceeds 3,000MW by 2018, to 15,026MW in 2030 and 16,905MW in 2031
Laikipia, Nakuru and Nyandarua County Integrated Development Plans	The CIDP is the development blueprint made by each county in Kenya for the period between 2018–2022

**Table 4-2. Summary of National Legislations**

Legislation	Provisions	Relevance to the Project
The Constitution of Kenya (2010)	Article 69 provides for protection and conservation of the environment and ensuring ecologically sustainable development and use of natural resources; Mandates the State to: -Establish systems of environmental impact assessment, environmental audit and monitoring of the environment; - eliminate processes and activities that are likely to endanger the environment; - Encourage public participation in the management, protection and conservation of the environment; and Article 42 accords every person the right to a clean and healthy	Constitutional requirements on right to a clean and healthy environment, protection of the environment, consultation, public participation and access to information will be adhered to by KETRACO and its contractors during the project phases (construction, operation and decommissioning).

	environment and where this 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.	
Environmental Management and Coordination Act, Cap 387.	Part V, VI and VII provide for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring.	KETRACO in complying with this statute has prepared ESIA study report.
Environmental (Impact Assessment and Audit) Regulations, 2003	Part II, III and IV provide for the procedure for carrying out Environmental Impact Assessment (EIA) and Environmental Audit (EA).  Part V provides for the carrying out of an environmental audit study following commencement of project operations.	KETRACO in complying with this statute has prepared ESIA study report in accordance with this regulation.  -An initial environmental audit should also be carried out in the first year of operation of the transmission line.
Environmental Management and Co-ordination (Water Quality) Regulations, 2006	Part II-V provide for the protection of ground and surface water resources.  Part II provides the water quality standards for sources of domestic water.	-During construction and operation, KETRACO and its contractors are required to comply with the water quality regulations in terms of effluent discharge and will obtain effluent discharge licenses/permits as necessary and guided by regulation.
Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009	Section 3 (1) prohibits the generation of unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.  The First Schedule provides for the maximum noise levels permissible in various environmental set ups such as residential areas, places of worship, commercial areas and mixed residential.	-During construction and operation, KETRACO and its contractors are required to comply with this regulation in terms of noise and excessive vibration control and will obtain licenses as necessary and guided by regulation.  -Sound level limits as per the regulations to be observed during construction and operations.
Environmental Management and Co-ordination (Waste Management) Regulations, 2006	Part III-VII provide standards for handling, transportation and disposal of various types of wastes including hazardous wastes.  Sections 4, 5 and 6 provide for waste minimization or cleaner production, waste segregation, recycling or composting. Section 7 provides for licensing of vehicle transporting waste. Section 10 provides for the licensing of waste disposal facilities.	-During construction and operation, KETRACO and its contractors are required to comply with this regulation in terms of waste management and will obtain or engaged licensed entities to manage wastes from its activities as necessary and guided by regulation.

Environmental Management and Coordination (Air Quality) Regulations, 2014	<p>The First Schedule provides for ambient air quality tolerance limits.</p> <p>Section 5 prohibits air pollution in a manner that exceed specified levels.</p> <p>Section 16 provides for installation of air pollution control systems where pollutants emitted exceed specified limits.</p> <p>Section 22 provides for the control of fugitive emissions within property boundary.</p> <p>Section 25 provides for the control of vehicular emissions.</p> <p>Section 29 provides for prevention of dispersion of visible particulate matter or dust from any material being transported.</p> <p>Part IX provides for acquisition of an emission license.</p>	-During construction and operation, KETRACO and its contractors are required to comply with this regulation in terms of air quality and will obtain licenses as necessary and guided by regulation.
Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources, and Benefit Sharing) Regulations, 2006.	<p>Section 4 (1) provides that;</p> <p>1. A person shall not engage in any activity that may-</p> <ul style="list-style-type: none"> <li>a. have an adverse impact on any ecosystem;</li> <li>b. lead to the introduction of any exotic species;</li> <li>c. lead to unsustainable use of natural resources,</li> </ul> <p>Without an Environmental Impact Assessment License issued by NEMA.</p>	KETRACO has prepared ESIA to determine the impacts of the project on biological diversity in accordance with this regulation and mitigation measures to conserve biological diversity are outlined in the ESIA.
Physical planning and land use Act 2019	Under Section 3 of the Act, the law provides for norms and principles in physical planning and land use which include the requirement that planning takes into account new approaches such as transit-oriented development, mixed land-uses, planning for public transport and non-motorized transport among others to achieve sustainable development and more efficient use of natural resources, be inclusive and take into consideration the culture and heritage of people concerned; and that development activities be planned in a manner that integrates economic, social and environmental needs of present and future generations.	- The proponent will take into account these norms and principles in particular new approaches such as transit-oriented development, mixed land-uses, planning for public transport and non-motorized transport among others to achieve sustainable development and more efficient use of natural resources.
The Water Act No. 43 of 2016 revised 2017	Section 3 outlines the objectives of the Act as to provide for the regulation, management and development of water resources and water and sewerage services.	The implementation of the project should conform to sound integrated water resource management practices

County Government Act No. 17 of 2012 Revised 2017	The County Government Act is intended to provide powers, functions and responsibilities to deliver services to the Counties under the devolved government as spelt out under Section 3 of the Act.	The proposed project will traverse Nakuru, Nyandarua and Laikipia counties
The Public Health Act (Cap 242)	<p>Section 115 provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans.</p> <p>Section 126 provides that the relevant local authority shall take all lawful, necessary and reasonably practicable measures -:</p> <ul style="list-style-type: none"> <li>- for preventing any pollution dangerous to health of any supply of water which the public within its jurisdiction has a right to use and does use for drinking or domestic purposes (whether such supply is derived from sources within or beyond its jurisdiction); and</li> <li>- for purifying any such supply which has become so polluted, and to take measures (including, if necessary, proceedings at law) against any person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health.</li> </ul>	Project activities during construction could lead to public health impacts and project must comply with the requirements of the Public Health Act.
Civil Aviation Act, 2013	-This is an Act of Parliament to provide for the control, regulation and orderly development of civil aviation in Kenya; and for connected purposes and Safety of aircraft and persons on board. Under Part V of this Act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of the mast for the purpose of ensuring the safety of flying aircraft over the proposed project area.	- The height of transmission line and towers has may interfere with flight paths and aviation safety in general. The Proponent shall comply with the provisions of the Act in seeking authorization from KCAA for the installation of the lattice steel self-supporting towers along the transmission line route.
Protection of Traditional Knowledge and Cultural Expressions Act, 2016;	The Act of parliament provides a guideline for the protection and promotion of traditional knowledge and cultural expressions. Section 3 requires every person dealing with matters relating to traditional knowledge or cultural expressions to be guided by the national values and principles of governance set out in Article 10 of the Constitution.	The project is to be implemented away from areas of cultural importance
Occupational Safety and Health Act (OSHA), 2007	-Section 6 provides for the safety, health and welfare of workers and all persons lawfully present at workplaces.	Construction sites require registration as a workplace;

	<p>Part V provides for the registration of workplaces.</p> <p>Part VII outlines safety requirements in use of machinery to prevent accidents and injuries.</p>	
The Work Injury Benefits Act, 2007	<p>Part V provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc.</p>	<p>Construction of the proposed transmission line will have potential to cause injuries/ health hazards to construction workers.</p>
The Energy Act, 2019	<p>The Energy Act, 2019 has made several amendments to the repealed Energy Act, 2006. Its objective is to consolidate the laws relating to energy, to properly delineate the functions of the national and devolved levels of government in relation to energy, to provide for the exploitation of renewable energy sources, to regulate midstream and downstream petroleum and coal activity and for the supply and use of electricity and other forms of electricity.</p>	<p>The project will be implemented in accordance with the regulatory requirements of the Act, including acquiring a generation license from the Energy and Petroleum Regulatory Authority.</p> <p>The project will comply with the Energy Regulatory Commission requirements.</p>
The Land Act, 2012	<p>Section 4 (2) obligates the Land Commission and other public officers to use the following guiding principles and values:</p> <ul style="list-style-type: none"> <li>-equitable access to land; security of land rights;</li> <li>- security of land rights;</li> <li>-sustainable and productive management of land resources;</li> <li>- Regulates the change of use for substation land from agricultural to industrial.</li> </ul>	<p>Project will lead to land acquisition and hence will have to follow the procedure for acquisition.</p> <p>Land will be acquired in accordance with the Land Act.</p>
National Land Commission Act, 2012	<p>Section 3 of the Act outlines its objectives to include among other things; to provide a linkage between the Commission, county governments and other institutions dealing with land and land related resources; to provide for the operations, powers, responsibilities and additional functions of the Commission and for the management and administration of land;</p>	<p>The proposed transmission line will require RoW and the NLC will be key in wayleave acquisition as the mandate body to acquire land for public projects.</p>

Land Registration Act No. 3 of 2012	<p>This is an Act of Parliament to revise, consolidate and rationalize the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes</p> <p>According to section 3, the Act applies 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.</p>	The proposed transmission line will traverse private land. People whose land is traversed by the project will need to be verified, compensated, and an easement registered in their title deeds.
Forest Conservation and Management Act No. 34 of 2016	<p>This is an Act of Parliament to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socioeconomic development of the country and for connected purposes.</p> <p>According to Section 3, the Act shall apply to all forests on public, community and private lands.</p>	The proposed transmission line will traverse a section of Bahati forest.
HIV And Aids Prevention and Control Act No. 14 Of 2006 Revised in 2012	The Act provides for measures for the prevention, management and control of HIV and AIDS. Part III-V of the Act are dedicated the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection.	<p>The Contractor shall prepare a project implementation plan that contains a comprehensive Program for:</p> <ul style="list-style-type: none"> <li>• Regular sensitization of all workers on HIV Aids and other Sexually Transmitted Diseases (STDs).</li> <li>• Providing workers with condoms</li> </ul>
Sexual Offences Act, 2006	-This Act of Parliament makes provision about sexual offences and aims at prevention and the protection of all persons from harm from unlawful sexual acts. Section 15, 17 and 18 focuses mainly on sexual offenses on minors (children).	The contractor is obligated to put in place mechanisms which are necessary or expedient in order to achieve or promote the objects of this Act, including for instance, a sexual harassment policy.
Children Act, 2001	<p>-This Act of Parliament provides safeguards for the rights and welfare of the child including the right to parental care, non-discrimination, education, religion, health care and protection from child labour and armed conflict, among others.</p> <p>Under Section 4 (2) the Act requires that in all actions concerning children,</p>	<p>The contractor under this Project will be required to comply with provisions of the Act during Project implementation by ensuring that measures are in place to prevent violation of children's rights particularly protection from child labour.</p> <p>No child will be employed in the project as per the act.</p>

	the best interests of the child shall be a primary consideration.	
Climate Change Act 2016	Under Section 3 of the Act, the objectives of the Act include to provide for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes	The contractor under this Project will be required to comply with provisions of the Act during Project implementation
National Gender and Equality Commission Act, 2011	As per Section 8, the over-arching goal for NGECC is to contribute to the reduction of gender inequalities and the discrimination against all women, men, persons with disabilities, the youth, children, the elderly, minorities, and marginalized communities.	<p>The provisions of the Act become relevant during hiring of workforce on site in a fair and non-discriminative manner. It may also apply in grievance redress if an aggrieved person escalates a complaint to the commission.</p> <p>The project, through the contractor is expected to consider and hire both male and female gender during the duration of the project.</p>
Employment Act, 2007	-This Act of Parliament prohibits discrimination in labour relations under section 5, sexual harassment under section 6, forced labour under section 4 and child labour in section 52. Section 6 (2) obligates all employers with twenty or more employees to issue a policy statement on sexual harassment.	The contractor will be guided by the provisions of this Act on matters touching on equality of opportunities in employment, terms of service, age limit and prevention of sexual harassment in the workplace.
Kenya Roads Act No. 2 of 2007	Part II provides for the establishment of the Roads Authorities.	Permits will be sought from the relevant road's authorities in cases where the line crosses the roads infrastructure.
Valuers Act Cap 532	This Act provides for the registration of valuers and the regulation of the valuation profession and practice in Kenya. Section 21 of Cap 532 prohibits any person who is not a registered Valuer and whose name does not appear in the register to prepare and submit a valuation report.	KETRACO will require land for the project and must engage a registered valuation expert during the RAP preparation.
Community Land Act	This is an Act of Parliament to give effect to Article 63 (5) of the Constitution. Part II of the Act provides for the recognition, protection and registration of community land rights. Part III provides for the management and administration of community land. Section 6 provides for the role of county governments in relation to unregistered community land.	All affected community land, will be compensated in accordance with the provisions of the Land Act.
Public Roads and Roads of Access Act (Cap. 399)	Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines	During the construction phase of the project, access to the site areas will be required for the construction vehicles.

	including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent landowners seeking permission to construct the respective roads.	Where existing roads do not exist, the Proponent shall seek permission from the appropriate authorities to create such access during the construction phase.
Occupiers Liability Act (Cap. 34)	Rules of Common Law regulates the duty which an occupier of premises owes to his visitors in respect of danger and risk due to the state of the premises or to things omitted or attributes an affliction on his/her health to a toxic material in the premises.	The Proponent shall acquire Way leave along the transmission line corridor. The Proponent shall endeavor to ensure that the management of health and safety issues is of high priority during the operational phase of the project.
Land Value Amendment Act 2019	The Land Value (Amendment) Act, 2019 (the Act) came into force on 16 August 2019 and has amended various sections of the Land Act, the Land Registration Act as well as the Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act. The Act aims at standardising the value of land in Kenya for the primary purpose of enhancing efficiency and expediting the compulsory land acquisition process.	Land valuation and compensation for lost asset will be in accordance with this Act.
Building Code	This law recognizes the county governments as the leading planning agencies mandating the potential developers to submit development applications for approval. The county governments will approve or reject plans if they do or don't comply with the law, respectively.	In the construction of the transmission lines, KETRACO will adhere to the Building Code.

#### 4.1.1 National Air Quality Emission Standards

In undertaking the construction activities described above, the Contractor will comply with the following national regulatory air quality standards and WBG/WHO Air Emission and Ambient Air Quality guidelines, whichever is stringent. Regular monitoring to determine compliance will be done by the Supervision Consultant and corrective/mitigation measures applied where necessary.

**Table 4-3: Ambient Air Quality Tolerance Limits**

Pollutant	Time Weighted Average			
		Industrial Area	Residential, Rural & Other Area	Controlled Areas
Sulphur oxides (SOX);	Annual Average	80 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>	15 ug/m <sup>3</sup>
	24 hours	125 ug/m <sup>3</sup>	80 ug/m <sup>3</sup>	30 ug/m <sup>3</sup>
	Annual Average		0.019 ppm/50ug/m <sup>3</sup>	
	Month Average			
	24 Hours		0.048ppm /125ug/m <sup>3</sup>	
	Instant Peak		500 ug/m <sup>3</sup>	
	Instant Peak (10 min)		0.191 ppm	

Pollutant	Time Weighted Average			
		Industrial Area	Residential, Rural & Other Area	Controlled Areas
Oxides of Nitrogen (NOX);	Annual Average	80 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>	15 ug/m <sup>3</sup>
	24 hours	150 ug/m <sup>3</sup>	80 ug/m <sup>3</sup>	30 ug/m <sup>3</sup>
	Annual Average		0.2 ppm	
	Month Average		0.3 ppm	
	24 Hours		0.4 ppm	
	One Hour		0.8 ppm	
	Instant Peak		1.4 ppm	
Nitrogen Dioxide	Annual Average	150 ug/m <sup>3</sup>	0.05 ppm	
	Month Average		0.08 ppm	
	24 Hours	100 ug/m <sup>3</sup>	0.1 ppm	
	One Hour		0.2 ppm	
	Instant Peak		0.5 ppm	
Suspended Particulate Matter	Annual Average	360 ug/m <sup>3</sup>	140 ug/m <sup>3</sup>	70 ug/m <sup>3</sup>
	24 hours	500 ug/m <sup>3</sup>	200 ug/m <sup>3</sup>	100 ug/m <sup>3</sup>
	Annual Average		100 ug/m <sup>3</sup>	
	24 hours		180 ug/m <sup>3</sup>	
Respirable Particulate Matter (<10µm) (RPM)	Annual Average	70 ug/m <sup>3</sup>	50 ug/m <sup>3</sup>	50 ug/m <sup>3</sup>
	24 hours	150 ug/Nm <sup>3</sup>	100 ug/Nm <sup>3</sup>	75 ug/Nm <sup>3</sup>
PM2.5	Annual Average	35 ug/m <sup>3</sup>		
	24 hours	75 ug/m <sup>3</sup>		
Lead (Pb)	Annual Average	1.0 ug/Nm <sup>3</sup>	0.75 ug/Nm <sup>3</sup>	0.50 ug/m <sup>3</sup>
	24 hours	1.5 ug/m <sup>3</sup>	1.00 ug/m <sup>3</sup>	0.75 ug/m <sup>3</sup>
	Month Average		2.5	
Carbon monoxide (CO)/ carbon dioxide (CO <sub>2</sub> )	8 hours	5.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>
	1 hour	10.0 mg/m <sup>3</sup>	4.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>
Hydrogen sulphide	24 hours	150ug/m <sup>3</sup>		
	instant Peak	700ppb		
Total VOC	24 hours	600 ug/m <sup>3</sup>		

Source - NEMA

**Table 4-4: National Air Quality Standards for General Pollutants**

Pollutant	Time Weighted Average	Property Boundary
Particulate matter (PM)	Annual Average	50 ug/m <sup>3</sup>
	24 hours	70 ug/m <sup>3</sup>
Oxides of Nitrogen (NOX);	Annual Average	80 ug/m <sup>3</sup>
	24 hours	150 ug/m <sup>3</sup>
Sulphur oxides (SOX);	Annual Average	50 ug/m <sup>3</sup>
	24 hours	125 ug/m <sup>3</sup>
Hydrogen Sulphide	24 hours	50 ug/m <sup>3</sup>
Lead (Pb)	Annual/24 hours	0.5 – 2.0ug/m <sup>3</sup>

Ammonia	24 hours	100 ug/m <sup>3</sup>
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#### Source-NEMA

#### 4.1.2 National Noise Emission Guidelines

In undertaking the construction activities described above, the Contractor will comply with the following national regulatory air quality standards and WBG noise level guidelines, whichever is stringent. Regular monitoring to determine compliance will be done by the Supervision Consultant and corrective/ mitigation measures applied where necessary.

**Table 4-5: National Noise Guidelines**

Zone	Maximum Noise level limits dB (A)		Time Frame
	Day	Night	
Places of worship	30	25	Day time: 6.01a.m – 8.00p.m  Night time: 8.01p.m – 6.00p.m
Residential:			
1. Indoors	35	25	
2. Outdoors	40	25	
Mixed Residential (inclusive of Entertainment and commercial places)	55	45	
Commercial	70	70	
Silent arena	30	25	

#### Source - NEMA

**Table 4-6: Noise Levels for different areas and facilities**

Facility	Maximum Noise level limits dB (A)		Time Frame
	Day	Night	
Health facilities, Educational Centres and homes of disabled	60	35	Day time: 6.01am- 10.00pm Night time: 10.01pm – 6.00am
Residential	60	35	
Industrial	85	65	
Commercial	75	50	

#### Source - NEMA

**Table 4-7: Noise levels from a factory or a workshop (Continuous or intermittent noise)**

dB(A)	Daily	Weekly
85	8 hours	40 hours
88	4 hours	20 hours
91	2 hours	10 hours
94	1 minute	5 hours
97	30 minutes	2.5 hours
100	15 minutes	1.25 hours
103	7.5	37.5 minutes
106	3.75	18.75 minutes
109	1.875 minutes	9.375 minutes

#### Source – NEMA

**N/B: Noise levels should not exceed a level of**

- I.** Factory/Workshops 85 dB (A)
- II.** Offices 50 dB (A)
- III.** Factory/Workshop Compound 75 dB (A)

**Table 4-8: Maximum Permissible Noise level for Impact or Impulsive Noise**

Sound Level dB(A) Max	Permitted impulses per day
140	100
130	1,000
120	10,000

Source-NEMA

## 4.2 National Water Quality Standards

The contractor will comply with the following national regulatory wastewater and effluent discharge standards. Regular monitoring to determine compliance will be done by the contractor and corrective/ mitigation measures applied where necessary.

**Table 4-9: National Wastewater Discharge Standards**

Parameters	Maximum levels permissible
Suspended solids (mg/L)	250
Total dissolved solids (mg/L)	2000
Temperature °C	20 -35
pH	6-9
Oil and Grease (mg/L)	where conventional treatment shall be used - 10
Oil and Grease (mg/L)	where ponds is a final treatment method - 5
Ammonia Nitrogen (mg/L)	20
Substances with an obnoxious smell	Shall not be discharged into the sewers
Biological Oxygen Demand BOD <sub>5</sub> days at 20°C (mg/L)	500
Chemical Oxygen Demand COD (mg/L)	1000
Arsenic (mg/L)	0.02
Mercury (mg/L)	0.05
Lead (mg/L)	1.0
Cadmium (mg/L)	0.5
Chromium VI (mg/L)	0.05
Chromium (Total) (mg/L)	2.0
Copper (mg/L)	1.0
Zinc (mg/L)	5.0
Selenium (mg/L)	0.2
Nickel (mg/L)	3.0
Nitrates (mg/L)	20
Phosphates (mg/L)	30
Cyanide Total (mg/L)	2
Sulphide (mg/L)	2
Phenols (mg/L)	10
Detergents (mg/L)	15
	40 Hazen units

Parameters	Maximum levels permissible
Colour Less than	(nd)
Alkyl Mercury Not Detectable	4.0
Free and saline Ammonia as N (mg/L)	Nil
Calcium Carbide	Nil
Chloroform	Nil
Inflammable solvents	Nil
Radioactive residues	Nil
Degreasing solvents of mono-di-trichloroethylene type	

Source-NEMA

### 4.3 World Bank Group General Environmental, Health and Safety Guidelines

These are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). These General EHS Guidelines are used in addition to the local guidelines in order to provide mitigation measures for the various environmental and social impacts that will be identified in this report. The main EHS guidelines that will be used alongside local policies include:

#### 4.3.1 Environmental Guidelines

These guidelines will govern the Contractor's activities during the construction of the transmission line and the construction works impacts on the physical environment.

##### 4.3.1.1. Air Emissions and Ambient Air Quality

Air emission and ambient quality provide the air quality standards, limits and monitoring requirements for construction works. The guidelines incorporate World Health Organization (WHO) air quality guidelines on the major air pollutants expected from the Contractor's machinery and equipment. Baseline and annual air quality measurements should be taken to establish the impacts of exhaust from the Contractor's works. Use of several equipment and plant is bound to generate some level of air emissions, which are bound to have a negative impact on the surrounding environment and in particular sensitive receptors. These impacts will be short-lived during the construction and operation phase of the project, and if minimal mechanization is employed the impacts can be reduced further. The guidelines also provide the air emission levels which the Contractor should strive to adhere to.

**Table 4-10: WHO Ambient Air Quality Guidelines**

WHO Ambient Air Quality Guidelines 7, 8		
	Averaging Period	Guideline value in mg/m <sup>3</sup>
Sulfur dioxide (SO <sub>2</sub> )	24-hour	125 (Interim target 1) 50 (Interim target 2) 20 (guideline)
	10 minutes	500 (guideline)
Nitrogen dioxide (NO <sub>2</sub> )	1-year	40 (guideline)
	1-hour	200 (guideline)

Particulate Matter PM10	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM2.5	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Source: IFC/WBG

**Table 4-11: Ambient Air Quality Tolerance Limits**

Pollutant	Time Weighted Average			
		Industrial Area	Residential, Rural & Other Area	Controlled Areas
Sulphur oxides (SOX);	Annual Average	80 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>	15 ug/m <sup>3</sup>
	24 hours	125 ug/m <sup>3</sup>	80 ug/m <sup>3</sup>	30 ug/m <sup>3</sup>
	Annual Average		0.019 ppm/50ug/m <sup>3</sup>	
	Month Average			
	24 Hours		0.048ppm /125ug/m <sup>3</sup>	
	Instant Peak		500 ug/m <sup>3</sup>	
	Instant Peak (10 min)		0.191 ppm	
Oxides of Nitrogen (NOX);	Annual Average	80 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>	15 ug/m <sup>3</sup>
	24 hours	150 ug/m <sup>3</sup>	80 ug/m <sup>3</sup>	30 ug/m <sup>3</sup>
	Annual Average		0.2 ppm	
	Month Average		0.3 ppm	
	24 Hours		0.4 ppm	
	One Hour		0.8 ppm	
	Instant Peak		1.4 ppm	
Nitrogen Dioxide	Annual Average	150 ug/m <sup>3</sup>	0.05 ppm	
	Month Average		0.08 ppm	
	24 Hours	100 ug/m <sup>3</sup>	0.1 ppm	
	One Hour		0.2 ppm	
	Instant Peak		0.5 ppm	
Suspended Particulate Matter	Annual Average	360 ug/m <sup>3</sup>	140 ug/m <sup>3</sup>	70 ug/m <sup>3</sup>
	24 hours	500 ug/m <sup>3</sup>	200 ug/m <sup>3</sup>	100 ug/m <sup>3</sup>

Pollutant	Time Weighted Average			
		Industrial Area	Residential, Rural & Other Area	Controlled Areas
	Annual Average		100 ug/m <sup>3</sup>	
	24 hours		180 ug/m <sup>3</sup>	
Respirable Particulate Matter (<10m) (RPM)	Annual Average	70 ug/m <sup>3</sup>	50 ug/m <sup>3</sup>	50 ug/m <sup>3</sup>
	24 hours	150 ug/Nm <sup>3</sup>	100 ug/Nm <sup>3</sup>	75 ug/Nm <sup>3</sup>
PM2.5	Annual Average	35 ug/m <sup>3</sup>		
	24 hours	75 ug/m <sup>3</sup>		
Lead (Pb)	Annual Average	1.0 ug/Nm <sup>3</sup>	0.75 ug/Nm <sup>3</sup>	0.50 ug/m <sup>3</sup>
	24 hours	1.5 ug/m <sup>3</sup>	1.00 ug/m <sup>3</sup>	0.75 ug/m <sup>3</sup>
	Month Average		2.5	
Carbon monoxide (CO)/ carbon dioxide (CO <sub>2</sub> )	8 hours	5.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>
	1 hour	10.0 mg/m <sup>3</sup>	4.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>
Hydrogen sulphide	24 hours	150ug/m <sup>3</sup>		
	instant Peak	700ppb		
Total VOC	24 hours	600 ug/m <sup>3</sup>		
Ozone	1-Hour	200 ug/m <sup>3</sup>	0.12 ppm	
	8 hour (instant Peak)	120 ug/m <sup>3</sup>	1.25 ppm	

#### 4.3.1.2. Wastewater Quality

These guidelines will be key particularly in the Resident Engineers Office and the impacts of wastewater generation and treatment before release into the environment, in order to prevent pollution of the surrounding physical environment. The guidelines call for monitoring of wastewater from the site through testing and inspections for which the Contractor will have to establish a plan for management and monitoring.

**Table 4-12: Standards for Effluent Discharge into the Environment**

Parameter	Max Allowable (Limits)
1,1,1-trichloroethane (mg/l)	3
1,1,2-trichloroethane (mg/l)	0.06
1,1-dichloroethylene	0.2
1,2-dichloroethane	0.04
1,3-dichloropropene (mg/l)	0.02
Alkyl Mercury compounds	Nd
Ammonia, ammonium compounds, NO <sub>3</sub> compounds and NO <sub>2</sub> compounds (Sum total of ammonia-N times 4 plus nitrate-N and Nitrite-N) (mg/l)	100
Arsenic (mg/l)	0.02
Arsenic and its compounds (mg/l)	0.1
Benzene (mg/l)	0.1
Biochemical Oxygen Demand (BOD 5days at 20 oC) (mg/l)	30
Boron (mg/l)	1.0
Boron and its compounds – non-marine (mg/l)	10
Boron and its compounds –marine (mg/l)	30
Cadmium (mg/l)	0.01
Cadmium and its compounds (mg/l)	0.1

Carbon tetrachloride	0.02
Chemical Oxygen Demand (COD (mg/l)	50
Chromium VI (mg/l)	0.05
Chloride (mg/l)	250
Chlorine free residue	0.10
Chromium total	2
cis -1,2- dichloro ethylene	0.4
Copper (mg/l)	1.0
Dichloromethane (mg/l)	0.2
Dissolved iron (mg/l)	10
Dissolved Manganese(mg/l)	10
E. coli (Counts / 100 ml)	Nil
Fluoride (mg/l)	1.5
Fluoride and its compounds (marine and non-marine) (mg/l)	8
Lead (mg/l)	0.01
Lead and its compounds (mg/l)	0.1
n-Hexane extracts (animal and vegetable fats) (mg/l)	30
n-Hexane extracts (mineral oil) (mg/l)	5
Oil and grease	Nil
Organo-Phosphorus compounds (parathion, methyl parathion, methyl demeton and Ethyl parantropheryl phenylphosphorothroate, EPN only) (mg/l)	1.0
Polychlorinated biphenyls, PCBs (mg/l)	0.003
pH (Hydrogen ion activity----marine)	5.0-9.0
pH (Hydrogen ion activity—non-marine)	6.5-8.5
Phenols (mg/l)	0.001
Selenium (mg/l)	0.01
Selenium and its compounds (mg/l)	0.1
Hexavalent Chromium VI compounds (mg/l)	0.5
Sulphate (mg/l)	0.1
Simazine (mg/l)	0.03
Total Suspended Solids, (mg/l)	30
Tetrachloroethylene (mg/l)	0.1
Thiobencarb (mg/l)	0.1
Temperature (in degrees celcius) based on ambient temperature	± 3
Thiram (mg/l)	0.06
Total coliforms (counts /100 ml)	30
Total Cyanogen (mg/l)	Nd
Total Nickel (mg/l)	0.3
Total Dissolved solids (mg/l)	1200
Colour in Hazen Units (H.U)	15
Detergents (mg/l)	Nil
Total mercury (mg/l)	0.005
Trichloroethylene (mg/l)	0.3
Zinc (mg/l)	0.5
Whole effluent toxicity	
Total Phosphorus (mg/l)	2 Guideline value
Total Nitrogen	2 Guideline value

Source: IFC/WBG

#### 4.3.1.3. Hazardous Materials Management

These guidelines will mainly govern the handling and disposal of hazardous materials, under this project the major hazardous material is used engine oil which if not handled properly can have a negative impact on the health of the workers and the local community.

#### 4.3.1.4. Solid Waste Management

All construction works are expected to produce one or more forms of waste. The transmission line construction will be no exception. Construction wastes and domestic wastes are expected from the Contractor's site. The Contractor will have to prepare a **waste management plan** using these guidelines that conform to the local legal framework provided in this chapter.

#### 4.3.1.5. Noise

Use of several equipment and plant is bound to generate some level of noise, which are bound to have a negative impact on the surrounding environment and in particular sensitive receptors. These impacts will be short-lived during the construction and operation phase of the project, and if minimal mechanization is employed the impacts can be reduced further. The guidelines also provide the maximum noise levels which the Contractor should strive to adhere to. The guidelines also call for baseline and annual monitoring of noise generation within the Contractor's site to establish compliance to the guidelines and local regulation.

**Table 4-13: Noise Level Guidelines**

Noise Level Guidelines		
	One Hour LAeq (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Source: WBG

## 4.4 International Conventions

Relevant international agreements, treaties and conventions that have a social and/or environmental aspect, to which Kenya is a signatory or has acceded to/ratified and which will guide project implementation, are detailed in Table 4-14 below.

**Table 4-14: International Conventions**

Convention	Objective
African Convention for the Conservation of Nature and Natural Resources (2003)	The objectives of the ACCNNR have been considered in this ESIA.
Convention on Biological Diversity (1992)	The objectives of the CBD have been considered in this ESIA.
Convention on the Conservation of Migratory Species of Wild Animals	This ESIA has taken into account any potential impacts on migratory species.
Convention on Wetlands of International Importance especially Waterfowl Habitat (Ramsar Convention, 1971)	This ESIA has taken into account any potential impacts on wetlands.

Convention	Objective
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1998)	The objectives of the Rotterdam Convention should be considered when developing plans and programs for the management of relevant hazardous chemicals and pesticides.
Convention concerning the Protection of the World Cultural and Natural Heritage (1972)	By applying international standards such as World Bank O.P 4.11 in regard to Physical Cultural Resources to any identification and management of cultural heritage aspects during project development, the developer will comply with the objectives of the convention.
Abolition of Forced Labour Convention, 1957 (No. 105)	Ensure that forced labour is prohibited and that human resource (HR) policies and procedures are developed and implemented to ensure this.
Minimum Age Convention, 1973 (No. 138)	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.
Worst Forms of Child Labour Convention, 1999(No. 182)	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.
Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	Ensure that the Project recognise workers freedom of association and protection of the right to organise.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Discrimination in the field of employment and occupation should be expressly forbidden.
International Convention on the Elimination of All Forms of Racial Discrimination: 1969.	All workplace racial discrimination should be expressly forbidden.
Convention on the Elimination of All Forms of Discrimination against Women :1981 (CEDAW)	Ensure that non-discrimination against women is enshrined in HR policies and practices for the proposed Project.
Convention on the Rights of the Child, 1990	Ensure that employment policies include prohibitions on the employment of children.
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment:1987	Torture in all workplace should be expressly forbidden.
International Covenant on Economic, Social and Cultural Rights, 1976	Ensure that economic, social and cultural rights are respected in the proposed Project.
International Covenant on Civil and Political Rights,1976	Ensure civil and political rights are observed in the proposed Project.
Convention on the Rights of Persons with Disabilities	All workplace discrimination should be expressly forbidden.
The African Charter on Human and Peoples' Rights (African Charter)	Ensure civil and political rights are observed in the proposed Project.
The African Charter on the Rights and Welfare of the Child	Ensure that employment policies include prohibitions on the employment of children.
The Protocol to the African Charter on the Rights of Women in Africa (Maputo Protocol)	Ensure civil and political rights are observed in the proposed Project.

## 4.5 Applicable World Bank Operational Policies

KETRACO prepare a number of safeguards instruments under the KESIP including ESMF, RPF and VMGF as these were deemed applicable. The applicable WB safeguards triggered by the project are discussed below.

**Table 4-15: World Bank Policies**

<b>Safeguards Policies</b>	<b>Provision</b>	<b>Relevance to the Project</b>
World Bank OP 4.01 (Environmental Assessment)	-Provides for environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.	This project is categorized as a "Category A" and hence an Environmental and Social Impact Assessment is required.
World Bank OP 4.04 (Natural Habitat)	<p>-Provides for the application of a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development;</p> <p>-Provides for measures for the identification of (a) natural habitat issues and special needs for natural habitat conservation, including the degree of threat to identified natural habitats (particularly critical natural habitats), and (b) measures for protecting such areas in the context of the country's development strategy;</p> <p>-Provides for measures to rehabilitate degraded natural habitats;</p> <p>-Discourages the significant conversion or degradation of critical natural habitats; and</p> <p>-Provides for measures to take into account the views, roles, and rights of groups, including local nongovernmental organizations and local communities, affected by Bank-financed projects involving natural habitats, and to involve such people in planning, designing, implementing, monitoring, and evaluating such projects.</p>	<p>Baseline reviews and field studies identified natural habitats that the transmission line will traverse, hence triggering this policy.</p> <p>The natural habitats along the project route that trigger this policy include Bahati Forest which is traversed by the line.</p>
World Bank OP 4.10 (Indigenous Peoples)	<p>The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate and gender and inter-generationally inclusive social and economic benefits.</p> <p>The policy requires free, prior and informed consultation with indigenous peoples.</p>	Screening has determined that the transmission line does not traverse areas inhabited by VMGs/IPs. OP 4.10 is therefore not applicable to the T-line under study.
World Bank OP 4.12 (Involuntary Resettlement)	-Provides measures to mitigate against impoverishment risks associated with Involuntary Resettlement and the restoration or improvement of income earning capacity of the Project Affected People (PAP).	<p>Screening has determined that the construction of the project will require acquisition of land and hence the applicability of this policy.</p> <p>A Resettlement Action Plan has been prepared.</p>
World Bank OP 4.11 (Physical Cultural Resources)	<p>-Provides for measures to protect cultural heritage from the adverse impacts of project activities and support its preservation;</p> <p>-Provides for measures to promote the</p>	<p>There are no known physical-cultural resources identified during the study along the project area.</p> <p>As required, a Chance Find</p>

	<p>equitable sharing of benefits from the use of cultural heritage; and</p> <p>-Provide for measures to address impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process.</p>	<p>Procedure has been prepared for use by contractor during the construction phase.</p>
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#### **4.5.1 World Bank Group General Environmental, Health and Safety (EHS) Guidelines**

These are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). These General EHS Guidelines are used in addition to the local guidelines in order to provide mitigation measures for the various environmental and social impacts that will be identified in this report. The main EHS guidelines that will be used alongside local policies include:

##### **4.5.1.1. Environmental Guidelines**

These guidelines will govern the Contractor's activities during the construction of the transmission line and the construction works impacts on the physical environment. The guidelines include:

##### **4.5.1.2. Air Emissions and Ambient Air Quality**

Air emission and ambient quality provide the air quality standards, limits and monitoring requirements for construction works. The guidelines incorporate WHO air quality guidelines on the major air pollutants expected from the Contractor's machinery and equipment. Baseline and annual air quality measurements should be taken to establish the impacts of exhaust from the Contractor's works. Use of several equipment and plant is bound to generate some level of air emissions, which are bound to have a negative impact on the surrounding environment and in particular sensitive receptors. These impacts will be short-lived during the construction and operation phase of the project, and if minimal mechanization is employed the impacts can be reduced further. The guidelines also provide the air emission levels which the Contractor should strive to adhere to.

##### **4.5.1.3. Industry Specific EHS Guidelines: IFC EHS Guidelines for Electric Power Transmission and Distribution, 2007**

The IFC guidelines are applicable to power transmission between a generation facility and substations located within an electric grid as well as power distribution from a substation to consumers. Industry specific impacts and management measures are included within the Guidelines, including information on construction impacts such as:

- Construction site waste generation;
- Soil erosion and sediment control from site preparation activities;
- Fugitive dust emissions and other emissions;
- Noise from heavy equipment and truck traffic; and
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fuelling activities.

Operational impacts are associated with the following:

- Terrestrial habitat alteration (through right of way construction and maintenance, potential for forest fires, and avian and bat collisions and electrocutions);
- Electric and magnetic fields; and
- Hazardous materials (e.g., insulating oils/gases and fuels in addition to herbicides for right of way vegetation maintenance).

Environmental issues during the construction phase of power transmission and distribution projects specific to this industry sector include the following:

#### **4.5.2.1. Terrestrial Habitat Alteration**

The construction and maintenance of transmission line rights-of way, especially those aligned through forested areas may result in alteration and disruption to terrestrial habitat, including impacts to avian species and an increased risk of forest fires.

#### **4.5.2.2. Avian Collisions and Electrocutions**

The combination of the height of transmission towers and distribution poles and the electricity carried by transmission and distribution lines can pose potentially fatal risk to birds and bats through collisions and electrocutions. Avian collisions with power lines can occur in large numbers if located within daily flyways or migration corridors, or if groups are traveling at night or during low light conditions (e.g., dense fog). In addition, bird and bat collisions with power lines may result in power outages and fires.

#### **4.5.2.3. Aquatic Habitat Alteration**

Power transmission and distribution lines, and associated access roads and facilities, may require construction of corridors crossing aquatic habitats that may disrupt watercourses and wetlands, and require the removal of riparian vegetation. In addition, sediment and erosion from construction activities and storm water runoff may increase turbidity of surface watercourses.

#### **4.5.2.4. Electric and Magnetic Fields**

Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

#### **4.5.2.5. Hazardous Materials**

Hazardous materials in this sector include insulating oils/gases (e.g. Polychlorinated Biphenyls [PCB] and sulfur hexafluoride [SF6], and fuels, in addition to chemicals or products for wood preservation for poles and associated wood construction material. Background information indicate that KETRACO does not use wooden poles hence no need for wood preservatives. Insulating oils/gases (e.g., Polychlorinated Biphenyls [PCB] and sulfur hexafluoride [SF6] are not used in KETRACO projects and the contractor to be procured is expected to maintain similar standards. Occupational health and safety hazards specific to electric power transmission and distribution projects primarily include:

- Live power lines
- Working at height
- Electric and magnetic fields
- Exposure to chemicals

In addition to general health and safety standards outlined in the General EHS Guidelines, the operation of live power distribution lines may generate the following industry-specific impacts:

#### **4.5.2.6. Electrocution**

Hazards most directly related to power transmission and distribution lines and facilities occur as a result of electrocution from direct contact with high-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with high-voltage electricity.

#### **4.5.2.7. Electromagnetic Interference**

The corona of overhead transmission line conductors and high frequency currents of overhead transmission lines may result in the creation of radio noise. Typically, transmission line rights-of-way and conductor bundles are created to ensure radio reception at the outside limits remains normal. However, periods of rain, sleet or freezing rain sharply increases the streaming corona on conductors and may affect radio reception in residential areas near transmission lines.

#### **4.5.2.8. Visual Amenity**

Power transmission and distribution are necessary to transport energy from power facilities to residential communities but may be visually intrusive and undesirable to local residents.

#### **4.5.2.9. Noise and Ozone**

Noise in the form of buzzing or humming can often be heard around transformers or high voltage power lines producing corona. Ozone, a colourless gas with a pungent odour, may also be produced.

#### **4.5.2.10. Aircraft Navigation Safety**

Power transmission towers, if located near an airport or known flight paths, can impact aircraft safety directly through collision or indirectly through radar interference. As the basis for design evaluation, the IFC EHS Guidelines for Electric Power Transmission and Distribution (April 30, 2007) were followed in the development of the Project (TDS-V3) with specific reference to the mitigation of potential electric and magnetic field (EMF) health risks. Information is also provided on Occupational Health and Safety hazards associated with live power lines, working at height, electric and magnetic fields and exposure to chemicals.

**Table 4-16: Management of EMF within Project Design**

<b>IFC EHS Guideline Recommendation</b>
"Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure".
"Considering siting new facilities so as to avoid or minimize exposure to the public.

Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided”.

“If EMF levels are confirmed or expected to be above the recommendation exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples include shielding with specific metal alloys, burying transmission lines, modifications to size, spacing & configuration of conductors”.

The IFC EHS Guidelines state the following recommendation for the management of EMF exposures: “Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP Pre commendation for General Public Exposure”. It is noted that the ICNIRP Guidelines referenced in the EHS Guidelines reference the 1998 exposure levels. These were subsequently updated in 2010 as further scientific data became available. The Project has been designed to comply with the updated 2010 ICNIRP Guidelines.

## **4.6 Institutional Frameworks**

### **4.6.1 Ministry of Energy and Petroleum**

Ministry of Energy and Petroleum (MOE&P) - MOE&P is in charge of making and articulating energy policies to create an enabling environment for efficient operation and growth of the sector.

### **4.6.2 The National Environment Council**

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

### **4.6.3 The National Environment Management Authority**

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.

### **4.6.4 The Standards and Enforcement Review Committee**

In addition to NEMA, EMCA provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee (SERC).

### **4.6.5 The National Environmental Complaints Committee**

The Act (EMCA) has also established a Public Complaints Committee, which provides the administrative mechanism for addressing environmental harm. The Committee has the mandate to investigate complaints relating to environmental damage and degradation. Its members include representatives from the Law Society of Kenya, NGOs and the business community

#### **4.6.6 The County Environmental Committee**

County Environmental Action Plan Committee is charged with the responsibility of preparing a provincial environmental Action based on the county environmental plan. The county Environmental action plans are further compiled at the national level.

#### **4.6.7 Directorate of Occupational Health and Safety**

The institution will be task for registration of the construction site as a workplace and enforcing compliance with Occupational Health and Safety Regulations at the construction site.

#### **4.6.8 National Land Commission**

The National Land Commission (NLC) 2012 will undertake compensation. NLC is an independent government commission whose establishment was provided for by the Constitution of Kenya, 2010 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.

## 4.7 Comparison of World Bank Policies and Kenyan Laws

Table 4-17. World Bank Policies Versus Kenyan Laws

World Bank	Kenya Requirements	Gaps
<b>Environmental Assessment</b>		
Assess potential impacts of the proposed project on physical, biological, socio-economic and physical cultural resources, including transboundary and global concerns, and potential impacts on human health and safety.	<p>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 PART IV – requires below for high risk projects 18. (1) A proponent shall submit to the Authority, an environmental contents of impact assessment study report incorporating but not limited to the environmental following information</p> <ul style="list-style-type: none"> <li>- (a) the proposed location of the project;</li> <li>(b) a concise description of the national environmental legislative and regulatory framework, baseline information,</li> <li>(c) and any other relevant information related to the project; the objectives of the project;</li> <li>(d) the technology, procedures and processes to be used, in the implementation of the project; (e) the materials to be used in the construction and implementation of the project;</li> <li>(f) the products, by-products and waste generated project;</li> <li>(g) a description of the potentially affected environment;</li> <li>(h) the environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated;</li> <li>(i) alternative technologies and processes available and reasons for preferring the chosen technology and processes;</li> <li>(j) analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.</li> <li>(k) an environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;</li> <li>(l) provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;</li> <li>(m) the measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;</li> <li>(n) an identification of gaps in knowledge and uncertainties which were encountered in compiling the information;</li> <li>(o) an economic and social analysis of the project;</li> <li>(p) an indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures; and</li> <li>(q) such other matters as the Authority may require.</li> </ul> <p><b>The Public Health Act (Cap 242)</b> Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans. Provides that the relevant local authority shall take all lawful, necessary and reasonably practicable measures.</p>	No Gap- OP 4.01 and Kenyan environmental laws and regulations complement each other.

	<p><b>Environmental Management and Co-ordination (Water Quality) Regulations 2006</b>  Provides for the protection of ground and surface water resources.  Provides the water quality standards for sources of domestic water.  Provides that an EIA shall be carried out and license obtained to abstract water or carry out activities that may have adverse impacts on the quantity or quality of water in lakes, rivers, streams, springs and wells  Provides the water quality standards for effluent discharged into the aquatic environment. Environmental Management and Co- ordination (Waste Management) Regulations 2006 Provides for standards for handling, transportation and disposal of various types of wastes including hazardous wastes.  Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting.  Provides for licensing of vehicle transporting waste.  Provides for the licensing of waste disposal facilities.</p> <p><b>Environmental Management and Coordination (Controlled Substances) Regulations 2007 (Legal Notice No 73 of 2007)</b>  Provides for measures for storage, handling packaging and disposal of products with ozone-depleting substances including air conditioning and refrigeration equipment.</p> <p><b>Environmental Management and Coordination (Air Quality) Regulations, 2014</b>  Provides for ambient air quality tolerance limits. Prohibits air pollution in a manner that exceed specified levels.  Prohibits air pollution in controlled areas including residential areas, hospitals, National Parks, reserves and sanctuaries, conservation areas and central business districts  Provides for air pollution monitoring of quarries  Provides for measures to prevent air pollution from stockpiles or handling of construction materials  Provides for installation of air pollution control systems where pollutants emitted exceed specified limits.  Provides for the control of fugitive emissions within property boundary.  Provides for the control of vehicular emissions.  Provides for prevention of dispersion of visible particulate matter or dust from any material being transported.  Provides for acquisition of an emission license</p>	
Assess the adequacy of the applicable legal and institutional framework, including applicable international environmental agreements, and confirm that they provide that the cooperating government does not finance project activities that would contravene such international obligations	Described above	No Gap- OP 4.01 and Kenyan environmental laws and regulations complement each other.

Provide for assessment of feasible investment, technical, and siting alternatives, including the "no action" alternative, potential impacts, feasibility of mitigating these impacts, their capital and recurrent costs, their suitability under local conditions, and their institutional, training and monitoring requirements associated with them.	Described above	No Gap OP 4.01 and Kenyan environmental laws and regulations complement each other.
Where applicable to the type of project being supported, normally apply the EHS Guidelines. Justify deviations when alternatives to measures set forth in the EHS Guidelines are selected.	<p><b><u>Occupational Safety and Health Act (OSHA), 2007:</u></b>  Provides for the safety, health and welfare of workers and all persons lawfully present at workplaces.  Provides for the registration of workplaces.  Provides for maintenance of cleanliness of workplaces, adequate lighting and ventilation, provision of sanitary conveniences,  Outlines safety requirements in use of machinery to prevent accidents and injuries</p> <p><b>The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005 Rules</b>  Provide for the maximum noise exposure levels for workers in places of work and for the provision of protective equipment for those exposed to high noise levels.  Provide that an occupier shall also institute noise reduction measures at the source of noise in the workplace.  Provides for development of a noise prevention program where noise in a workplace exceeds the continuous</p>	There is a gap between the World Bank's EHS Guidelines, and Kenyan laws and regulations. Projects should apply whichever is more stringent.
Prevent and, where not possible to prevent, at least minimize, or compensate for adverse project impacts and enhance positive impacts through environmental management and planning that includes the proposed mitigation measures, monitoring, institutional capacity development and training measures, an implementation schedule, and cost estimates.	Described above	No major gap
Involve stakeholders, including project-affected groups and local nongovernmental organizations, as early as possible, in the preparation process and ensure that their views and concerns are made known to decision makers and taken into account. Continue consultations throughout project implementation as necessary to address EA-related issues that affect them.	<p><b>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 PART IV 21.</b>  (1) The Authority shall, within fourteen days of receiving the environmental impact assessment study report, invite the public to make oral or written comments on the report.  (2) The Authority shall, at the expense of the proponent - (a) publish for two successive weeks in the Gazette and in a newspaper with a nation-wide circulation and in particular with a wide circulation in the area of the proposed project, a public notice once a week inviting the public to submit oral or written comments on the environmental impact assessment study report; and (b) make an announcement of the</p>	No major gap

	<p>notice in both official and local languages at least once a week for two consecutive weeks in a radio with a nation-wide coverage.</p> <p>(3) The invitation for public comments under this regulation shall state - (a) the nature of the project; (b) the location of the project; (c) the anticipated impacts of the project and the proposed mitigation measures to respond to the impacts; (d) the times and place where the full report can be inspected; and (e) the period within which the Authority shall receive comments.</p> <p>(4) The notice to be published in the newspaper as specified under sub regulation (3) shall be in Form 8 set out in the First Schedule to these Regulations. 22.</p> <p>(1) Upon receipt of both oral and written comments as specified Public hearing. by section 59 and section 60 of the Act, the Authority may hold a public hearing</p> <p>(2) A public hearing under these Regulations shall be presided over by a suitably qualified person appointed by the Authority.</p> <p>(3) The date and venue of the public hearing shall be publicized at least one week prior to the meeting - (a) by notice in at least one daily newspaper of national circulation and one newspaper of local circulation; (b) by at least two announcements in the local language of the community and the national language through radio with a nationwide coverage.</p> <p>(4) The public hearing shall be conducted at a venue convenient and accessible to people who are likely to be affected by the project.</p> <p>(5) A proponent shall be given an opportunity to make a presentation and to respond to presentations made at the public hearing.</p> <p>(6) The presiding officer shall in consultation with the Authority determine the rules of procedure at the public hearing.</p> <p>(7) On the conclusion of the hearing, the presiding officer shall compile a report of the views presented at the public hearing and submit the report to the Director General within fourteen days from the date of the public hearing.</p>	
Use independent expertise in the preparation of EA where appropriate. Use independent advisory panels during preparation and implementation of projects that are highly risky or contentious or that involve serious and multidimensional environmental and/or social concerns.	<p><b>EMCA CAP 387 outlines the following</b></p> <p>(5) Environmental impact assessment studies and reports required under this Act shall be conducted or prepared respectively by individual experts or a firm of experts authorized in that behalf by the Authority. The Authority shall maintain a register of all individual experts or firms of all experts duly authorized by it to conduct or prepare environmental impact assessment studies and reports respectively. The register shall be a public document and may be inspected at reasonable hours by any person on the payment of a prescribed fee.</p> <p><b>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 FOURTH SCHEDULE</b> sets out the Criteria for registration of Environmental Impact Assessment Experts.</p>	No major gap
Provide measures to link the environmental assessment process and findings with studies of economic, financial, institutional, social and technical analyses of a proposed project.	<p><b>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 PART VI-MISCELLANEOUS PROVISIONS</b> (3) states The Government, and all the lead agencies shall in the development of sector or national policy, incorporate principles of strategic environmental assessment.</p>	

Disclose draft EA in a timely manner, before appraisal formally begins, in an accessible place and in a form and language understandable to key stakeholders.	<p>Described above under public hearing Part II (I) of the Constitution of Kenya, 2010 commits the State to: Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;</p> <p>Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;</p> <p>Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;</p> <p>Encourage public participation in the management, protection and conservation of the environment;</p> <p>Protect genetic resources and biological diversity;</p> <p>Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;</p> <p>Eliminate processes and activities that are likely to endanger the environment; and</p> <p>Utilise the environment and natural resources for the benefit of the people of Kenya. Part II (II) 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.”</p> <p>Moreover, the Constitution includes aspects around land acquisition and compensation. It also mandates the development of a national land policy to implement the principles and establishes the National Land Commission.</p> <p><b>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003</b></p> <p><b>PART IV (2)</b> The environmental impact assessment study report shall be accompanied by a non-technical summary outlining the key findings, conclusions and recommendations of the study and shall be signed by the proponent and environmental impact assessment experts involved in its preparation.</p>	
<b>Physical Cultural Resources</b>		
Use an environmental assessment (EA) or equivalent process to identify PCR and prevent or minimize or compensate for adverse impacts and enhance positive impacts on PCR through site selection and design.	<b>Antiques and Monuments Act, Cap 215 and National Museums and Heritage Act, Cap 216,</b> These Acts been used for gazettement of areas of historical importance, museums and threatened heritage as they protect the archaeological, historical, and cultural sites such as monuments, elements or structures of an archaeological nature, inscriptions, and cave dwelling.	
As part of the EA, as appropriate, conduct field-based surveys, using qualified specialists.	Field-based surveys conducted by specialists and describe the proposed site for project including map, borders and neighborhoods with design of infrastructures, facilities and services and all inputs and outputs (THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003).	
Consult concerned government authorities, relevant nongovernmental organizations, relevant experts and local people in documenting the presence and significance of PCR, assessing the nature and extent of potential impacts on these resources, and	<b>Antiques and Monuments Act, Cap 215 and National Museums and Heritage Act, Cap 216, 30.</b> Where a person discovers a monument or object of archaeological or paleontological interest, the person shall, within seven days, give notice thereof, indicating the precise site and circumstances of the discovery, to the National Museums, and in the case of an object, shall deliver the object to the National Museums or to the District Commissioner to keep it for any particular purpose or for any particular purpose or for any particular period	Prepare Chance Find Procedures to fill the gap.

<p>designing and implementing mitigation plans.</p> <p>For materials that may be discovered during project implementation, provide for the use of "chance find" procedures in the context of the PCR management plan or PCR component of the environmental management plan.</p>		
<b>Natural Habitats</b>		
<p>Use a precautionary approach to natural resources management to ensure opportunities for environmentally sustainable development. Determine if project benefits substantially outweigh potential environmental costs.</p>	<p><b>The Wildlife Conservation and Management Act, 2013</b> Prohibits pollution of wildlife habitats and ecosystems</p>	<p>No significant gaps. Apply either of the two due to insignificant differences</p>
<p>Avoid significant conversion or degradation of critical natural habitats, including those habitats that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value, or (d) recognized as protected by traditional local communities.</p>	<p><b>The Forest Conservation and Management Act, 2016</b> Prohibits the destruction of protected tree species or family of trees Provides for the sustainable management of indigenous forests and woodlands</p> <p><b>The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009</b> applies to all wetlands in Kenya whether occurring in private or public land. The objectives of the regulations is to provide for the conservation and sustainable use of wetlands and their resources in Kenya and promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development. The act also aims at ensuring the conservation of water catchments and the control of floods and the sustainable use of wetlands for ecological and aesthetic purposes for the common good of all citizens.</p> <p>The act also makes provision for the protection of wetlands as habitats for species of fauna and flora. It also provides a framework for public participation in the management of wetlands.</p> <p>The Act requires wetland resources to be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services. The Act requires special measures to be undertaken to preserve and maintain knowledge innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity in wetlands. The regulation also calls for sustainable use of wetlands through integration into the national and local land use plans to ensure sustainable use of wetlands in the country</p>	

Where projects adversely affect non-critical natural habitats, proceed only if viable alternatives are not available, and if appropriate conservation and mitigation measures, including those required to maintain ecological services they provide, are in place. Include also mitigation measures that minimize habitat loss and establish and maintain an ecologically similar protected area.	<b>WILDLIFE CONSERVATION AND MANAGEMENT ACT, 2013.PART VI – CONSERVATION, PROTECTION AND MANAGEMENT</b> No exemption from environment law to be granted (1) No user rights or other license or permit granted under this Act shall exempt a person from complying with any other written law concerning the conservation and protection of the environment. (2) A user or other related right shall not be granted under this Act where the requirement for a strategic environmental, cultural, economic and social impact assessment license under the Environmental Management and Co-ordination Act, 1999 (No. 8 of 1999) has not been complied with.	
Whenever feasible, give preference to siting projects on lands already converted.	<b>THE ENVIRONMENTAL (IMPACT ASSESSMENT AND AUDIT) REGULATIONS, 2003 PART IV (2)</b> (j) analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.	
Consult key stakeholders, including local nongovernmental organizations and local communities, and involve such people in design, implementation, monitoring, and evaluation of projects, including mitigation planning.	Part II (I) of the Constitution of Kenya, 2010 commits the State to: Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya; Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities; Encourage public participation in the management, protection and conservation of the environment; Protect genetic resources and biological diversity; Establish systems of environmental impact assessment, environmental audit and monitoring of the environment; Eliminate processes and activities that are likely to endanger the environment; and Utilise the environment and natural resources for the benefit of the people of Kenya.  Part II (II) 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.” Moreover, the Constitution includes aspects around land acquisition and compensation. It also mandates the development of a national land policy to implement the principles and establishes the National Land Commission.  <b>WILDLIFE CONSERVATION AND MANAGEMENT ACT, 2013.PART VI – CONSERVATION, PROTECTION AND MANAGEMENT</b> Variation of boundaries or revocation of a national park or a marine protected area A notice under this section which proposes to— (a) vary the boundaries of a national park; or (b) change the status from national park to wildlife conservancy or sanctuary, shall only be published by the Cabinet Secretary where a proposal is recommended by the Service after consultation with the	

	<p>National Land Commission in accordance with subsection (2) of this section and is subsequently approved by a resolution of Parliament:</p> <p>Provided that there shall be no recommendation unless—</p> <p>(a) they are satisfied that such variation of boundary or cessation of national park proposed by the notice— (i) shall not endanger any rare, threatened or endangered species; (ii) shall not interfere with the migration and critical habitat of the wildlife; (iii) does not adversely affect its value in provision of environmental goods and services; and (iv) does not prejudice biodiversity conservation, cultural site protection, or its use for educational, ecotourism, recreational, health and research purposes;</p> <p>(b) the proposal has been subjected to an environmental impact assessment in accordance with the provisions of the Environmental Management and Co-ordination Act, 1999; and</p> <p>(c) public consultation in accordance with the Fourth Schedule has been undertaken in relation to the proposal.</p>	
Provide for the use of appropriate expertise for the design and implementation of mitigation and monitoring plans.	As above	
Disclose draft mitigation plan in a timely manner, before appraisal formally begins, in an accessible place and in a form and language understandable to key stakeholders.	As above	
<b>Involuntary Resettlement</b>		
Avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	<p>The Land Act, 2012 Act outlines procedures for sensitizing the affected population to the project and for consultation on implications and grievance procedures. The Land Act 2012 guarantees the right to fair and just compensation in case of relocation. The Land Act 2021 outlines procedures for consultations with affected population by NLC and grievance management procedures. Land Act 2012 clearly outline the steps and process for grievance redress that includes alternative dispute resolution, re-negotiation with NLC and is backed by the judicial system through the Land Acquisition Tribunal as established by the Land Value (Amendment) Act 2019 and Environmental and Land Court as established by the Constitution 2010.</p> <p>The Land Act 2012 provides that written and unwritten official or customary land rights are recognized as valid land right. The Law provides that people eligible for compensation are those holding land tenure rights. Land Act also recognizes those who have interest or some claim in the land such pastoralist or who use the land for their livelihood. Land Act 2012 provides for census through NLC inspection and valuation process.</p> <p>The constitution recognizes ‘occupants of land even if they do not have titles and payment made in good faith to those occupants of land. However, this does not include those who illegally acquired land</p>	Implement consultation procedures as outlined in both Kenyan legislation and World Bank.

	<p><b>Severity of impacts of land taking and recommended entitlement options as per OP 4.12.</b></p> <p><b>If more than 20% of holdings are acquired.</b>  Option 1: Replacement land for that taken.  Option 2: Prorated cash compensation and rehabilitation package.</p> <p><b>Displaced Persons losing more than 20 percent of their total agricultural land.</b>  Those affected are entitled to a land-replacement option.</p> <p><b>If less than 20% of holdings are acquired.</b>  Prorated cash compensation is availed to those affected.</p> <p><b>If more than 80% of holdings are acquired.</b>  Option 1: Replacement land for that taken is availed to those affected.</p> <p>Option 2: Prorated cash compensation, rehabilitation package, and option to sell residual land.  <i><b>Residual holdings are no longer economically viable</b></i>  Option 1: Replacement land for that taken.  Option 2: Prorated cash compensation, rehabilitation package, and option to sell residual land.</p> <p><b>The National Land Commission Act 2012</b>  Provides for the management and administration of land in accordance with the principles of the land policy set out in Article 60 of the Constitution and the national land policy  Gives power to the National Land Commission (NLC) to manage public land on behalf of the national and county governments, and to monitor and have oversight responsibilities over land use planning throughout the country  Mandates the NLC to investigate and provide recommendations on historical land injustices including development-induced displacement for which no adequate compensation or other form of remedy was provided, including conversion of non-public land into public land The Land Act 2012  Mandates the National Land Commission and other public officers to use the following guiding principles and values: equitable access to land; security of land rights; sustainable and productive management of land resources; conservation and protection of ecologically sensitive areas  Provides for methods of acquisition of title to land including compulsory acquisition where land is required for public purposes or in the public interest as related to and necessary for fulfilment of the stated public purpose  Provides for the conversion of private land to public land through compulsory acquisition, transfer, surrender or reversion of leasehold interest to Government;  Provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined; and  Provides for the creation of a public rights of way (ROW) or wayleave by the National Land Commission.</p>	<p>Apply the World Bank OP 4.12</p> <p>Apply the World Bank OP 4.12 on compensation before displacement</p> <p>Apply the World Bank OP 4.12 valuation measures, as outlined.</p> <p>Apply OP. 4.12</p>
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	<p>Previously, the National Land Commission (NLC) was required to compensate a landowner prior to taking possession of the land. However, the Land Value (Amendment) 2019, Act now allows the NLC to take possession of the land and pay compensation at a later date within a reasonable amount of time (not later than one year).</p> <p><b>The Land Value (Amendment) Act 2019</b> The Land Value (Amendment) Act 2019 provides that valuation of land for purposes of compensation shall be based on the Land Value Index. This is an analytical representation showing the spatial distribution of land values in a given geographical area at a specific time.</p> <p>Kenyan law does not require the development and documentation or consultation of a Livelihood Restoration Plan.</p>	
Avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	<p><b>The National Land Commission Act 2012</b> Provides for the management and administration of land in accordance with the principles of the land policy set out in Article 60 of the Constitution and the national land policy. Gives power to the National Land Commission (NLC) to manage public land on behalf of the national and county governments, and to monitor and have oversight responsibilities over land use planning throughout the country Mandates the NLC to investigate and provide recommendations on historical land injustices including development-induced displacement for which no adequate compensation or other form of remedy was provided, including conversion of non-public land into public land The Land Act 2012 Mandates the National Land Commission and other public officers to use the following guiding principles and values: equitable access to land; security of land rights; sustainable and productive management of land resources; conservation and protection of ecologically sensitive areas Provides for methods of acquisition of title to land including compulsory acquisition where land is required for public purposes or in the public interest as related to and necessary for fulfilment of the stated public purpose Provides for the conversion of private land to public land through compulsory acquisition, transfer, surrender or reversion of leasehold interest to Government; Provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined; and Provides for the creation of a public rights of way (ROW) or wayleave by the National Land Commission.</p>	
<b>Indigenous Peoples</b>		
Design and implement projects in a way that fosters full respect for Indigenous Peoples' dignity, human rights, and cultural uniqueness and so that they: (a) receive culturally compatible social and economic benefits; and (b) do not suffer adverse effects during the development process.	While the term "Indigenous Peoples" is not used in Kenya, the legal framework recognizes particular concerns and rights of minorities and marginalized groups. The Constitution defines a marginalized community as: "A community that, because of its relatively small population or for any other reason, has been unable to fully participate in the integrated social and economic life of Kenya as a whole; A traditional community that, out of a need or desire to preserve its unique culture and identity from assimilation,	No significant gaps Apply either of the two due to insignificant differences

<p>Realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.</p>	<p><b>Forest Conservation and Management Act, 2016.</b>  Where viable alternatives are not available for project that affect non critical habitat the forest act provides; Concession on public forests  (1) Where the Service is satisfied that utilization of a public forest can be done through the granting of a concession, the Service shall grant the concession subject to the provisions of the Constitution, this Act and any other relevant written law.  (2) The Service shall not recommend any such proposal unless—  (a) the proposal has been subjected to an independent environmental impact assessment; and  (b) public consultation in accordance with the Second Schedule has been undertaken and completed.  (3) The grantee of a concession shall—  (a) comply with the guidelines or management plans prescribed by the Service;  (b) prepare environmental and social impact assessments as may be required under any other written law; (c) prepare a concession area forest management plan that shall include inventories, reforestation or replanting programmes, annual operation plans and community user rights and benefits;  (d) protect the concession area from destruction and encroachment by any other person;  (e) ensure that the forest areas under his management are maintained for the conservation of biodiversity, cultural or recreational use;  (f) maintain the physical boundaries of the concession;  (g) take precautions to prevent the occurrence or spread of forest fires in connection with any or all operations within or outside the concession area;  (h) ensure that all structures and facilities constructed or operated by and in connection with any activities are maintained according to the conditions of the license; and  (i) pay applicable land rent, fees and other charges for utilizing forest resources within the concession area; (4) The concession shall indicate the nature of the concession, including its physical location and boundaries, and the purpose for which it is granted.  (5) A grantee of a concession shall be personally responsible for any loss or damage, including the negligence of the grantee's employees, arising from the grantee's operations on the land for which the concession has been obtained.  (6) The Service may, by notice in the Gazette, withdraw a concession granted under this section where a grantee breaches any of the conditions prescribed by this section or prescribed in the concession agreement.  (7) A grantee of a concession shall provide a bond or some other form of financial security in this section referred to as "an Environmental Protection Bond".  (8) An Environmental Protection Bond shall be of an amount sufficient to cover the costs associated with the implementation of the environmental obligations of the holder under this Act.  (9) An Environmental Protection Bond shall be in a form and for an amount as may be determined by the Cabinet Secretary having regard to the particular characteristics of the concession.</p>	<p>No significant gaps  Apply either of the two due to insignificant differences</p>
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## 5 ENVIRONMENTAL AND SOCIAL BASELINE

This chapter provides a description of the current baseline conditions in the Project Area of Influence (AoI). The baseline characteristics of the biophysical and socio-economic conditions are used as the basis of prediction of possible effects and also to monitor changes during construction and operation.

### 5.1 Overview of Field Surveys

Surveys were undertaken by a combined physical, biological, and social study team which collected and categorized both primary and secondary data. To plan the survey, maps of the Project AoI were created, and the key environmental and social resources were located and analysed. This analysis was used to develop the survey plan and target locations. The following surveys were performed during field work activities:

- Flora and habitats (primary data collection, including vegetation mapping ground-truthing);
- Fauna (primary data collection);
- Noise (primary data collection);
- Water resources, soils, land use and landscape (screening); and
- Ground-truthing on 1000 m either side of line for the 132kV line (i.e., 2000 m in width).
- Stakeholder identification;
- Social demographics and other characteristics (secondary and primary data collection);

During the surveys, a number of engagements were held with stakeholders at the community level (Project disclosure meetings, village profiles, focus group discussions) and government level.

#### 5.1.1 Bio-physical Baseline Studies

Under the scope of the biophysical components, field visits to several pre-identified locations were undertaken in order to survey the baseline conditions and identify the main potential impacts of the mentioned project from the start to the end of the transmission line including the sub-station area. In order to better systematize the data collection and subsequent analysis, in view of the description of the ecosystems to be crossed and vulnerability and accessibility, all possible routes within the 1,000 m corridor were assessed.

Before the survey, a literature review was undertaken on the vegetation cover of the area under assessment, and together with analyses of satellite images, this information was used as a basis for the fieldwork. After the desktop analysis, field visits were held in order to collect data for ground-truthing. The different vegetation/habitat types as well as the flora component were analyzed. The occurrences of the main plant and animal species (mammals, birds, reptiles, and amphibians) were recorded with the assistance of field guides, scientific references, satellite material and other bibliographic resources available.

### 5.1.2 Social Baseline Studies

The geographical focus of this baseline is a socio-economic Study Area which was defined as:

1. All the settlements totally or partially within a 500 m corridor (250 m either side of the centre line) running the entire length of the transmission line.
2. As most surveyed settlements are located close to the lands they cultivate, it is expected that most of the impacts, including land-based impacts, will occur within this corridor. Some settlements may be located further away from the 500 m corridor and still have cultivated land within the corridor. Affected settlements located outside the 500 m corridor, if any, will be identified during the household surveys as part of the implementation of stand-alone Resettlement and Action Plan (RAP) for specific sections of the line as part of the resettlement and compensation process.
3. Information at a national, county and sub county level has been gathered from secondary sources using publicly available information. Data presented for the socio-economic Study Area has been gathered from publically available secondary sources along with primary data gathered during a field visit to the Study Area.
4. The fieldwork undertaken included a high-level settlement survey, key informant interviews, focus group meetings and ground truthing of points of interest encompassing settlements within the 500m corridor.
5. The field work focused on high level socioeconomic information including demographic estimates (e.g., population size, age, and gender distribution estimates, etc.), main livelihood activities and land uses, land tenure, health and education and access to basic infrastructure and services. The list of engagement activities undertaken, and number of people interviewed/consulted in each of these settlements is presented in the engagement log Annex A to the ESIA.

As such, the socioeconomic information presented in the baseline focuses to the extent possible on the Study Area (i.e. the 2000m corridor) based on a combination of data collected during the field visits and additional secondary sources. Information is provided at a higher level (county and national) as applicable when local level information is not available or when the general information applies at the local level. It should be noted that specific information relative to land affected households (land ownership status, asset inventories, etc.) was not included in the scope of the ESIA fieldwork. This information has been collected as part of the RAP preparation process. The baseline bio-physical and socio-economic information has been presented by County traversed by the transmission line. The line crosses 3 Counties namely Nyandarua, Nakuru and Laikipia.

### **5.1.3 Nakuru County Bio-Physical Environment**

#### **5.1.3.1 Location and Size**

Nakuru county covers an area of 7,495.1 Km<sup>2</sup> and is located between Longitude 35° 28` and 35° 36` East and Latitude 0°13 and 1° 10` south. It lies in the central part of the Great Rift Valley and borders several counties namely; Kericho and Bomet to the west, Baringo and Laikipia to the north, Nyandarua to the east, Narok to the south-west and Kajiado and Kiambu to the south. Nakuru County has a diverse background comprising of urban and rural set-ups as well as a rich multi-ethnic, economic and cultural diversity. The total length of the transmission line in Nakuru County is **16.3 km**. Figure 5-1 below is a map of Nakuru County with the length of the transmission line.

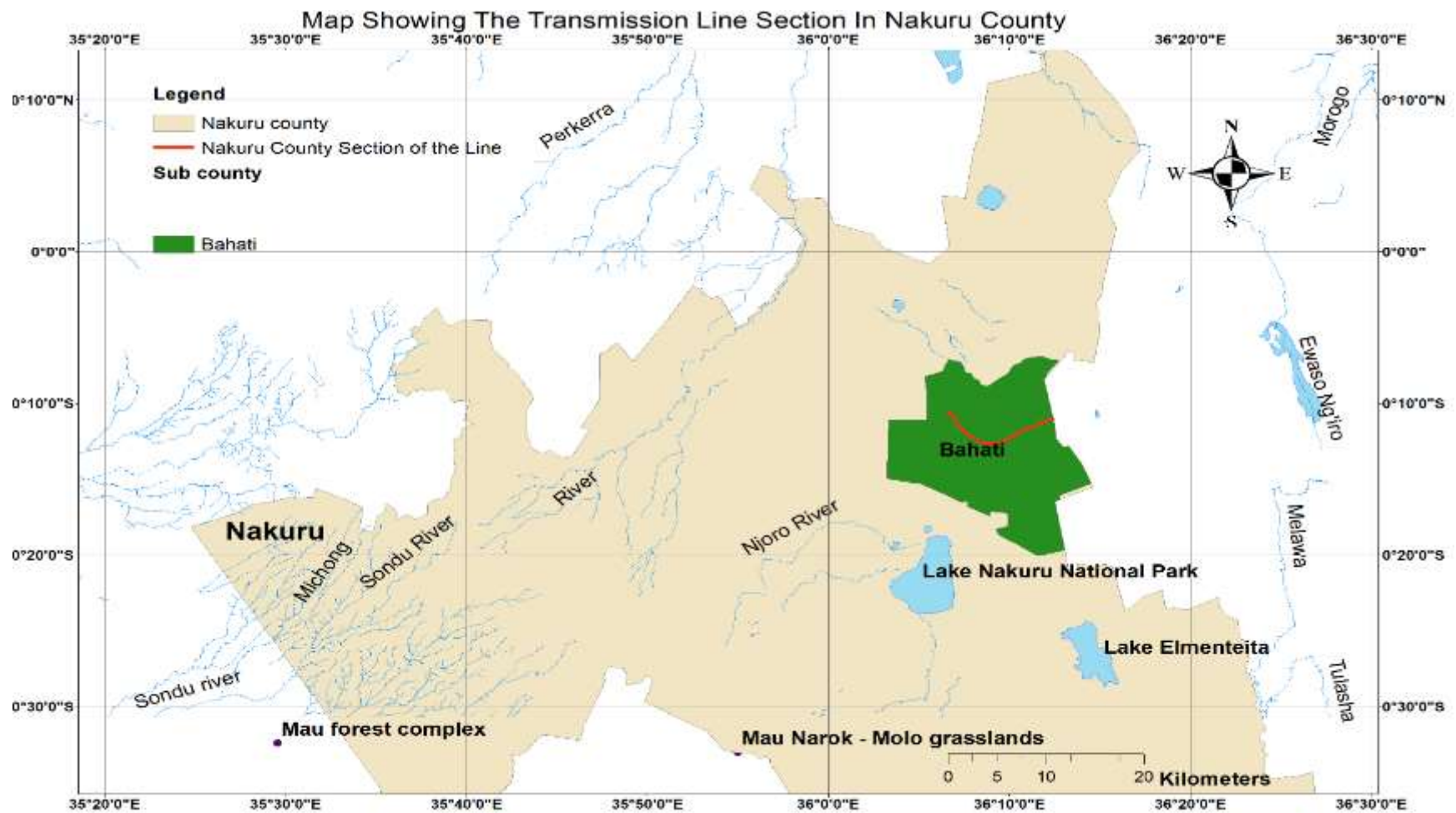


Figure 5-1. Map of Nakuru County and Transmisison Line Route.

### 5.1.3.2 Administrative and Political Units

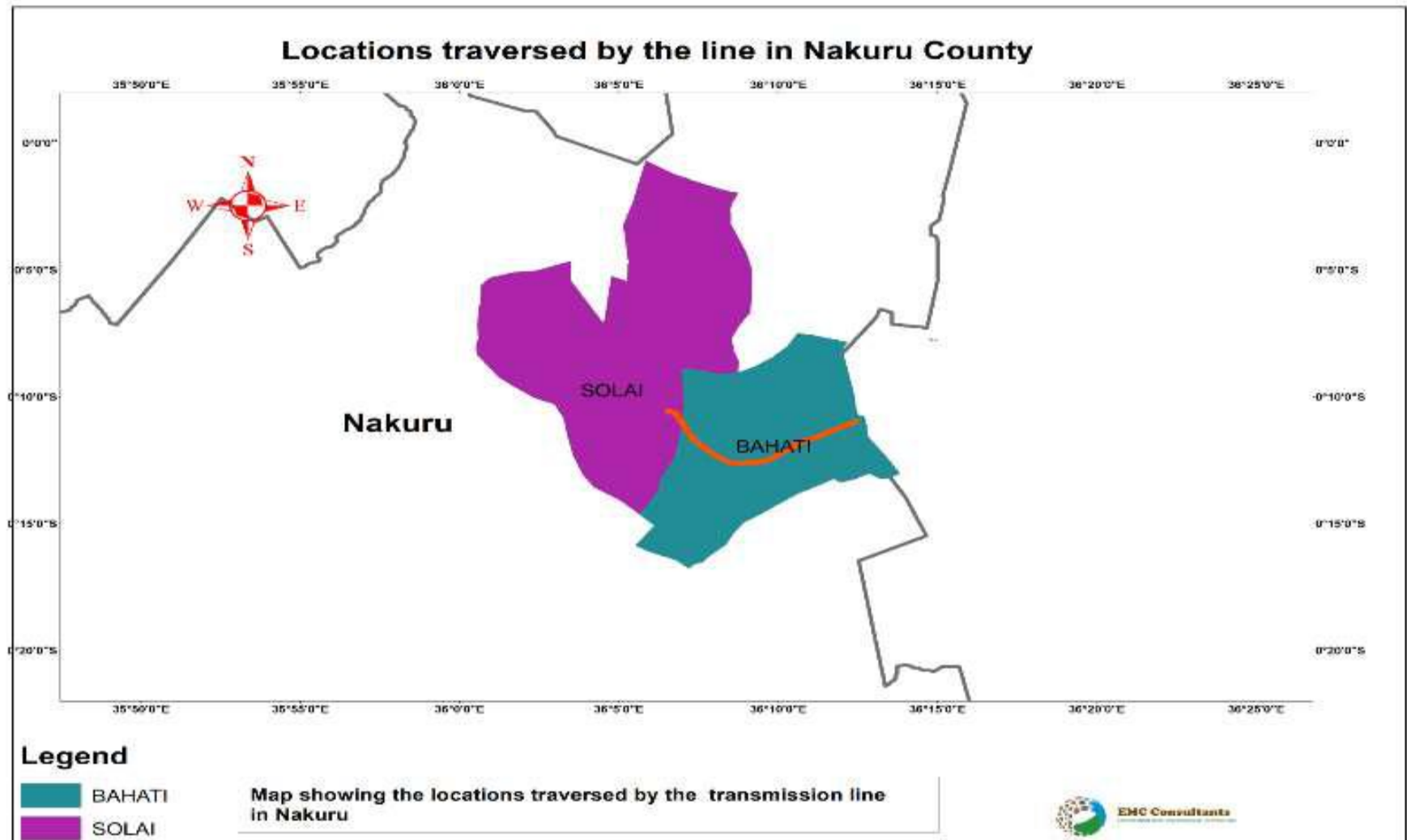
The county headquarter is Nakuru Municipality, one of the fastest growing towns in the East Africa region. Nakuru County is divided into 11 administrative Sub-Counties with a total of 31 divisions and 55 electoral wards. The county has five towns and one municipality.

**Table 5-1: County's Electoral Wards by Constituency**

Constituency	Wards
Molo	Molo, Turi, Elburgon, Marioshoni.
Njoro	Mau Narok, Kihingo, Mauche, Nessuit, Lare, Njoro
Naivasha	Biashara, Maiella, Maimahiu, Viwandani, Hells Gate, Olkaria, Naivasha East, Lake View
Gilgil	Gilgil, Malewa West, Eburru/Mbaruk, Elementaita, Murindat
Kuresoi South	Amalo, Keringet, Kiptagich, Tinet
Kuresoi North	Kiptororo, Nyota, Sirikwa, Kamara
Subukia	Waseges, Subukia, Kabazi
Rongai	Mosop, Soin, Menengai West, Visoi, Solai.
Bahati	Kabatini, Kiamaina, Lanet/Umoja, Dundori, Bahati
Nakuru Town West	Barut, London, Kaptembwo, Kapkures, Rhonda, Shaabab
Nakuru Town East	Biashara, Kivumbini, Menengai, Flamingo, Nakuru East

**Source: IEBC, 2017**

Figure 5-2: Map of Sub-Counties in Nakuru



### 5.1.3.3 Climatic Condition

Nakuru County has a mean annual precipitation of 600 to 800 mm in the rifts and about 1300 mm annual precipitation in the plateau. Modern climate in tropical East Africa is mainly controlled by the Intertropical Convergence Zone (ITCZ) and the African-Asian summer monsoon, both being very sensitive to the El Nino/ Southern Oscillation (ENSO) (Marwan et al., 2007). The average monthly temperature ranges from 15.9°C to 17.8°C. The rain seasons are from April to May and October to November. The annual potential evaporation is estimated at about 1700 mm.

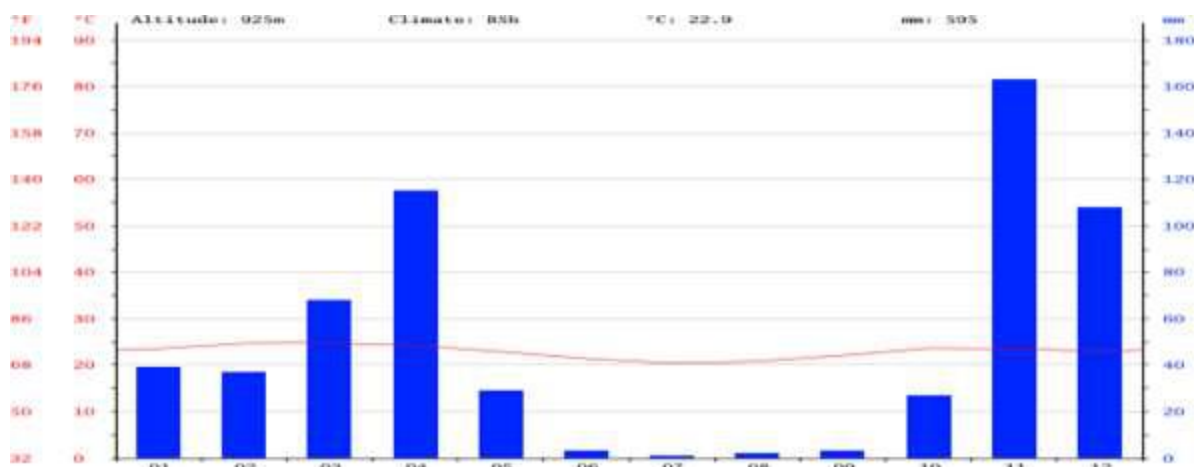


Figure 5-3: Rainfall distribution in the project area

Source: Kenya Meteorological Department

### 5.1.3.4 Baseline Ambient Environmental Measurements

Tables 5-2 to 5-10 below are the results of ambient air and noise measurements and soil sampling conducted to understand the baseline situation of the project area specifically in areas with sensitive receptors that may be affected by the project construction activities. Figure 5-7 shows the locations of the sensitive receptors in the AOL and which formed the basis for baseline environmental measurements.

#### 5.1.3.4.1 Ambient Air Emission Measurements

Table 5-2: Ambient Air Emission: Air Quality Data – PM10

Location	Proxy	PM10 ( $\mu\text{g}/\text{m}^3$ )	WHO AQG	EMCA (Air Qual. Reg. 2014)
GDC Grounds, Kirima Location	MP1	26	50 $\mu\text{g}/\text{m}^3$ 24hrs	50 $\mu\text{g}/\text{m}^3$ 24hrs
Kirima Village	MP2	27		
Wendo Village	MP3	31		
Sabugo Village	MP4	42		

Source: Field Data

Table 5-3: Weather Conditions

Sunlight	Sunny
Precipitation	None

Wind	Still
Temperature	25 ° C
Cloud Cover	Sparse
Date	20th August 2019
Duration of Measurements	1hour

**Source: Field Data**

**Table 5-4: Ambient Air Emission: Air Quality Data – Sulphur Dioxide, So<sub>2</sub>**

Location	Proxy	SO <sub>2</sub> (µg/m <sup>3</sup> )	WHO AQG	EMCA (Air Qual. Reg. 2014)
GDC Grounds, Kirima Location	MP1	<8.1	20 µg/m <sup>3</sup> 24hrs	80 µg/m <sup>3</sup> 24hrs
Kirima Village	MP2	<8.1		
Wendo Village	MP3	<8.1		
Sabugo Village	MP4	<8.1		

**Table 5-5: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	25 ° C
Cloud Cover	Sparse
Date	20 <sup>th</sup> August 2019
Duration of Measurements	1hour

**Source: Field Data**

**Table 5-6: Ambient Air Emission: Air Quality Data – Nitrogen Dioxide**

Location	Proxy	NO <sub>2</sub> (µg/m <sup>3</sup> )	WHO AQG	EMCA (Air Qual. Reg. 2014)
GDC Grounds, Kirima Location	MP1	21	40 µg/m <sup>3</sup>	80 µg/m <sup>3</sup> 24hrs
Kirima Village	MP2	24	Annual	
Wendo Village	MP3	19	200 µg/m <sup>3</sup>	
Sabugo Village	MP4	21	1hr average	

**Table 5-7: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	25 ° C
Date	20 <sup>th</sup> August 2019
Duration of Measurements	1hour

**Source: Field Data**



Figure 5-4: Environmental Measurement for SO<sub>x</sub> and NO<sub>x</sub>.

#### 5.1.3.4.2 Ambient Noise Emission Measurements

Table 5-8: Ambient Noise Level

Location	Proxy	Diurnal (LAeq)	Nocturnal (LAeq)
GDC Grounds, Kirima Location	MP1	65	50
Kirima Village	MP2	70	42
Wendo Village	MP3	68	47
Sabugo Village	MP4	66	40

Figure 5-5: Ambient Noise Level

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	25 °C

Source: Field Data



Figure 5-6: Environmental Measurement Equipment in the field (Sensitive receptors)

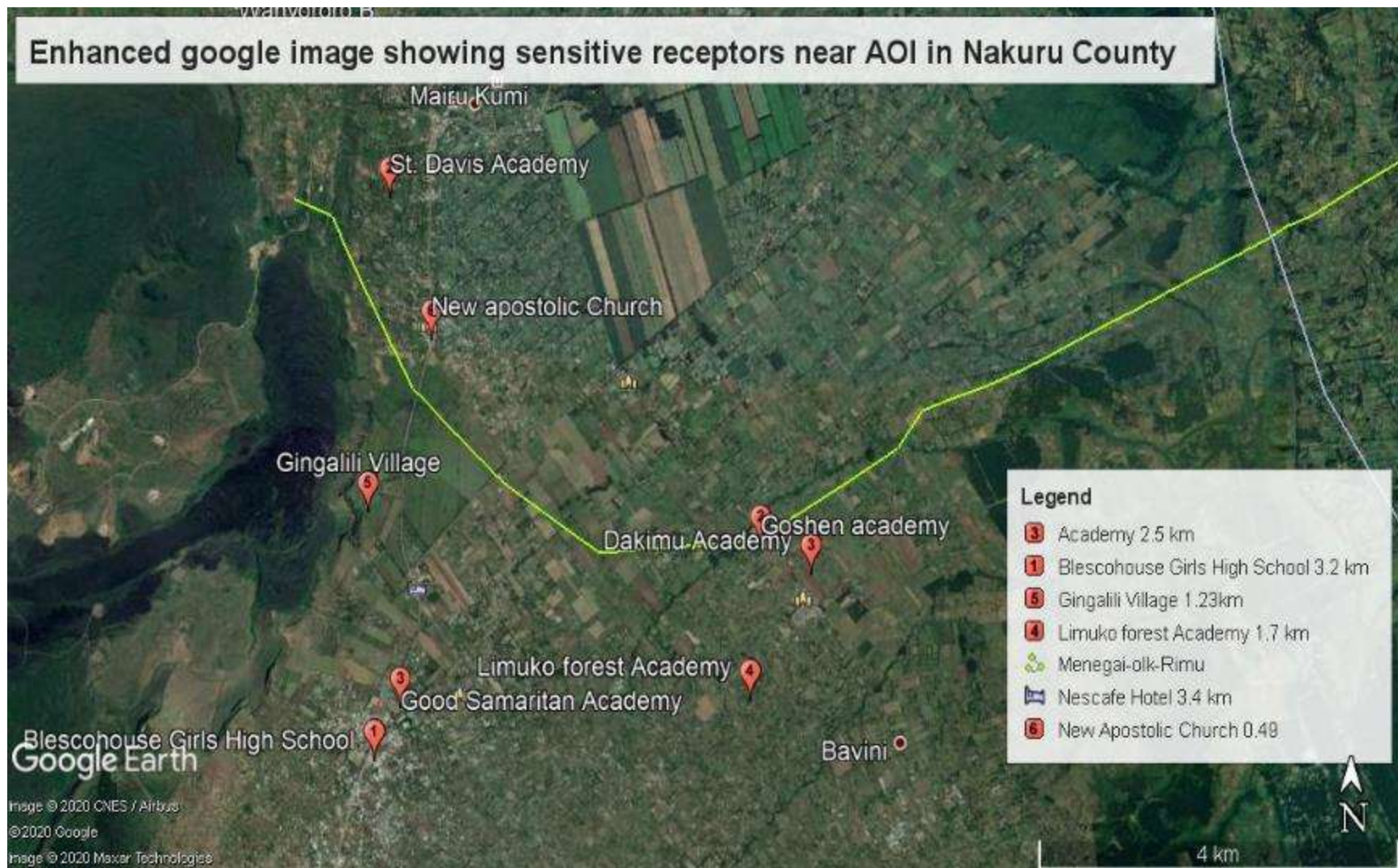


Figure 5-7. Sensitive receptors along transmission line AOL

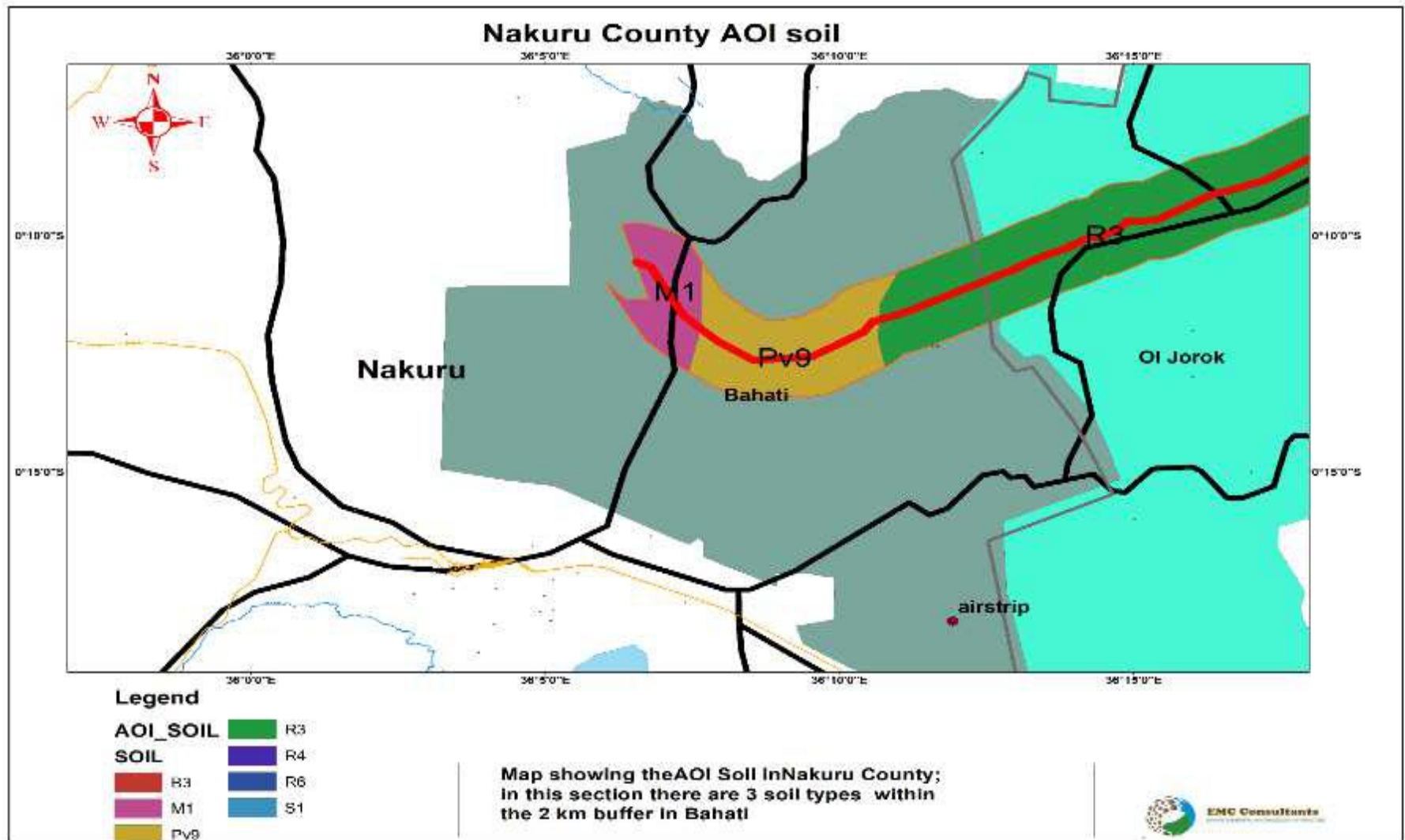
#### **5.1.3.5 Soils and Geology**

The Nakuru area lies within the inner graben of the central Kenya rift valley and has experienced continual outpourings of trachyte magma during the last 6.2 Ma. The volcanic rocks of intermediate composition are usually overlain and not exposed while basaltic rocks are rare. These volcanic rocks were extruded at various times and hence there is an old surface and this intercalation of sedimentary rocks with volcanic rocks is very common. Volcanic rocks older than 6.2 Ma must underlie the area, contributing to the total volcanic and sedimentary rift fill. According to Sombroek et al., (1982) the geology of the county is composed of volcanic rocks, ranging in age from tertiary quaternary to recent, basically consisting of pyroclastic rocks of recent volcanoes. The rocks are predominantly agglomerates, sediments, welded tuffs, and phonolites on mountains, ridges, pumice, sandstone minerals, basaltic tuffs and black ashes on hills, plateaus, uplands, plains and valleys and alluvium and lacustrine and fluvial sediments derived directly from them.

The county is highly faulted with some being buried. As a result, areas of Nakuru town and its environs often undergo subsidence along the parallel fault zones during and after heavy rainfall. During the rainy season, when most of the subsidence occurs, the overlying unconsolidated volcanoclastic sediments become oversaturated with water. The water reduces the shear strength of the sediments and also introduces extra loading through saturation leading to subterranean erosion along faults. The unconsolidated sediments then collapse into the subsurface water channels which closely follow the fault zones, leading to formation of sinkholes. The frequent incidences of ground subsidence in the study area caused has to destruction of physical infrastructure, several fatalities and destruction of settlements (Ngecu and Nyambok, 2000).

The distribution of soil types within Nakuru County is complex which is attributed to the influence of climatic conditions, volcanic activities, and underlying rock type. Three main soil classification comprises of (i) Latosolic soils which are well-drained red volcanic soils encountered in the upper Subukia valley and imperfectly drained loam with dark brown subsoil encountered in Njoro, Nakuru Central Elementaita and Mai Mahiu in Naivasha areas. The fertility in these soil types varies from moderate to high and support crops such as wheat, maize, pyrethrum, sunflower, finger millet potatoes, pigeon peas, vegetables and beans and peas. (ii) Planosolic soils which comprises of poorly drained dark brown clay soils with highly developed textured topsoil as well as well drained humic lawns with dark brown sub soils. These soils are classified as fertile. Areas covered under these soils range from Olenguruoni in Kuresoi, Molo, Rongai and parts of Njoro (iii) Alluvial and Lacustrine deposits these are shallow soils resulting from volcanic ash sediments as well as other sources. They occupy the Rift Valley bed in Lake Nakuru, Lake Naivasha, and Lake Elementaita, Solai and the Menengai Crater as well as the adjacent areas to these features. Their fertility ranges from low to moderate.

Figure 5-8. Soil Map of project transmission route



### Agricultural Potential of Dominant Soil Types along the Transmission Line Route

The current land use along the route of the proposed transmission line also provides an indication of the agricultural potential. The current land use was determined using a combination of field observations and the interpretation of publicly available high-resolution satellite imagery. Agricultural activities observed include the cultivation of crops including potatoes, maize, wheat, sorghum, beans, peas, cassava, tomatoes, onions, coffee, tea, and livestock farming of cows, goats, sheep, donkey, poultry, and pigs. Based on these data and observations, the dominant land use along the route of the proposed transmission line is interpreted to be small-scale subsistence farming, which is of medium to high agricultural potential.



Figure 5-9: Cultivation along the Transmission Line Route

#### 5.1.3.6 Topography

The main topographic features in Nakuru County are the Mau Escarpment covering the Western part of the county, the Rift Valley floor, Ol Doinyo Eburru Volcano, Akira plains, Menengai Crater, elaborate drainage and relief system and the various inland lakes on the floor of the Rift Valley where nearly all the permanent rivers and streams in the county drain into. The most predominant is the Hells gate gorges in Naivasha which are an important tourist site. The land topography in Naivasha and Gilgil Sub-Counties is characterized by mountain ranges and savannah vegetation cover that support various species of wildlife.

Table 5-9: Topography

Type of Geography	Units	2014
Altitude: Highest point:	metres a.s.l	2,500
Altitude: Lowest point:	metres a.s.l	1,520
Latitudes:	degrees N/S	0 0 13' N and 10 10'
Longitudes:	degrees E/W	350 28' W and 350 36' E

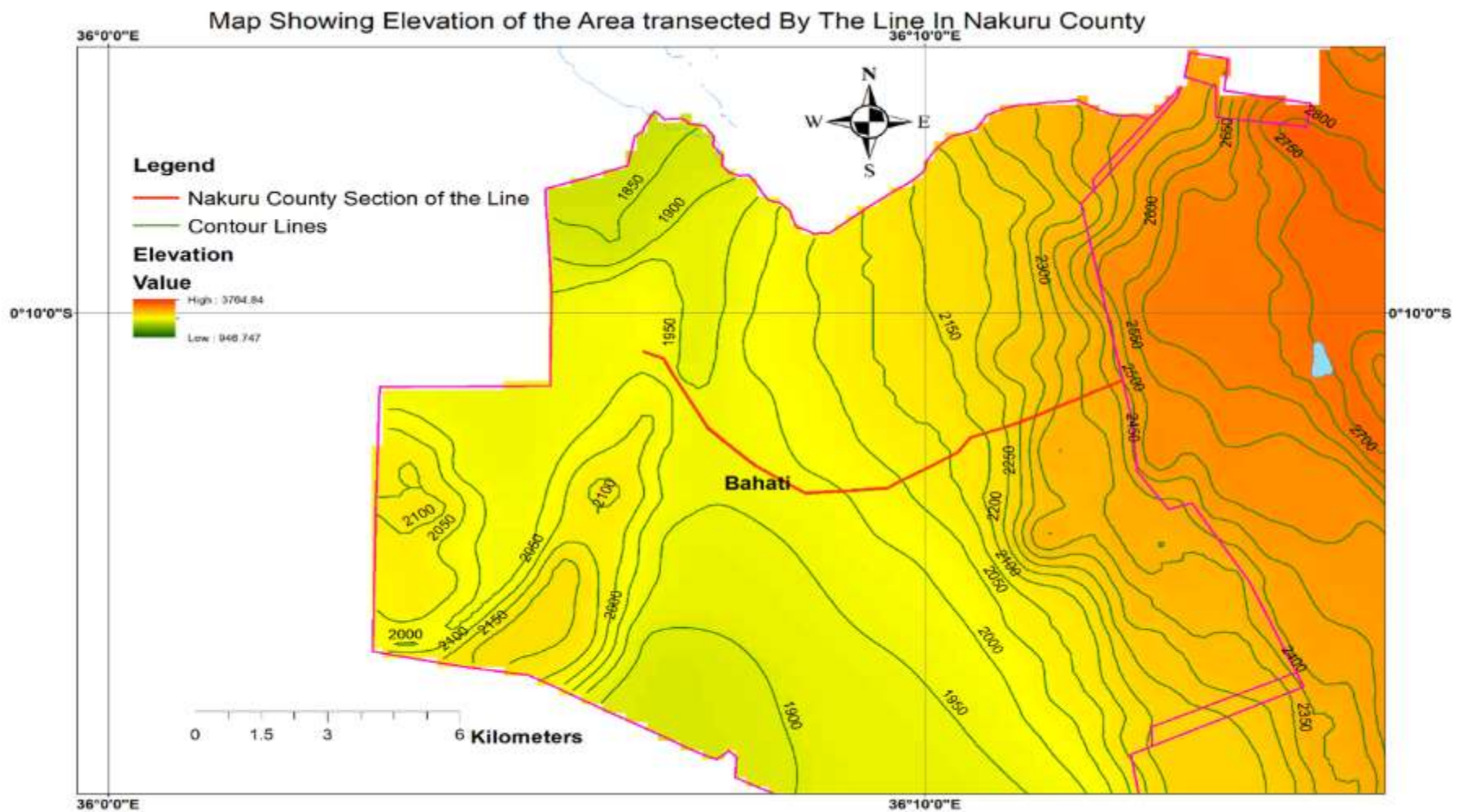


Figure 5-10: Elevation Map of Transmission Route

### **5.1.3.7 Hydrology**

Nakuru County has an elaborate basin, drainage and relief system comprising of rivers and lake. The county's basin is a closed drainage system which has its boundaries as the Bahati highlands to the east, Mau escarpment to the west, Eburru crater to the south and the Menengai crater to the north. There is a ground water divide, beyond Lake Elementaita and also at the Menengai crater. The divide separates the Nakuru basin and the Lake Naivasha basin. A large number of the rivers and streams systems in the county are permanent and drain into the either Lake Nakuru, Lake Baringo or Lake Naivasha. River Njoro and Makalia drain into Lake Nakuru, Malewa, Turasha and Gilgil drain into Lake Naivasha and Molo River drain into Lake Baringo among others.

#### **5.1.3.7.1 Lake Nakuru**

The Nakuru basin occupies a total catchment area of 1,800 km<sup>2</sup> and the Lake Nakuru as its lowest point. Lake Nakuru is a very shallow alkaline lake located in Kenya's rift valley, with a surface area of 44 km<sup>2</sup> and an average depth of 2.5 meters. The Lake is fed by one permanent river –Ngosur and four seasonal rivers Njoro, Nderit, Makalia and Lamudhiak. Treated wastewater from Nakuru town is also discharged into this Lake. The lake has very little recharge through fault systems compared to other lakes within the rift owing to its high elevation. There is no outflow from the Lake and in the long run, all rainfall is lost by evapo-transpiration in the catchment area. Some of the rivers (Njoro, Ngosur, and Naishi) become influent, disappearing along the fault lines to recharge deep aquifers (Odada *et al*, 2006). The proposed transmission line does not cross Lake Nakuru and is approximately 10.54 kms from this drainage system. Construction of the proposed transmission line will have no direct or indirect impact on this water body.

#### **5.1.3.7.2 Lake Naivasha**

The Lake Naivasha Basin is bordered by the Nyandarua Mountains (previously known as the Aberdare Range and Kinangop Plateau) to the east, the Mau Escarpment to the west, Mount Longonot to the south, and the Eburru Hills to the north. It is considered to be one of the remains of a once-larger lake that existed thousands of years ago and which covered the area between Mount Longonot and Menengai Crater. The other lakes, separated from Lake Naivasha by the Eburru Hills, are Lakes Nakuru and Elementaita, both of which have remained highly alkaline. The surface inflow to Lake Naivasha enters through three distinct river systems, the Malewa, Gilgil and Karati Rivers. According to Clarke *et al*. (1990) and Ojiambo *et al*. (2001), the lake has no surface outlet and it is thought that water from the lake seeps into the underlying volcanic rocks and probably moves both southwards, towards Mount Longonot, and northwards towards Gilgil and Lake Elementaita. Gaudet and Melack 1981 stated that the freshness of the lake water, with a pH range of 7.3–9.2 in some areas, has been attributed to four factors namely: dilution from incoming permanent discharges from the Malewa River, and other seasonal rivers; sodium salts extraction by *Cyperus papyrus* and other aquatic plants, underground seepage (inlet to the north, outlet to the south); and subterranean seepage of rainwater from the Nyandarua Mountains.

#### **Birds of Lake Naivasha Ecosystem**

Lake Naivasha's extensive riparian fringe hosts a great variety of birds. Many forage on fish and insects living within the lake shallow littoral waters and among the papyrus.

Others, such as the majestic African fish eagle (*Haliaeetus vocifer*) build their nests on the tall Acacia trees (*Vachellia xanthophloea*) at the lake edge. Eagles prey on fish by swooping down to the water surface and stabbing a surface-swimming individual with formidable claws. An adult eagle is capable of snatching a 1 kg catfish or carp, but they may attack other water birds (ducks, flamingos) too, or steal prey from large waders like Goliath heron (*Ardea goliath*) or Saddle-billed stork (*Ephippiorhynchus senegalensis*).

#### Endangered species;

- Tall and elegant Grey Crowned Crane (*Balearica regulorum*), present only in parts of eastern and southern Africa, who reproduce at the lake shore but whose chicks are highly vulnerable to attacks by a variety of predators.
- A less well-known endangered species, rarely seen on the lake shore at Naivasha, is the secretive Basra Reed Warbler (*Acrocephalus griseldis*), originating from the central and southern marshlands of Iraq, which migrates regularly to East Africa during the northern hemisphere winter season.
- The drainage of the Euphrates/Tigri marshes deprived this species of 80% of its home range, with a 20% consequent reduction per decade in species counts done in Kenya.



Figure 5-11: Birdlife in Lake Naivasha

The proposed transmission line does not cross Lake Naivasha and is approximately 57.2 kms from this hydrological system. Construction of the proposed transmission line will have no direct or indirect impact on this water body.

#### 5.1.3.7.3 Lake Elementaita

Elementaita is a shallow small saline lake, in the Great Rift Valley, about 120 km northwest of Nairobi, Kenya. It is fed by inflows from the rivers Mbaruk, Chamuka and Mbereroni which is the main water source. The lake level fluctuates and in some cases the lake and its feeder rivers have been known to dry up. This brings an effect to the water quality of the lake. Salt harvesting and game viewing are some of the major anthropogenic activities taking place in the area. Over 400 bird species have been recorded in the Lake Nakuru/Lake Elementaita basin. Elementaita attracts visiting flamingoes, both the Greater and Lesser varieties, which feed on the lake's crustacean and insect larvae and on its suspended blue-green algae, respectively. Tilapias were introduced to the lake from Lake Magadi in 1962 and since that time the flamingo population has dwindled considerably. The tilapia attracts many fish-eating birds that also feed upon the flamingo eggs and chicks. Over a million birds that formerly bred at Elementaita are now said to have sought refuge

at Lake Natron in Tanzania. The lake's shores are grazed by zebra, gazelle, eland and families of warthog. The lake is normally very shallow (less than 1 m deep) and bordered by trona-encrusted mudflats during the dry seasons. During the late Pleistocene and early Holocene, Lake Elementaita was at times united with an expanded Lake Nakuru, forming a much larger dilute lake. Remnants of the former joined lake are preserved as sediments at various locations around the lake basins, including former shorelines. The proposed transmission line does not cross Lake Elementaita and is approximately 23 kms from this hydrological system.

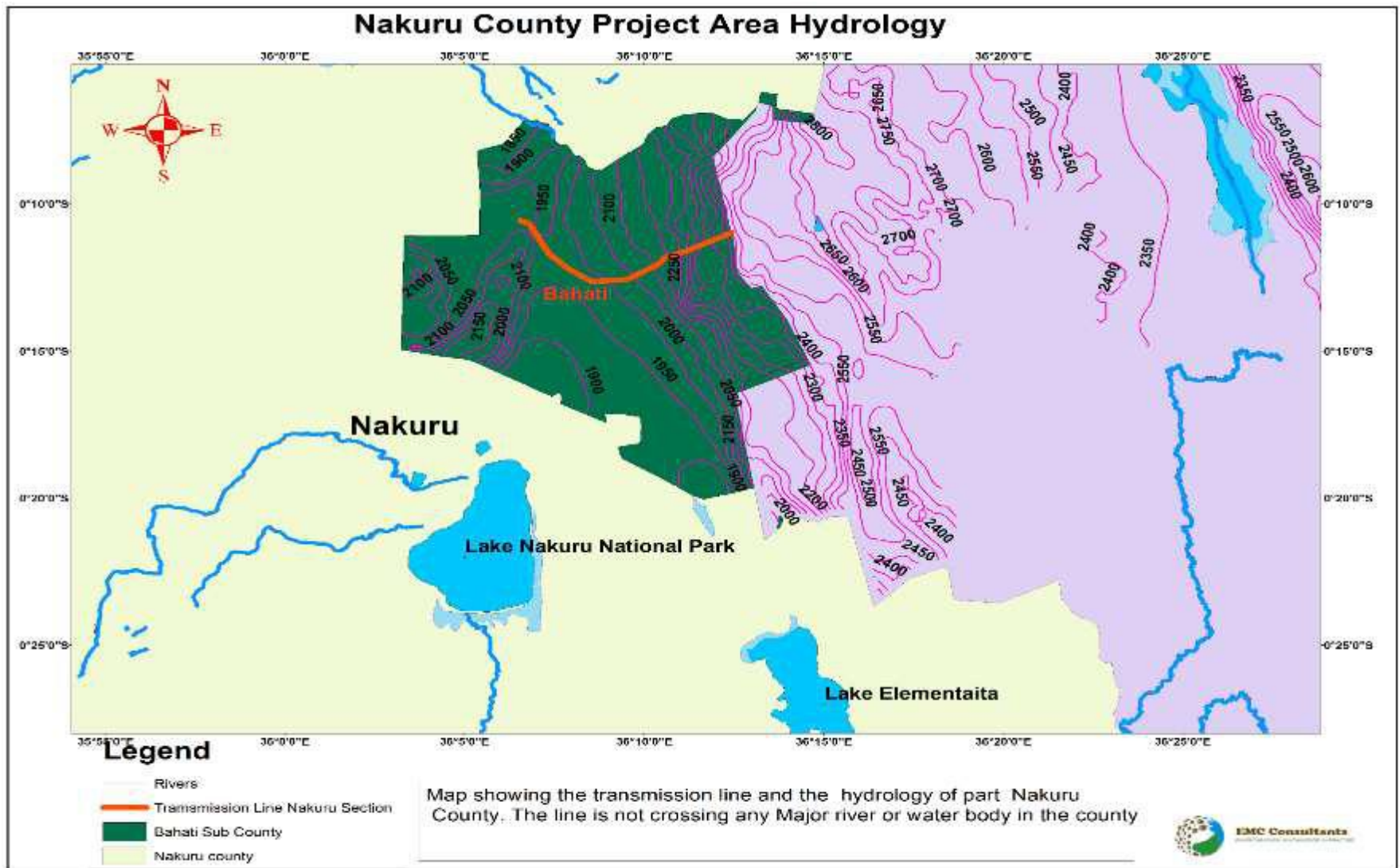


Figure 5-12: Hydrology of Area Traversed by Transmission Line.

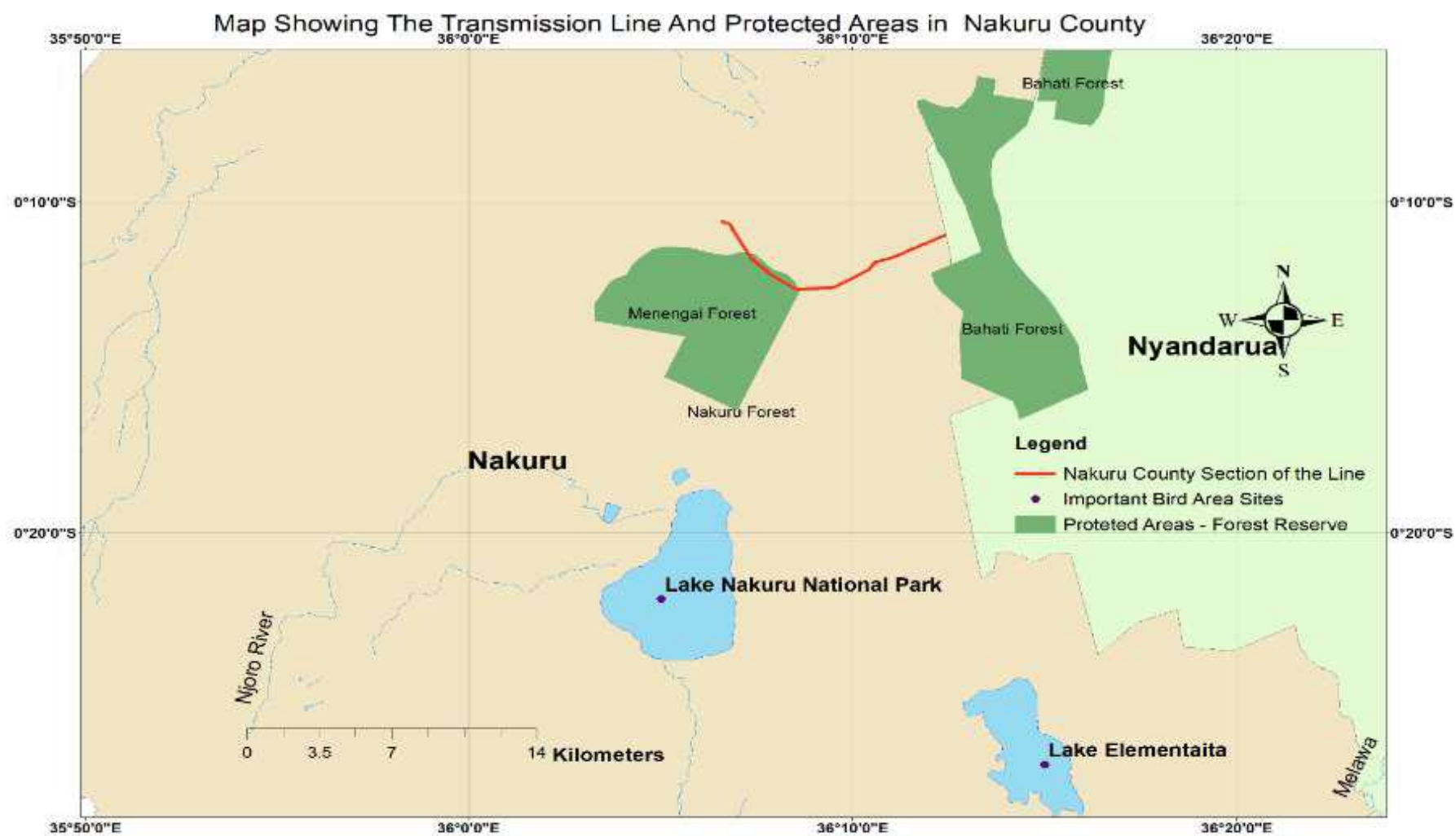


Figure 5-13: Protected Areas along Transmission Line.

### **5.1.3.8 Biological Environment**

#### **5.1.3.8.1 Menengai Forest**

Menengai Forest is located in the Great Rift Valley in Nakuru, 10 km North of Nakuru Town 160 km west of Nairobi City and 2244 m above sea level. The Menengai Caldera found in Menengai Forest Station is a large shield volcano with an area of approximately 90 km<sup>2</sup>, a diameter of 12 km and depth of almost half a kilometer. It is one of the largest calderas in the world and the second most visited caldera in the world. Over 169 species of flowering plants and 17 species of grasses have been recorded in Menengai Forest. Example of flowering plants include Leleshwa (*Tarconanthus camphorates*), Euphorbia species and Acacia species. Common grasses in the forest include geothermal grass (*Fibristylis exilis*) and Boma Rhode grass.

Mammal species include Tree hyrax, Rock hyrax, Olive baboons, Black-faced Vervet monkey and Mountain Reedbucks and Kirk's Dik diks and Slender Mongoose. Birds species include Varreaux eagles (only found in Menengai Forest in Nakuru) Abyssinian Ground Hornbill, Lesser Spotted Eagle, African Marsh Harrier, Horus Swift Apus hours, Turn-tailed ravens, Red-winged Sterling and other birds. Insects in Menengai Forest include Arachnids, Molluscs and various species of butterflies. The transmission line does not traverse the Menengai Forest which is approximately 2.2 kms from the proposed transmission line as shown in the figure 5-12 above.

#### **5.1.3.8.2 Bahati Forest**

Bahati forest, which is a gazetted forest and managed by KFS, is located in Bahati, one of the 10 administrative divisions of Nakuru County. It lies in latitude 0° 9' 0S and longitude 36° 7' 0E at an altitude 1,911 meters above sea level, it is approximately 16km North-East of Nakuru municipality. The highlands of Bahati have which latosolic soils are well drained red soils derived from volcanic and basement complex rocks. However, parts of Bahati have planosolic soils which are poorly drained, dark brown clay, with highly developed textured topsoil. Mainly cedar and hardwoods with scattered bamboo, grassland and heath on higher slopes. The forest has been largely planted up except on steep ground in north-east. Common indigenous tree species in the project area are: *Prunus africana*, *Cordial abyssinica*, *Croton macrostachyus*, *Olea africana*, *Ekebergia rueppelliana*, *Croton megalocarpus*, *Juniperus procera* and *Podocarpus falcatus*. The naturalized exotic species are; *Gravillea robusta*, and *Mangifera indica*, guava and avocado fruit species. A variety of animals are found in Bahati forests; they include African hare, kirks Dik Dik, impala, Thompsons Gazelle, common Zebra, spotted hyena, spring Hare, Bush squirrel, porcupine, warthog, black faced vervet monkey, Impala, and honey Badger. The transmission line does not traverse the Bahati Forest in Nakuru County as shown in the figure 5-12 above. It is approximately 1.5 kms from the proposed transmission line. Bahati Forest is not a wildlife migratory corridor.

#### **5.1.3.8.3 EBA and IBA Site**

The transmission line traverses the Kenya Mountains Endemic Bird Area but does not traverse any Important Bird Area as shown in figure below.



Figure 5-14: Map showing the Endemic Bird Areas and IBA in Nakuru County

## 5.1.4 Nakuru County – Socio Economic Baseline

### 5.1.4.1 Population and Demography

The County's population according to the 2019 National Population and Housing Census was approximately 2,162,202 with 1,077,272 males and 1,084,835 females. At a growth rate of 3.05 percent, the population is estimated to be at 2.4 million in 2022 whereas in 2030 the population is estimated to grow to 3.1 million people. With the rapid population growth, the County is expected to enhance its infrastructure to cater for the ever-growing population. The county population is predominantly youthful with about 51.87% aged below 20 years and about 71.63% of the total population aged below 30 years. About 62% of the total population dwells in the rural areas.

According to the socio-economic survey targeting households along the project route, majority (52.4%) of the household members in the project area were females, while the males formed 47.4%.

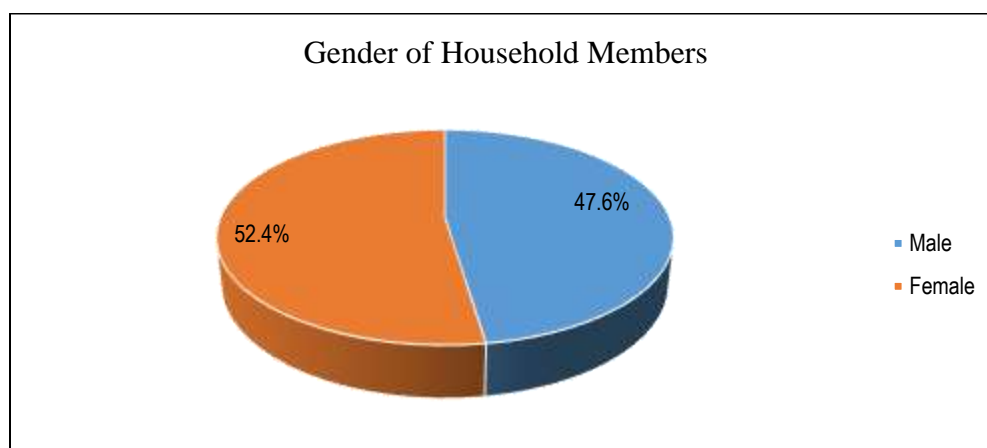


Figure 5-15. Gender Distribution of the Households Nakuru County

### 5.1.4.2 Ethnic Composition

Nakuru County is a multi-cultural county with individuals originating from all the Kenya chief tribes. The leading tribes are the Kalenjin and the Kikuyu making around 70% of the entire population. Other tribes for example Kamba, Meru, Luhya, Luo, Kisii among others are present mostly in urban area. Majority of these people migrated here for business and employment. The ethnic communities in the project route in Nakuru County are not categorized as Vulnerable and Marginalized with respect to World Bank's OP. 4.10 since they do not meet the criteria.

### 5.1.4.3 Settlement Patterns

These are rural settlements where agriculture activities are primarily undertaken. The settlement patterns are scattered in the farms. The percentage rural population in 2019 was 62 percent with a county average population density of 214 persons per km<sup>2</sup>. Urban Population projections show a significant growth in towns, for instance Molo and Gilgil will have a population of 53,789 and 58,276 in 2024 representing a 238 percent and 213 percent growth respectively. This growth can be attributed to growing social economic activities in the towns, rural-urban migration. Urban centres in the county play

administrative, service, economic, social and innovative roles in development in the county. Very important, they provide market for rural agricultural produce and supply inputs to the rural agricultural sector. The major urban centres are: Nakuru, Naivasha, Mai Mahiu, Molo, Njoro, Gilgil, Subukia, Olenguruone, Bahati, Rongai, Salgaa, Dundori and Mau Narok.

Due to rapid urbanization and failure of the formal sector to supply adequate houses especially for the low-income segment of the society, there has been proliferation of informal settlements to meet the housing gap. This is manifested by the slums and squatter settlements and other form of shanty developments. There is need to embrace the national housing policy and planning regulations to enhance housing delivery in the affected towns. The complimentary role of the public and private sector in housing delivery should be tapped into. The major informal settlements are in Nakuru East (Bondeni, Manyani, and Lakeview), Nakuru West (Ronda, Kaptembwo, and Gituima), Gilgil (Kampi Somali, Maina, and Makaburi), Naivasha (Lakeview, Kihoto), Molo (Casino, Kasarani), Njoro (Industrial area, Juakali, Jewathu, Bondeni). However, the County has made significant investments in selected informal settlements in Naivasha and Nakuru through Kenya Informal Settlement Improvement Project (KISIP). However, squatters are not present in the RoW.

Along the project route, the proposed project will displace a number of residential structures (settlements). Figure 5-18 below shows the settled areas along the transmission route. According to the RAP report, residential structures will be affected by the project. The structures are generally made of mud as depicted in the photos below.



Figure 5-16: Sample house affected by project

#### 5.1.4.4 Land Tenure and Land Use

Land use in the county is primarily agriculture, mostly subsistence farming, some large-scale establishment (horticultural and wheat), livestock (beef and dairy) rearing, and settlements. Some areas are under settlement (towns), wildlife conservancies, and others are under forest (such as Menengai, Koibatek, Eburru, Londiani, and Mau, among others).



**Figure 5-17: Agricultural activities along the project routing**

Along the project route, land use activities along the project transmission route are mainly cultivation agriculture (cropland) and open grassland mainly around Bahati Forest as shown in figure 5-17 above. Agricultural activities observed include the cultivation of crops including potatoes, maize, wheat, sorghum, beans, peas, cassava, tomatoes, onions, coffee, tea, and livestock farming of cows, goats, sheep, donkey, poultry and pigs. Along the project transmission line, the dominant land uses include agriculture and residential land. The PAHs affected by the project all have title deeds and therefore conflicts and grievances associated with lack of title deed that would hinder compensation for land loss is not expected.

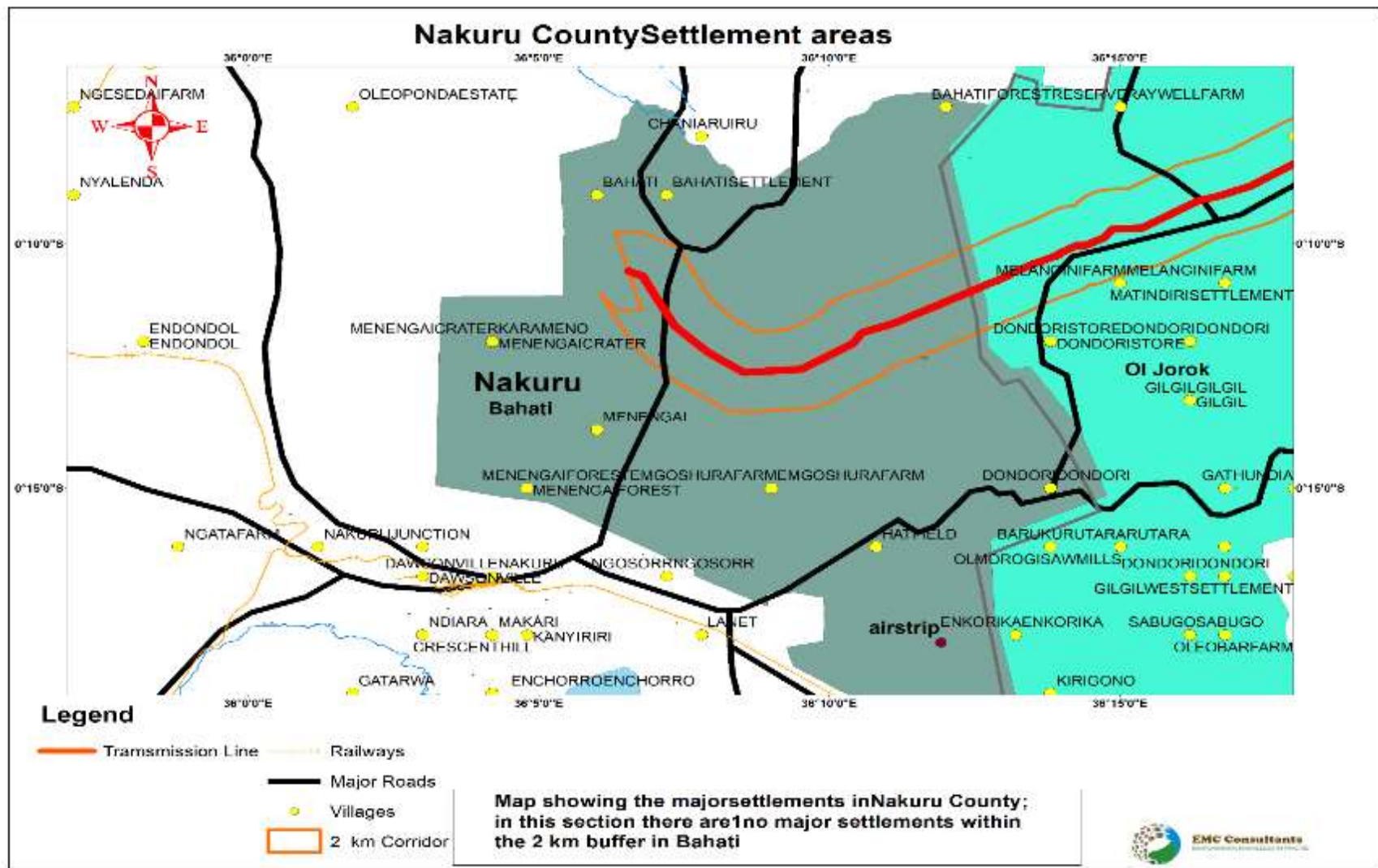


Figure 5-18. Settlement areas along the transmission route

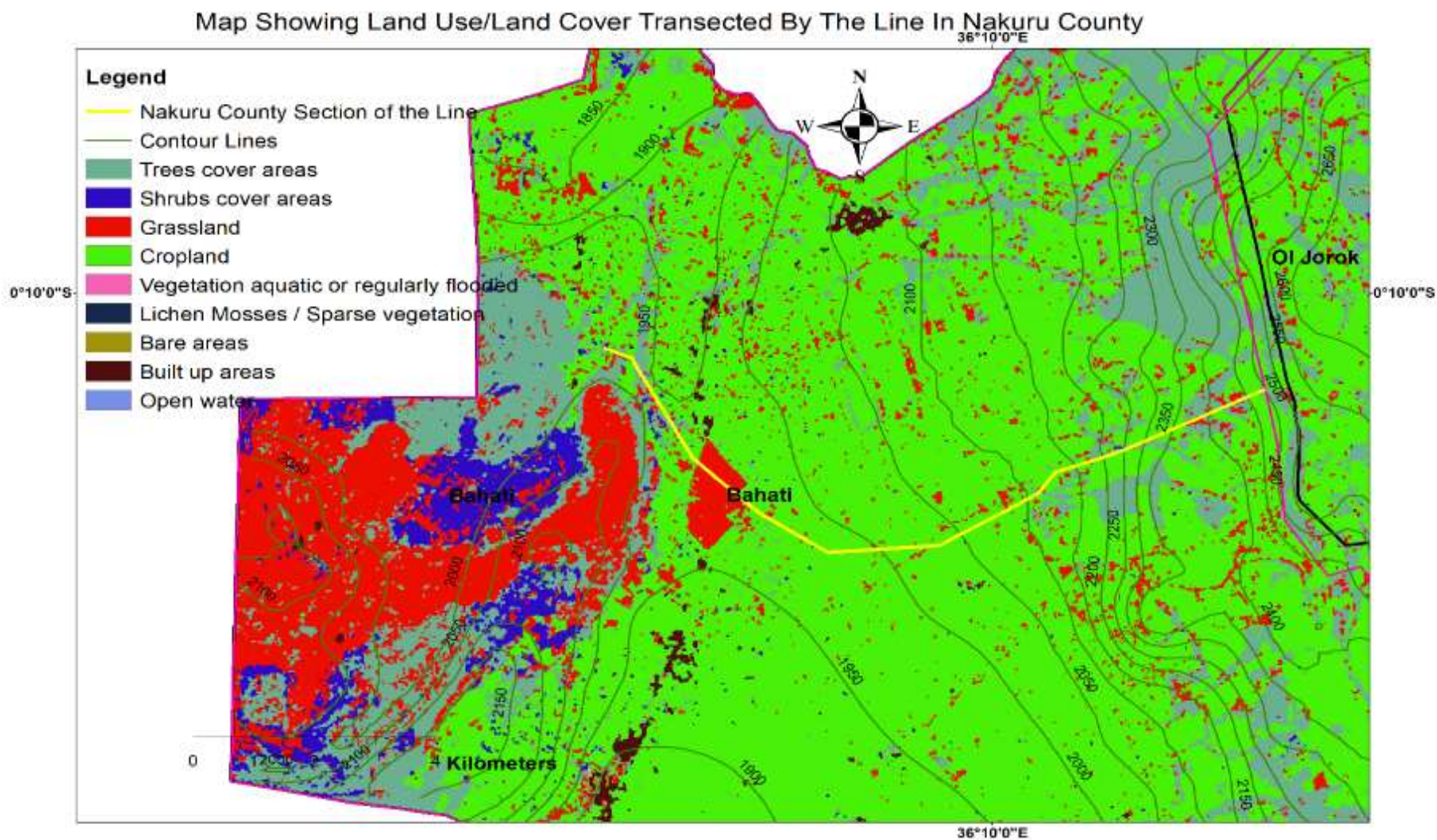


Figure 5-19: Land Use Map of along the transmission line traverses

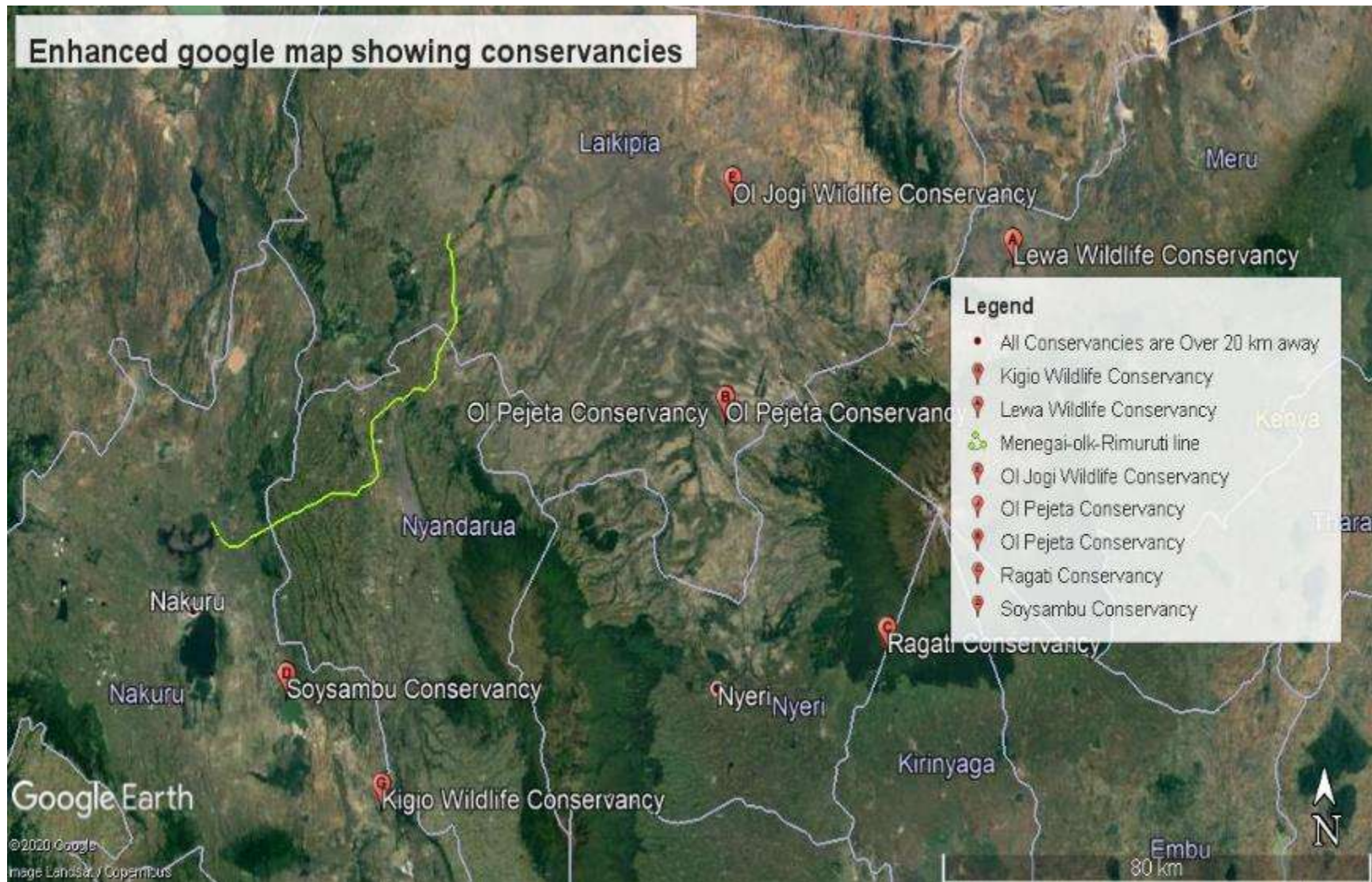


Figure 5-20: Conservancies close to transmission line traverses

#### 5.1.4.5 Education

The County has 2,194 ECD centres of which 1,394 are privately owned while 830 ECD centres are public. The teacher pupil ratio in public ECDs stands at 1:33 whereas the ratio of private ECD centres is 1:20. The projections shows that the preschool enrolment is at 121,735(boys 59,987, girls 61,748). There is an increase in the number of primary schools in the County. There are 1089 primary schools in the County consisting of 375 (21%) private primary schools and 714 ((79%) public primary schools. As at 2017 the student enrolment stood at 465,729 consisting of 234,154 (boys) and 231,575(girls). Free Primary Education (FPE) has led to pressure on existing facilities in the primary schools as many students are enrolled to the institutions. Public primary schools' population accounts for 79 percent while private schools' population is 21 percent.



Figure 5-21: Schools along the project route.

There are 336 public schools and 172 private schools with student enrolment of 111,987 and 34,086 respectively. The total enrolment in public and private is 146,073 students in which 73,141 are Boys while 72,932 are Girls. The current enrolment is significantly set to increase due to increased capitation to secondary schools beginning from the year 2018.

There are 24 active youth polytechnics spread across the County that offer various courses to improve the skills of the youth. The total number of youth enrolled in the polytechnics across the County is approximately 1,260 with a completion rate of 64 percent. The County has approximately 114 youth instructors. The number of youth who join the polytechnics is projected to significantly increase by 2022 due to the on-going expansion of polytechnic programs through the conditional grants to the County Governments and promotion of student enrolment.

There is one Public and Private University namely; Egerton and Kabarak with 13 university campuses, four teachers training colleges, 15 institute of Technology and two Technical training institutes. There are two (2) accredited public TVET institutions in the county as per the Technical Vocational Education and Training Authority (TVETA). These are namely; Dairy Training Institute in Naivasha and Rift Valley Institute of Science and Technology in Njoro. The accredited private TVET institutions are 18. However other three public TVET institutions are under construction in Naivasha, Molo and Bahati in partnership with the National Government Constituency Development Fund (NG-CDF).

Based on the socio-economic survey undertaken as part of baseline data collection, household heads in the project route could not read and write in English or Swahili. Kikuyu and Kalenjin language were the most spoken languages at home. About 36.5 % of the PAPs had attained primary level of education and 17.3% achieving secondary levels of education. These percentages are inclusive of household heads and other members of the household. In the survey conducted, 7.7% and 13.5% respectively did not complete Secondary and Primary level education. A further 1.9% of the residents interviewed had no formal education.

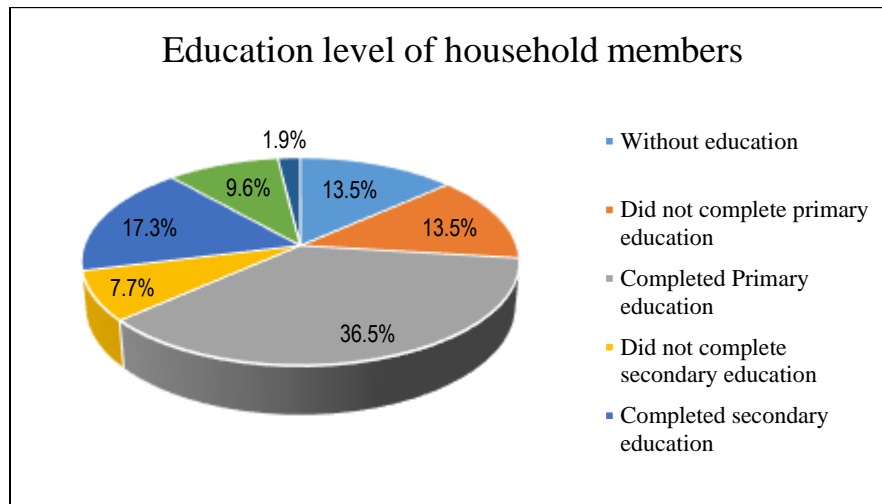


Figure 5-22: Literacy Levels Among Communities

#### 5.1.4.6 Health

There are about 440 health facilities inclusive of 22 level 4 and 5 hospitals. GoK hospitals are 16 and contribute to 36% of the total health facilities in the county. In terms of health, the major disease burden is upper respiratory infection, malaria, disease of skin and diarrhoea and HIV and AIDS. Deliveries by skilled attendants is at 69.5% and deliveries at health facilities stands at 69.7% against annual target of 70%, according to the Kenya Demographic and Health Survey 2018.

Nakuru is rated 7th among the high burden counties and 10th among high incidence counties (Kenya HIV prevention revolution roadmap). The HIV prevalence among women in the county is higher (5.8%) than that of men (3.5%), indicating that women are more vulnerable to HIV infection than men in the County. According to Kenya indicator Aids Survey (KAIS) 2016, the prevalence for the County stands at 5.3% with a total number of 66,295 People Living with HIV (PLHIV) with 58,397 being adults and 7,898 being children. By the end of 2015, a total of 41,217 people were living with HIV in the County, with 15% being young people aged 15-24 years and 9% being children under the age of 15 years. Approximately 202 children and 1,204 adults died of AIDS-related conditions in 2015. (Kenya HIV estimate 2018). There are geographic variations within the county with some sub-counties having a higher burden and more severely affected than others. This is defined by the hotspots which lie in the sub-counties.

Vulnerabilities identified during the socio-economic survey within the sampled households along the project route as shown below was composed of: -

1. The elderly over 60 years (41.5%)
2. Women headed households/widows (52.1%)
3. The sick/chronic illnesses (3.2%)
4. Household headed children under 18yrs (1.1%)
5. Orphans (2.1%)

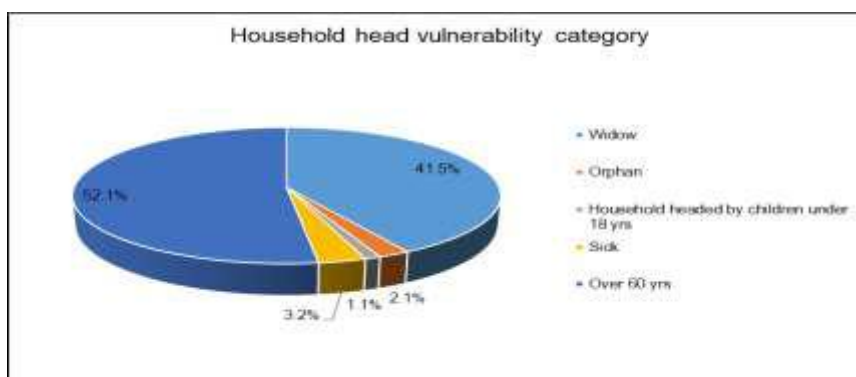


Figure 5-23: Perceived level of vulnerability.

#### 5.1.4.7 Poverty, Income and Employment

Majority of wage earners are in the private sector mainly in the flower, tea and coffee farms, construction, academic institutions, public transport, wholesale and retail trade, hotels and restaurants and *jua kali* sectors. Estimates from the 2009 Population and Housing Census indicate that on average, 14 per cent of the county population (12 per cent urban and 16 per cent rural) are self-employed. 33.5% of people in Nakuru county live below the poverty line. The economic growth and development of the county is mainly driven by agriculture. Trade and tourism are the other major contributors to the county economy. There are various economic activities in the county ranging from—land sale, manufacturing, horticulture, agro-business and strong service industry.

#### Work force

The working-age population in 2012 (15-64 years) in the county was 968,745 accounting for 55.1 per cent of the total population of whom 484,378 are male while 484,366 are female. The primary working-age population comprises the employed and the unemployed. It is expected to increase from 968,745 persons in 2012 to 1,128,338 persons in 2017. Given a labour force population which is more than half of the total population, measures will need to be put in place to provide adequate employment opportunities. Child labour and forced labour is not rampant in the project area, based on information obtained from the Department of Labour and Directorate of Occupational Safety and Health (DOSHS).

#### Unemployment

Based on the forgoing information, of the total labour force of 968,745 in the year 2012, the employed are 740,608 while the unemployed are 228,137 representing 24 per cent of the total labour force. The female accounts for 46 per cent of the unemployed population. In order to enhance the growth of the economy in the county, there is need to enhance

measures aimed at creating employment activities both in the formal and informal sectors to absorb the unemployed. The strategies should focus more on the women and youth population. There is need therefore to boost youth and women enterprise development funds that have contributed to the empowerment of these groups. Further, community-based projects like development of cottage industries that make use of local resources should be promoted.

#### 5.1.4.8 Livelihoods

Although a large population is in the rural areas, the urban centres have the highest population density due to rural-urban migration as a result of well-developed infrastructures, employment opportunities and security as in the case of Molo Town. High unemployment and low agricultural productivity are some of the likely reasons leading to high poverty. Despite the high literacy (those who can read and write) levels in the County (80% among youth), skill mismatch and lack of innovation, coupled with increased rural to urban migration, hinder economic development of urban areas.



Figure 5-24: Economic activities along the project route

The main livelihood activities in the County are livestock keeping, crop farming, small businesses (retailing) with minimal mining, tourism and industry. The main livestock types in the County are dairy cattle, local poultry and wool sheep. Agriculture is the backbone of the county's economy with food crops, horticulture and cash crops, dairy and beef as common products. The main source of income as shown in the figure below for the households interviewed during the socio-economic survey was agriculture at 88.9% followed by civil service at 3.2%. Animal husbandry, handicraft and construction work at 0.5% same as handicraft. Commerce was at 2.0%.

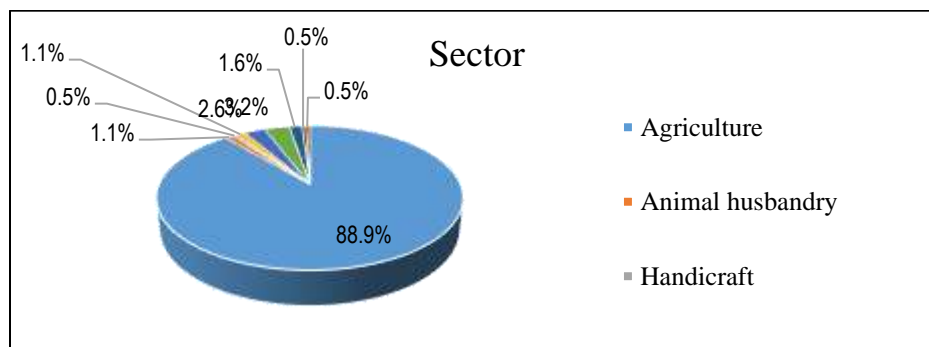


Figure 5-25: Economic Activities

#### **5.1.4.9 Gender Based Violence**

In Kenya, data from the Kenya Demographic and Health Survey shows that 45% of women and girls face a form of gender-based violence annually. Recent reports obtained by the National Bureau of Statistics indicate that 61.8 percent of women in the County are victims of gender violence. According to statistics from the Nakuru County Provincial General Hospital, 2300) cases of sexual and gender-based violence recorded between March and September 2019, showed 90% of the victims being female. There were 1,375 cases of sexual offences reported across health facilities in Nakuru County in 2015, out of which 90% underwent HIV counseling and testing, 80% put under preventive post exposure antiretroviral treatment, and emergency contraception given to 50% of those eligible.

A 2019 mapping exercise estimated a higher lifetime prevalence of gender-based violence in the west of the country and some urban areas compared with the east of the country. Furthermore, sexual violence is often repeated. A key challenge with this type of violence is the tendency for survivors not to report for fear of retaliation by perpetrators. Communities in rural Nakuru County experience gender-based violence with far-reaching consequences and long-lasting effects on survivors, families and the community. Gender Based Violence is rooted deeply in gender inequality; the consequences are severe, particularly for women suffering multiple vulnerabilities. Women are primarily affected because gender-based violence is condoned by customs/culture and reinforced by institutions because most rural women have limited knowledge on their rights and there is no responsive system for survivors of gender-based violence.

#### **5.1.4.10 Energy**

Only 30% of residents in Nakuru County use Liquefied Petroleum Gas (LPG), and 5.4% use paraffin. 39.6% use firewood, 0.1% use solar, 0.4% use biogas and 23.9% use charcoal. Firewood is the most common cooking fuel by gender at 44% in male headed households and 50% in female headed households. Kuresoi South constituency has the highest level of firewood use in Nakuru County at 83.6%. This is almost 23 times the level in Nakuru Town East constituency, which has the lowest share. Kuresoi South constituency is about 44 percentage points above the county average. Nessuit ward has highest level of firewood use in Nakuru County at 98%. This is 97 percentage points above Flamingo ward, which has the lowest share. Nessuit ward is 52 percentage points above the county average.

Nakuru Town West constituency has the highest level of charcoal use in Nakuru County at 65%. This is seven times Kuresoi South constituency, which has the lowest share. Nakuru Town West constituency is 25 percentage points above the county average. Kaptembwo ward has the highest level of charcoal use in Nakuru County at 77%. This is 75 percentage points more than Nessuit ward. Kaptembwo ward is 37 percentage points above the county average.

A total of 64.4% of residents in Nakuru County use electricity as their main source of lighting. A further 5.8% use lanterns, 4.4% use tin lamps, 14.5% use solar, and 0.4% use fuel wood. Electricity use is mostly common in male headed households at 35% as compared with female headed households at 31%. Nakuru Town East constituency has the highest level of electricity use at 53.6%. That is 27 times Kuresoi South and Kuresoi North constituencies, which have the lowest level of electricity use. Nakuru Town East

constituency is 43 percentage points above the county average. Rhoda ward has the highest level of electricity use at 89%. That is 89 percentage points above Nessuit ward, which has no share of level of electricity use. Rhoda ward is 55 percentage points above the county average.

The main household sources of energy used by communities along the proposed project route for cooking was dry plants/wood (76.1%), LPG Gas (7.6%) and Kerosene (3.6%). Other sources of energy for cooking included electricity and biogas. Electricity (62.2%) is the main source of energy used in lantern lamps for lighting; the other sources of energy for lighting formed 37.8% as shown in the figure below.

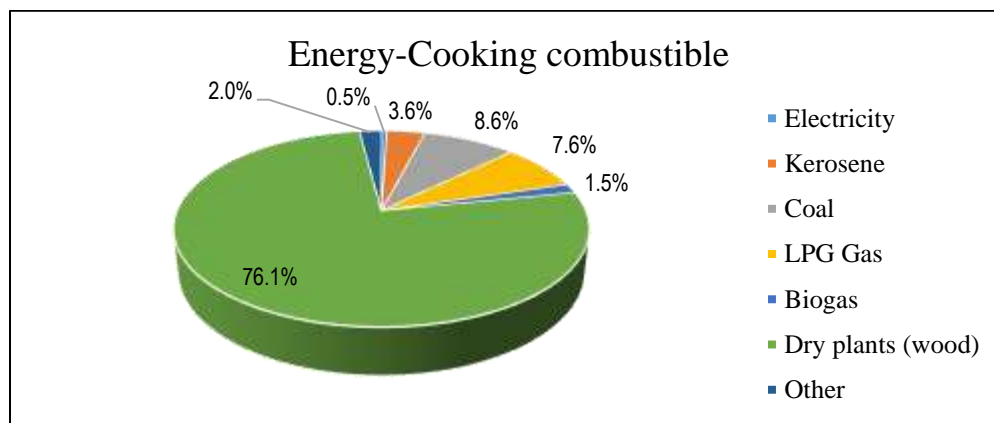


Figure 5-26: Sources of Energy for cooking

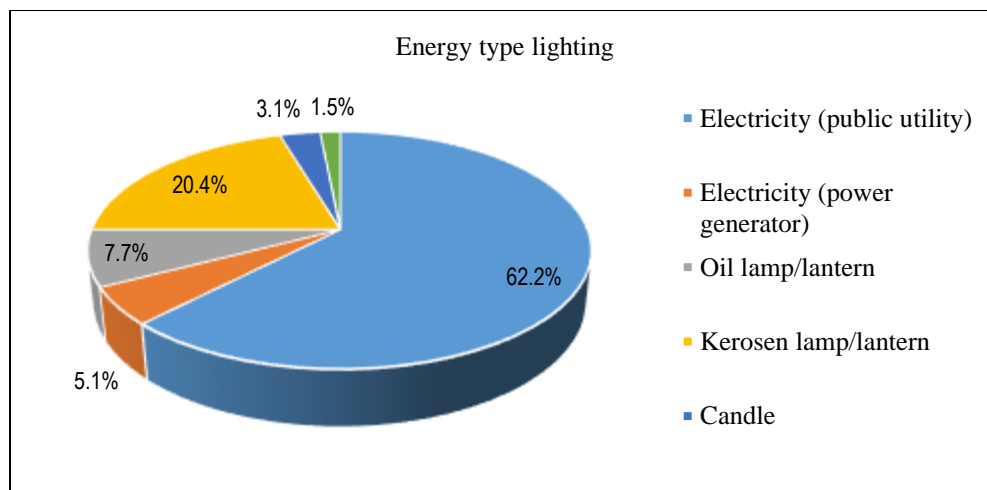


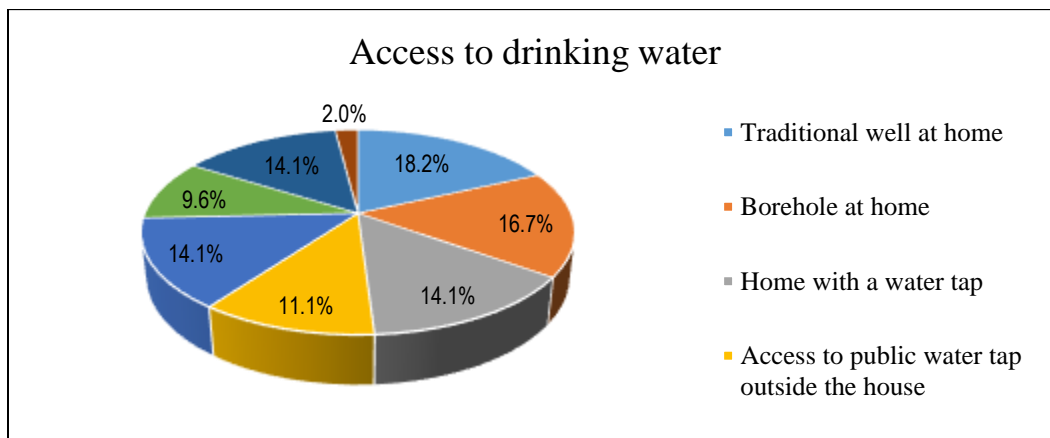
Figure 5-27: Sources of Energy for lighting

#### 5.1.4.11 Water and Sanitation

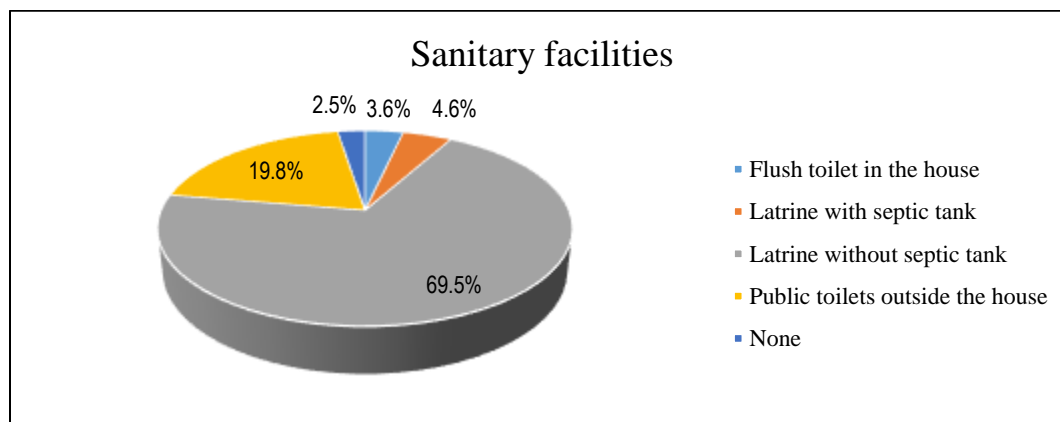
The distance to the nearest water point in Nakuru County is from zero to six kilometers. It is worth noting that 35% percent of the county population take between 1-4 minutes to fetch drinking water. Estimates from Kenya Population and Housing Census 2019 indicate that about 150,608 households (36.8 per cent) in the county have access to piped water. About 63 per cent have access to potable water. 80 per cent of household are harvesting rainwater. Improved sources of water comprise protected spring, protected well, borehole,

pipled into dwelling, piped and rainwater collection while unimproved sources include pond, dam, lake, stream/river, unprotected spring, unprotected well, jabia, water vendor and others. The 2019 Population and Housing Census indicated that 85 per cent of the residents had access to private improved sanitation. In rural areas, open defecation was estimated to be still practiced by 0.03 per cent of the population. Lack of affordable housing in the major towns in the county has led to mushrooming of informal settlements (slums) in these urban areas resulting in poor spring protection project in parts Mau forest, Olenguruoni, Kuresoi South Sub County, sanitation and poor management of both solid and liquid waste. There will be need therefore, for enhanced measures to ensure proper physical planning and management of waste disposal in the county.

Socio-economic survey outcomes targeting a sample of the communities along the project route concluded that traditional well at home was the most used source of water (18.2%) boreholes at home followed (16.7%), while water sourced from boreholes within the community; rainwater and taps within the homestead were at (14.1%). Other sources of water formed about 22.8%. The main sanitary facility used by the community interviewed was a latrine without septic tank (69.5%). Those who use public toilets outside the house constituted 19.8%, while PAPs with latrines with septic tanks formed 4.6%.



**Figure 5-28: Sources of Water**



**Figure 5-29: Sanitary Facilities**

#### **5.1.4.12 Tourism and Recreation**

The county has several tourist attractions such as Menengai Crater, Hell's Gate National Park, Lake Nakuru, Lake Nakuru National Park, Lake Naivasha and Lake Elementaita. Tourism is a major economic activity in Nakuru County, this is attributed to the numerous tourist attractions that include Lake Nakuru National Park, Lake Naivasha, Hell's Gate and the Menengai Crater. Lake Nakuru National Park, situated just 4km from Nakuru town, is one of Kenya's most popular tourist destinations. The park's ecosystem, which comprises Lake Nakuru and surrounding grasslands, supports over 50 species of mammals including white rhino and about 450 species of birds including the lesser flamingos. Other tourist destinations include Lake Naivasha with over 350 species of birds'; Hell's Gate National Park, which, is ideal for rock climbing'; biking and wildlife, including cheetahs, leopards and lions. The 2,490 meters high Menengai Crater 10km north of Nakuru town is also a tourist attraction. Nakuru County has substantial number of tourist hotels and camping sites offering high class services. They include: Crayfish, Fish Eagle, Marina, Hippo Point, Simba Lodge, Sopa Lodge, Naivasha Country Club Enashipai Resort and Spa, and Great Rift Valley Lodge among others. Many of these hotels are found in Naivasha Sub-County especially near Lake Naivasha.

#### **5.1.4.13 Trade and Industry**

Some of the industries that are found in the county forming the economic basis include: textile industries, animal feeds, agricultural implements, printing, dairy products, engineering works and body builders, saw mills, contractors, bitumen products and quarrying, posho mills, canners, edible oils and soap manufacturers and pyrethrum processing plants. A large proportion of the County population is employed in, wholesale and retail trade, hotels and restaurants, manufacturing sector and informal sector including the Jua kali sector. The Jua-Kali sector has employed over 23,169 artisans. In the market Centre's, there are a lot of trading activities such as retail shops, groceries and wholesale traders forming the bulk of business activities contributing significantly to income for many households.



**Figure 5-30: Traders along the project route**

A lot of emphasis should be laid on the promotion of Medium and Small-Scale businesses (MSEs), the informal sector, Jua-Kali- retail and wholesale trade and the transport sector.

These sectors create a lot of employment to the citizens especially for women and youth. The industrialization sub sector through the Economic Stimulus Programme has constructed and equipped Constituency Industrial Development Centres in four constituencies in the county, namely Kuresoi South, Nakuru town, Rongai and Subukia Constituencies. These centres will give the community an opportunity to channel their creativity, innovation and entrepreneurial competencies in economic activities like jua-kali.

#### **5.1.4.14 Transport Infrastructure and Network**

The entire road network in the Nakuru County is approximately 12,491km. Out of which paved roads are 993.7 Km and gravel roads are 4,500 Km and earth roads are 6,998Km. The road infrastructure can be described as 20% good, 35% fair and 45% poor. Some roads especially in agricultural rich areas including Kuresoi North and South, Molo, Njoro Subukia, Naivasha and Gilgil are still in deplorable condition hence leading to delays in transporting of agricultural produce to the market making farmers to incur losses for perishable goods.



Figure 5-31: Sample Road network in Nakuru County

#### **Rail Network**

The old railway line traverses through the County to Uganda which transports cargo mainly from the port of Mombasa to Malaba border. The Standard Gauge Railway (SGR) passes through Mai Mahiu (Naivasha) as it joins Narok County all the way to Malaba border.



Figure 5-32: Section of the railway in Nakuru

#### **Airstrips**

Currently, the County does not have an existing airport. However, there are plans for expansion of the airstrip at Lanet Military Base for commercial services. This will improve economic integration with the rest of the nation and open international market for products within the County including direct export of horticulture and floriculture.

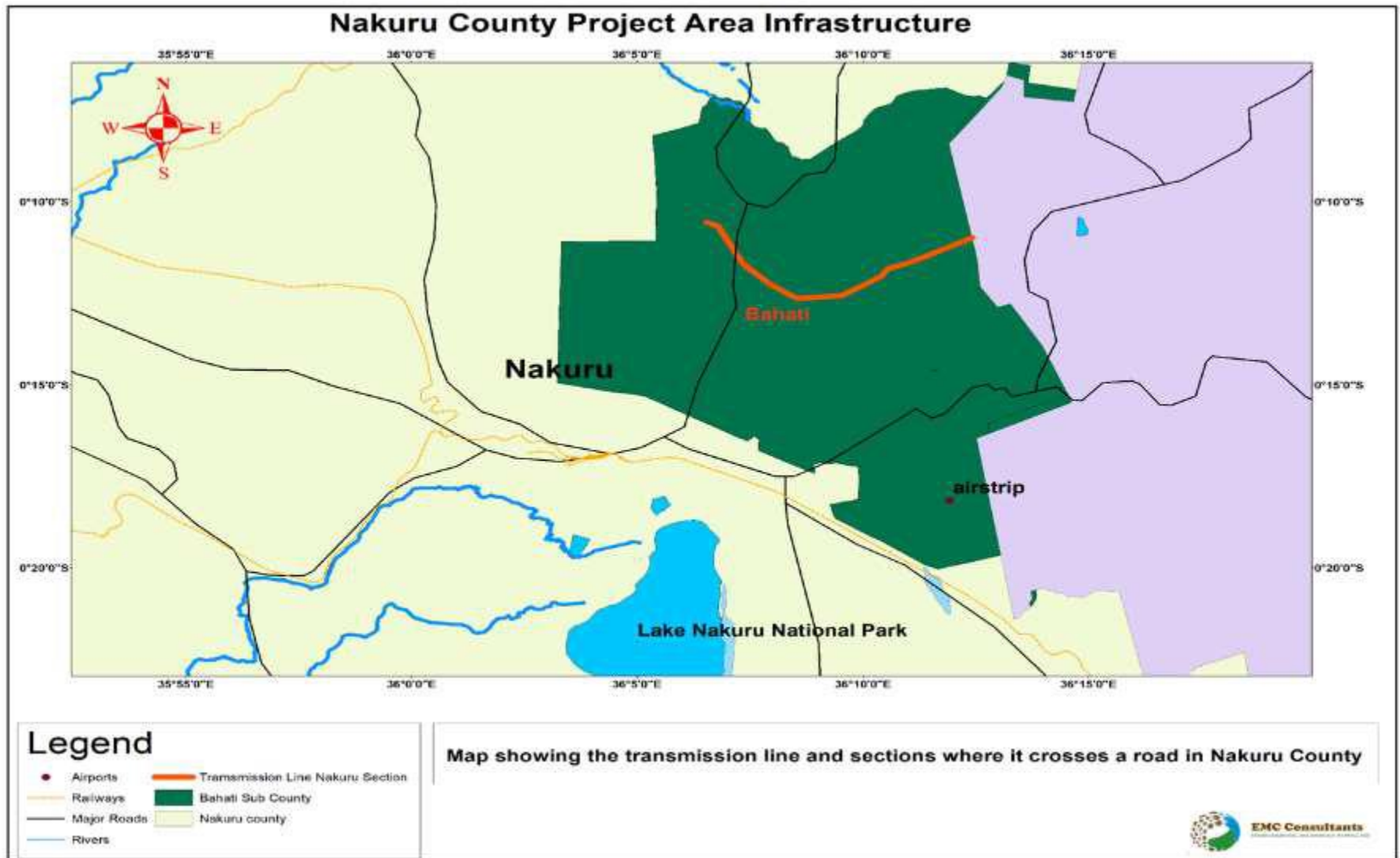


Figure 5-33. Infrastructure Crossed by Transmission Line

The proposed transmission line crosses the road infrastructure under the mandate of Kenya National Highways Authority (KeNHA). The transmission line does not cross any railway line. KETRACO will have to obtain the relevant permits required when traversing existing infrastructure like roads.

#### **5.1.4.15 Financial Services**

Financial services in the County are offered by; banks, Micro finance institutions, mobile money agents and SACCOs that offers FOSA services. A total of 60 bank branches are spread across the county, majority of them being in Nakuru town. The banks include; Kenya Commercial Bank (KCB), Co-operative Bank of Kenya, Standard chartered Bank, Equity Bank, Barclays Bank, Family Bank, Diamond Trust Bank, Commercial Bank of Africa, National Bank, ECO Bank, NIC Bank, Sidian Bank and Transitional Bank. In addition, the County is served by 17 micro finance institutions namely; Faulu Kenya, Kenya Women Finance Trust, Musoni, Small and Micro Enterprise Program (SMEP), Rafiki Micro finance among others. The County has a number of SACCOs that provide Front Office Service Activities (FOSA). They are; Harambee SACCO, Stima SACCO, Metropolitan SACCO, Cosmopolitan SACCO, Mwalimu SACCO, Egerton University SACCO, among others.

#### **5.1.4.16 Industry and Trade**

The County has a main market (Wakulima Market) where trading of farm produce takes place. The market functions as a wholesale market for the County and other neighboring counties i.e. Nyandarua, Laikipia, Baringo and Narok. In accommodating small scale traders, there's a hawker's complex which in Nakuru Town. Other fresh produce markets are in the major towns like Naivasha, Gilgil, Molo and Mai Mahiu. Various industries drive the County economy as well as offer employment opportunities. They include; animal feeds production companies, agricultural inputs e.g. Syngenta, engineering works, manufacturing industries e.g. Keroche, Menengai Oil Refineries, canners, dairy products, bakery and hotel industry. However, investment opportunities still exist in the County that includes revival of pyrethrum processing among other agro based industries.

#### **5.1.4.17 Archaeological Sites**

##### **Kariandusi Archaeological Pre-Historic Site**

Kariandusi lies on the eastern side of the Rift Valley, about 120-km north North West of Nairobi; and about 2 km to the East Side of Lake Elementaita. It is situated at 0°, 28s, and 36° 17E. The site rests on the Nakuru-Elementaita basin which occupies the width of the Rift valley, flanked by Menengai crater on the north and the volcanic pile of Mount Eburru, on the south. This living site of the hand-axe man was discovered in 1928. The Kariandusi archaeological site is amongst the first discoveries of Lower Paleolithic sites in East Africa. There is enough geological evidence to show that in the past, large lakes, sometimes reaching levels hundreds of meters higher than the Present Lake Nakuru and Elementaita, occupied this basin. Dating back between 700,000 to 1 million years old, Kariandusi is possibly the first Acheulian site to have been found in Situ in East Africa.

##### **Hyrax Hill Pre-Historic Site**

Hyrax hill lies in the middle of Kenya's Rift valley, about 4 km from Nakuru town. The site is close to the Nairobi-Nakuru highway. It is about 150 km away from Nairobi. From

Lake Nakuru, the hill is about 4.5 km with its base about 100m above the Lake. Hyrax Hill is a prehistoric site near Nakuru in the Rift Valley province of Kenya. It is a rocky spur roughly half a kilometer in length, with an elevation of 1,900 meters above sea level at its summit. The site was first discovered in 1926 by Louis Leakey during excavations at the nearby Nakuru Burial Site, and Mary Leakey conducted the first major excavations between 1937 and 1938. There are two distinct areas of occupation at Hyrax Hill. There are no graves affected by the project. The transmission line does not directly or indirectly affect adversely the existing archeological sites within Nakuru County.

### **5.1.5 Nyandarua County Bio-Physical Environment**

#### **5.1.5.1 Location and Size**

The county is located in the central part of Kenya. The county has an area of 3245.2km<sup>2</sup> lying between latitude 0° 8' to the North and 0°50' to South and between 35°13' East and 36°42' West. The county borders include several counties; Laikipia to the North, Nyeri to the East, Kiambu to the South, Murang'a to the South East and Nakuru to the West. The total length of the transmission line in Nyandarua County is 54.9km traversing Ol Jororok and Ndaragua Sub Counties. Figure 5-34 below is a map of Nyandarua County with the length of the transmission line.

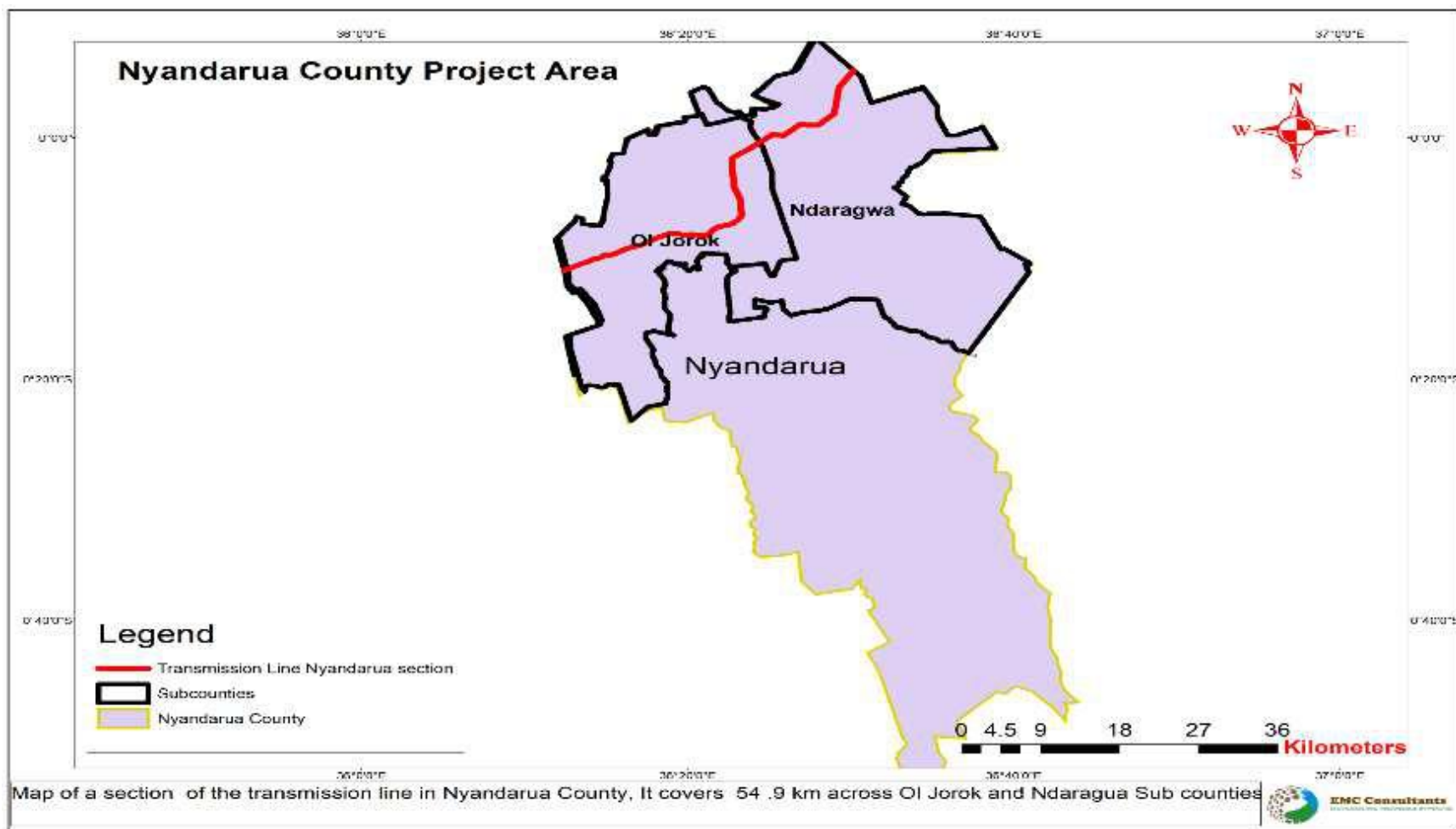


Figure 5-34: Transmission Line Route in Nyandarua County.

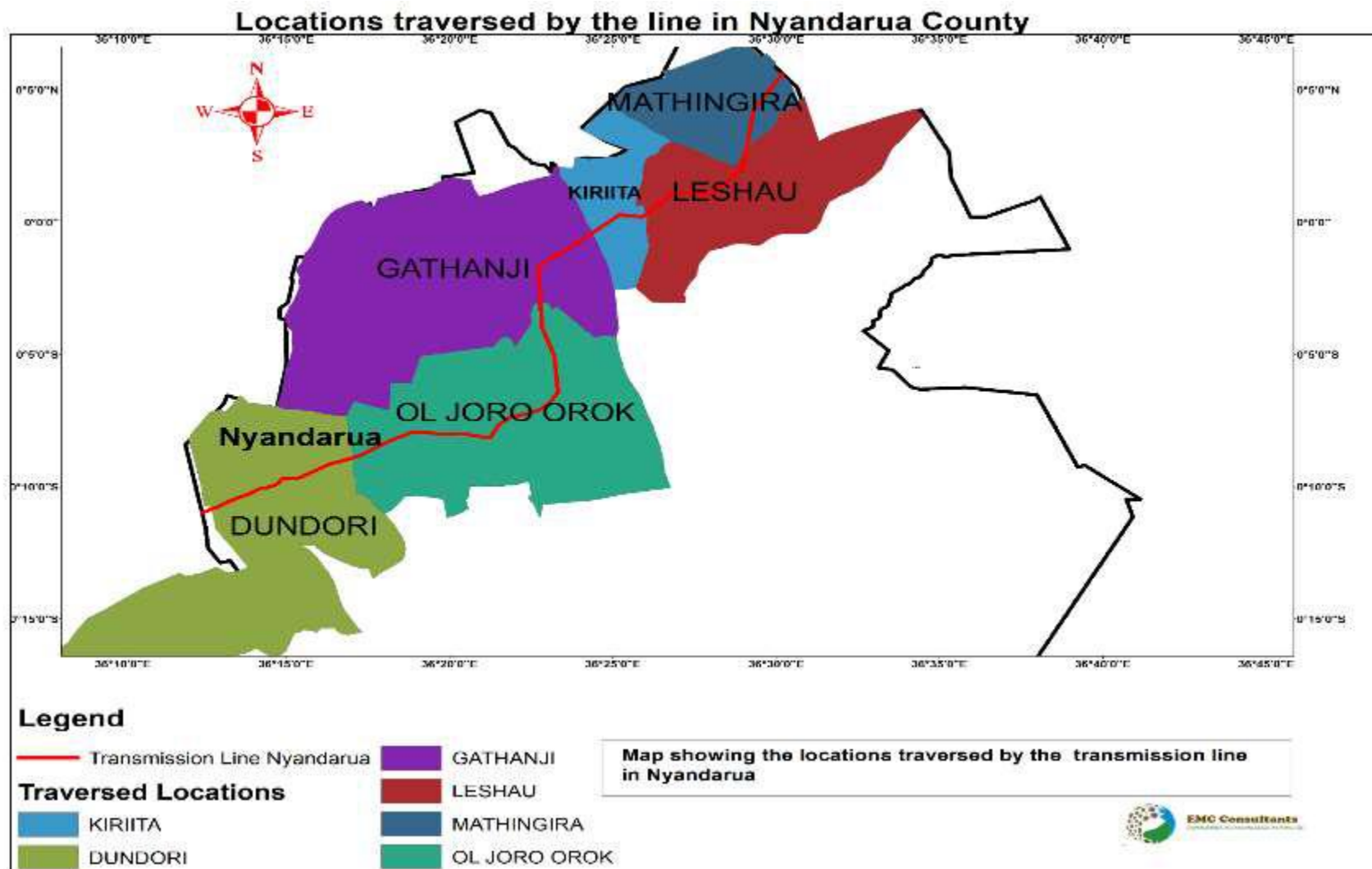


Figure 5-35: Transmission Line Route (Locations) in Nyandarua County.

### 5.1.5.2 Administrative and Political Units

The County is divided into five Sub-Counties (constituencies) and sub counties as shown below.

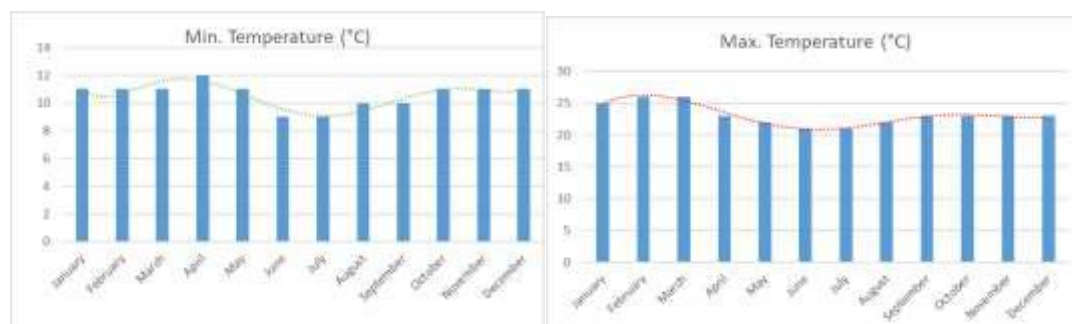
**Table 5-10. Political and Administrative Units**

Constituency	Sub County	Area(km <sup>2</sup> )	No. of Electoral wards	No. of Divisions	No. of Locations
Kinangop	Kinangop	822.0	8	6	16
Kipipiri	Kipipiri	543.7	4	3	12
Ol'kalou	Ol'kalou	586.7	5	8	21
Ol'jororok	Ol'jororok	389.1	4	4	8
Ndaragwa	Ndaragwa	653.6	4	4	13
	Aberdare forest	250.1		-	
		<b>3245.2</b>	<b>25</b>	<b>25</b>	<b>70</b>

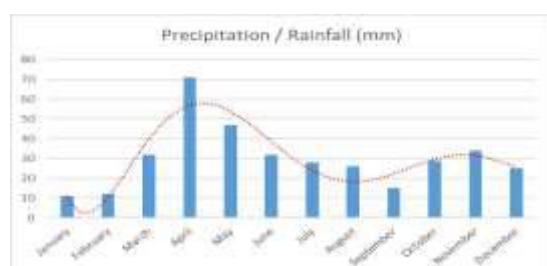
Source: County Commissioners' Office, Nyandarua County 2018

### 5.1.5.3 Climatic Conditions

The county experiences moderate to low temperatures. The highest temperatures are recorded in the month of December, with a mean average of 25<sup>0</sup> C while the lowest is recorded in the month of July, with a mean average temperature of 12<sup>0</sup> C. The County experiences two rainy seasons: Long rains from March to May with a maximum rainfall of 1600 mm and short rains from September to December and with a maximum rainfall of 700 mm.



**Figure 5-36: Minimum and Maximum temperature**



**Figure 5-37: Minimum and Maximum temperature**

#### 5.1.5.4 Baseline Ambient Environmental Measurements

Tables 5-10 to 5-17 below are the results of ambient air and noise measurements conducted to understand the baseline situation of the project area specifically in areas with sensitive receptors that may be affected by the project construction activities.

##### 5.1.5.4.1 Baseline Ambient Air Emission Measurements

**Table 5-11: Ambient Air Emission: Air Quality Data – PM10**

Location	Proxy	PM10 ( $\mu\text{g}/\text{m}^3$ )	WHO AQG	EMCA (Air Qual. Reg. 2014)
PCEA Church, - Gecaka Location	MP1	20	50 $\mu\text{g}/\text{m}^3$ 24hrs	50 $\mu\text{g}/\text{m}^3$ 24hrs
Hospital Hill Primary School	MP2	29		
Baari Secondary School	MP3	30		
Ndivai Baptist Church	MP4	46		
Waka Junior School Hall	MP5	35		

Source: Field Data

**Table 5-12: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Cloud Cover	Sparse
Date	28th August 2019
Duration of Measurements	1hour

Source: Field Data

**Table 5-13: Ambient Air Emission: Air Quality Data – Sulphur Dioxide, SO<sub>2</sub>**

Location	Proxy	PM10 ( $\mu\text{g}/\text{m}^3$ )	WHO AQG	EMCA (Air Qual. Reg. 2014)
PCEA Church, - Gecaka Location	MP1	20	50 $\mu\text{g}/\text{m}^3$ 24hrs	50 $\mu\text{g}/\text{m}^3$ 24hrs
Hospital Hill Primary School	MP2	29		
Baari Secondary School	MP3	30		
Ndivai Baptist Church	MP4	46		
Waka Junior School Hall	MP5	35		

**Table 5-14: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Cloud Cover	Sparse
Date	28 <sup>TH</sup> August 2019
Duration of Measurements	1hour

Source: Field Data

**Table 5-15: Ambient Air Emission: Air Quality Data – Nitrogen Dioxide**

Location	Proxy	PM10 ( $\mu\text{g}/\text{m}^3$ )	WHO AQG	EMCA (Air Qual. Reg. 2014)
PCEA Church-Gecaka Location	MP1	20	50 $\mu\text{g}/\text{m}^3$ 24hrs	50 $\mu\text{g}/\text{m}^3$ 24hrs
Hospital Hill Primary School	MP2	29		
Baari Secondary School	MP3	30		
Ndivai Baptist Church	MP4	46		
Waka Junior School Hall	MP5	35		

**Table 5-16: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Date	28 <sup>TH</sup> August 2019
Duration of Measurements	1 hour

**Source: Field Data****5.1.5.4.2 Baseline Ambient Noise Emission Measurements****Table 5-17: Ambient Noise Level**

Location	Proxy	Diurnal (LAeq)	Nocturnal (LAeq)
PCEA Church, - Gecaka Location	MP1	55	40
Hospital Hill Primary School	MP2	65	42
Baari Secondary School	MP3	63	45
Ndivai Baptist Church	MP4	56	47
PCEA Church, - Gecaka Location	MP5	60	49

**Table 5-18: Weather conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Date	28th August 2019
Duration of Measurements	1 hour

**Source: Field Data**

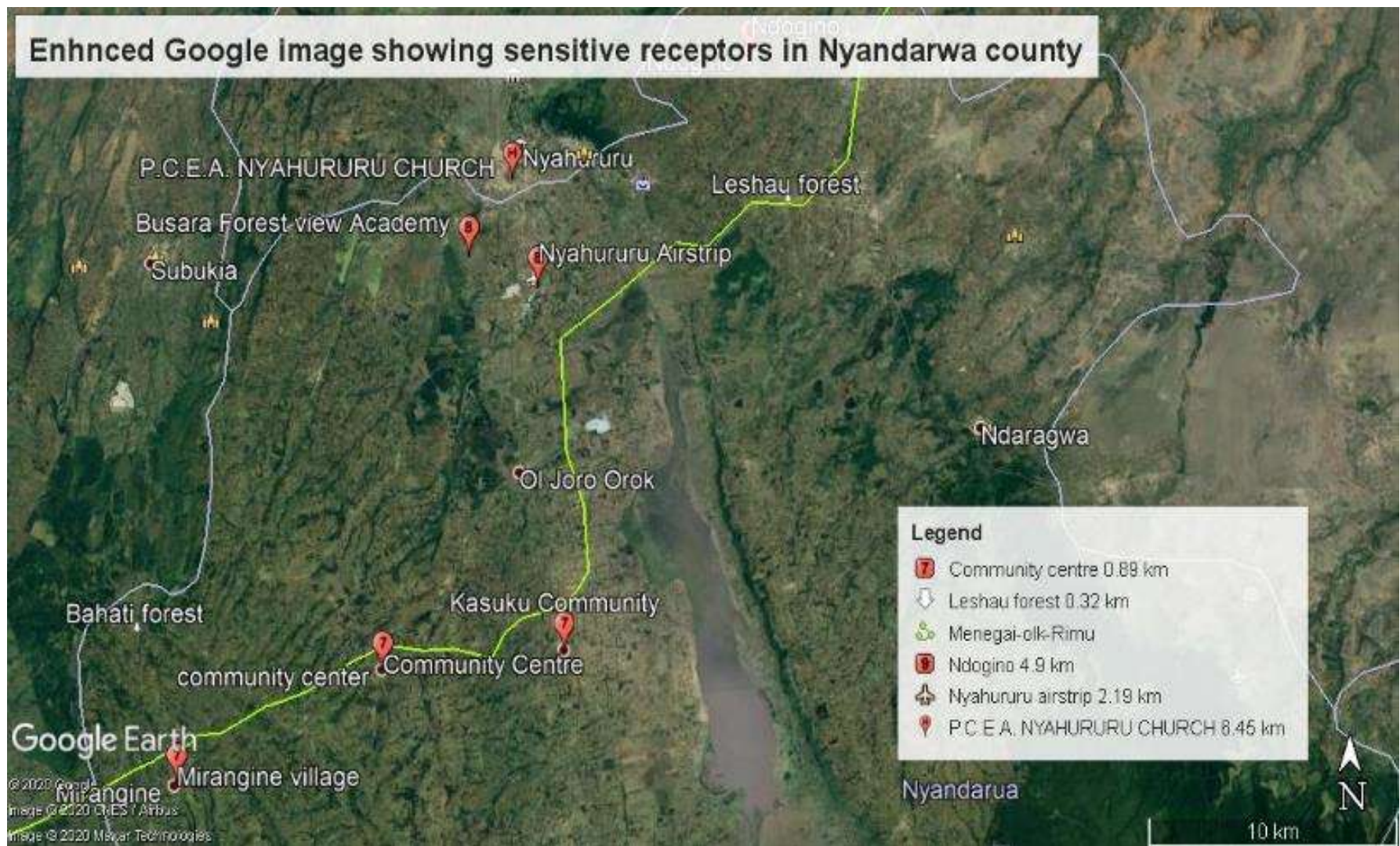


Figure 5-38. Sensitive Receptors Close to Transmission Line AOL

Figure 5-39 above shows the locations of the sensitive receptors in the AOL and which formed the basis for baseline environmental measurements

#### **5.1.5.5 Soils and Geology**

Most rock systems have lines of weaknesses occasioned by faulting which allows porosity and easy percolation. These are igneous rocks, volcanic, and alluvium. The oldest volcanic units are Late Miocene plagioclase-rich basalts of the Aberdare and Mount Kipipiri. Early Pliocene basalts and phonolites outcrop along the Satima fault Escarpment and the northern part of the Aberdare range. The Kinangop plateau is mostly Pliocene and Pleistocene tuffs and ignimbrites with trachytes to the south and north. Basalts dominate the Satima fault, Mount Kipipiri, and the Aberdare range (Bergner et al., 2009). The Satima lavas described by Shackleton (1945) only just extend into the area in the south-east corner, equivalent basaltic volcanic succession. They are trachytes and phonolites with well exposed dyke feeders on Satima. It is suggested that the commonly seen pattern of central and fissure eruptions, occurring concurrently, was operative and that these volcanic rocks erupted from dykes congregated around the Satima-Kipipiri massif at the same time as the plateau phonolites were erupted from fissures along the margin of the rift zone.

In the south-east corner of the area an equivalent basaltic volcanic succession, the Simbara basalts, is exposed. These include agglomerates and tuffs, and form two massifs, the Satima (Aberdare) massif and Kipipiri. The latter is certainly a dissected central volcano, but whether Satima is not the flank of the same volcano, rather than a separate central volcano left far above Kipipiri by the subsequent faulting, is open to question. Feeder dykes of the Simbara lavas are numerous on Satima. The Samburu lavas are locally over 1,500 feet thick and the Simbara lavas have at least an equivalent thickness. There is an upper series of plateau phonolite the Thomson's Falls phonolites of rather a different lithology, which is easily distinguishable to the east of Thomson's Falls but appears to be intercalated within the Rumuruti phonolites elsewhere (Keller, 2015).

The soils in Nyandarua County are of volcanic origin and vary in both fertility and distribution. The county is endowed with moderate to high fertile soils. Soils in the Kinangop and Ol 'Kalou plateau are poorly drained clay loams. However, Ndaragwa, the northern part of Ol Joro Orok and Ol 'Kalou has well drained clay loams. These soils have different crop production potentials. (NCG, 2013). The Satima escarpment is composed mainly of igneous rocks with a few areas having metamorphic rock strata. The soils on the Satima escarpment are grey loams dominated mainly by andosols and phaeozems and in the lake basin the soil is of black cotton soils, which are poorly drained, dominated by nitosols and xerosols. On the western side there are andosols and phaeozems (Mburu, 2014; NEMA, 2007).

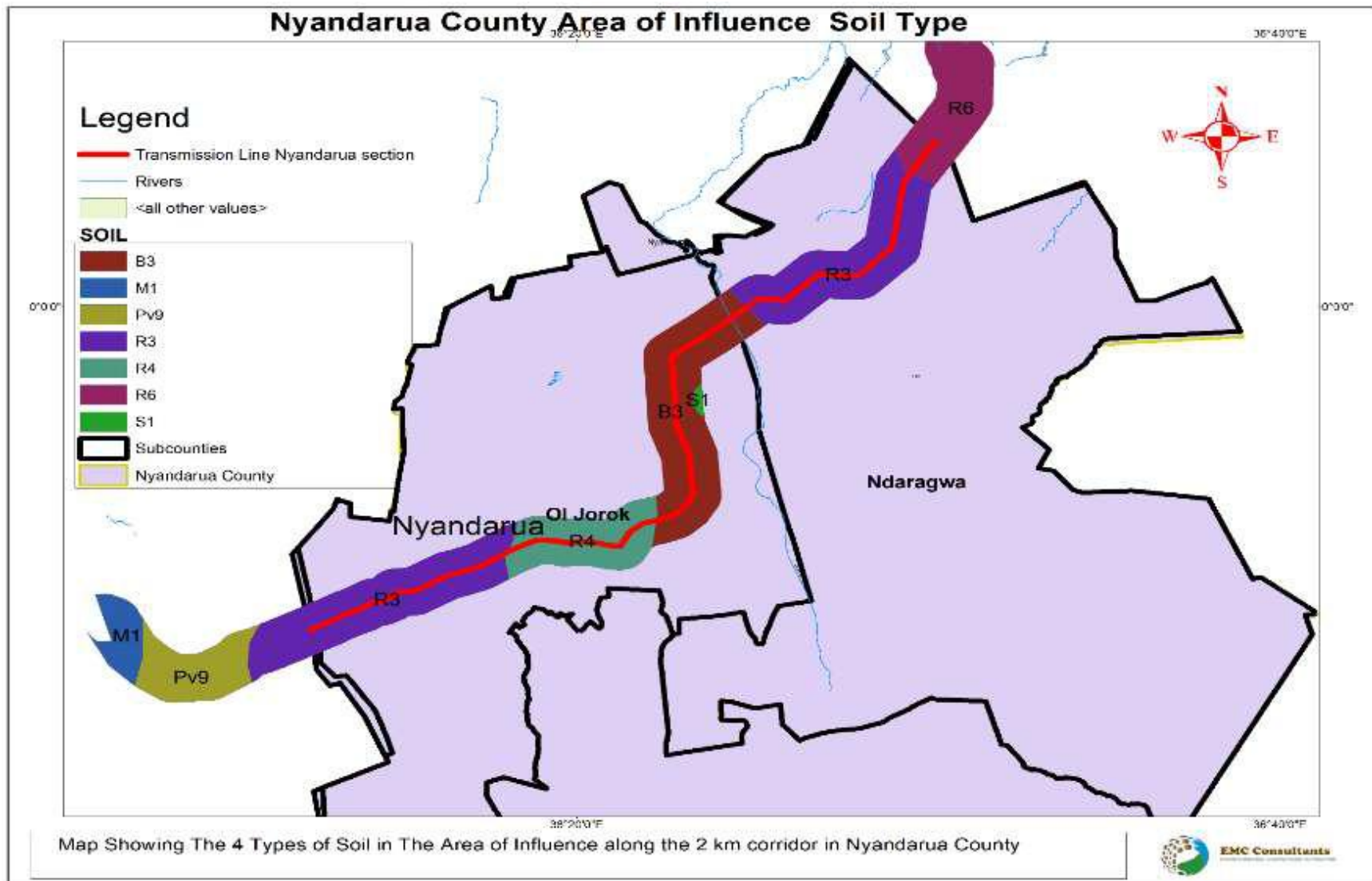


Figure 5-39: Soil and Geology along Transmission Route

### **Agricultural Potential of Dominant Soil Types along the Transmission line Route**

The current land use along the route of the proposed transmission line also provides an indication of the agricultural potential. The current land use was determined using a combination of field observations and the interpretation of publicly available high-resolution satellite imagery. Agricultural activities observed include the cultivation of crops including potatoes, maize, wheat, sorghum, beans, peas, cassava, tomatoes, onions, coffee, tea, and livestock farming of cows, goats, sheep, donkey, poultry and pigs. Based on these data and observations, the dominant land use along the route of the proposed transmission line is interpreted to be small-scale subsistence farming, which is of medium to high agricultural potential.



**Figure 5-40: Maize and Wheat Cultivation in AoI**

#### **5.1.5.6 Topography**

The County mainly consists of the Kinangop plateau, Ol kalou/Ol Joro Orok Plateau and Ol Kalou/Ol Joro Orok Salient. The County was affected by vulcanicity and faulting which gave rise to two major landforms, the Great Rift Valley to the west and Aberdare ranges to the east. In between the two physiographic features, there is Kinangop and Ol kalou Salient plateau. From the Eastern wall of the County, the Aberdare ranges have a height of 3,999m above sea level. There are steep slopes that have undergone great transformation through weathering, creating shallow valleys and gorges. The ranges drop gradually in series of faults giving way to an escarpment that has been broken into sharp valleys occasionally by change in levels of the river courses.

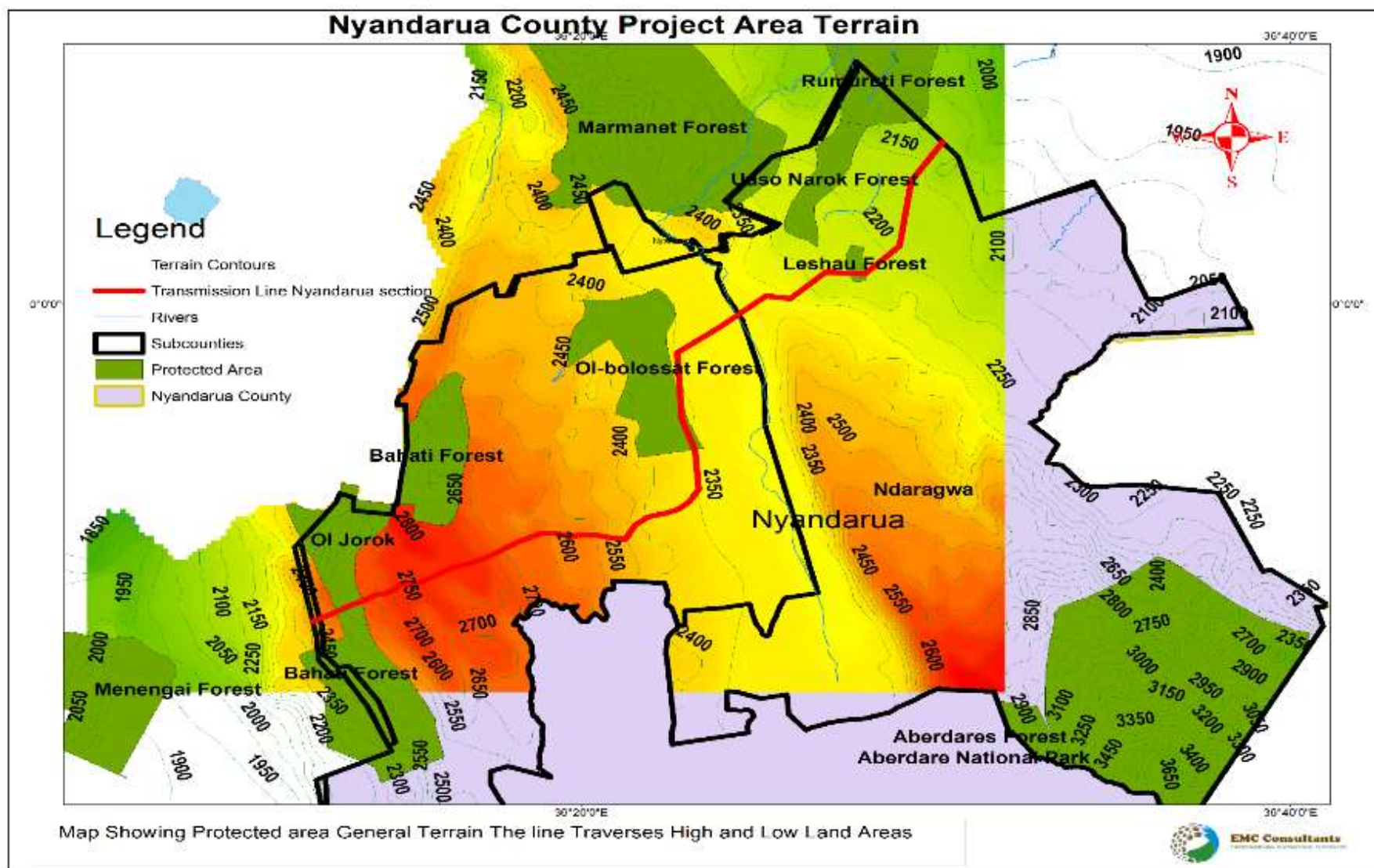


Figure 5-41: Topography of Transmission Route

#### **5.1.5.7 Hydrology**

There are eight permanent rivers; Malewa, Ewaso Narok, Pesi, Turasha, Chania, Kiburu, Mkungi and Kitiri. Lake Ol'bollosat which is the largest water mass in the county is fed by streams and underground water seepage from the Aberdare and Dundori hills. Human activities and clearing of the catchments areas for settlement has affected its natural refilling system and its existence is threatened.

##### **5.1.5.7.1 Ewaso Nyiro**

Ewaso Ng'iro is a river in Kenya which rises on the west side of Mount Kenya and flows north then east and finally south-east, passing through Somalia where it joins the Jubba River. The upper basin of the Ewaso Ng'iro River is 15,200-square-kilometre (5,900 sq mi). The river has a continuous water supply due to the glaciers on Mount Kenya. Ewaso Ng'iro feeds into Lake Ol Bolossat, the only lake in Nyandarua County and the larger Central Kenya. Ewaso Ng'iro crosses seven arid to semi-arid landscapes. It is characterized by vastly different physiographic features and species and has become a fundamental component to the survival of the wildlife, as well as the expansion of human population and socio-economic developments. The ecological diversity throughout the catchment is unique to the Ewaso Ng'iro watershed specifically, as it originates from the high agriculturally potential lands of Mount Kenya, right at Thome Area of Nanyuki-Laikipia County, that means the exact start point of this river is at the Thome village where it is formed out of confluence of Naromoru River, sourcing water from Mt. Kenya and Ngarinyiru River sourcing water from Aberdares. The transmission line crosses part (s) of the Ewaso Ng'iro tributaries as shown in the figure below at the intersection point Lon 36°24'23.77"E, lat 0° 0'23.13"S.

##### **5.1.5.7.2 Lake Ol'bollosat**

The catchment area of Lake Ol' Bolossat is approximately 4,800 km<sup>2</sup>. The area encompasses Nyandarua range, Satima escarpment, and Ndundori Hills. The lake serves as a catchment for Ewaso Nyiro River and supports important functions and lifestyles of communities living in the arid and semi-arid parts of North Eastern, Eastern and Rift Valley provinces. The marshes and swamps that form 85% of the lake ecosystem filter and purify the water (NEMA, 2007). Lake Ol' Bolossat drainage system comprises of the springs and streams along the Satima escarpment, open water, Wellmont, Ol' Joro Orok and Ol' Bolossat swamps, Ewaso Narok river, the numerous springs along the upper reaches of Ewaso Narok river, and springs and streams on the western side of the catchment. The transmission line does not cross Lake Ol'bollosat. Activities related to construction and operation of the transmission line are not expected to have direct and indirect adverse impacts on the lake. The distance between the transmission line and Lake Ol'bollosat is about 2.25km.

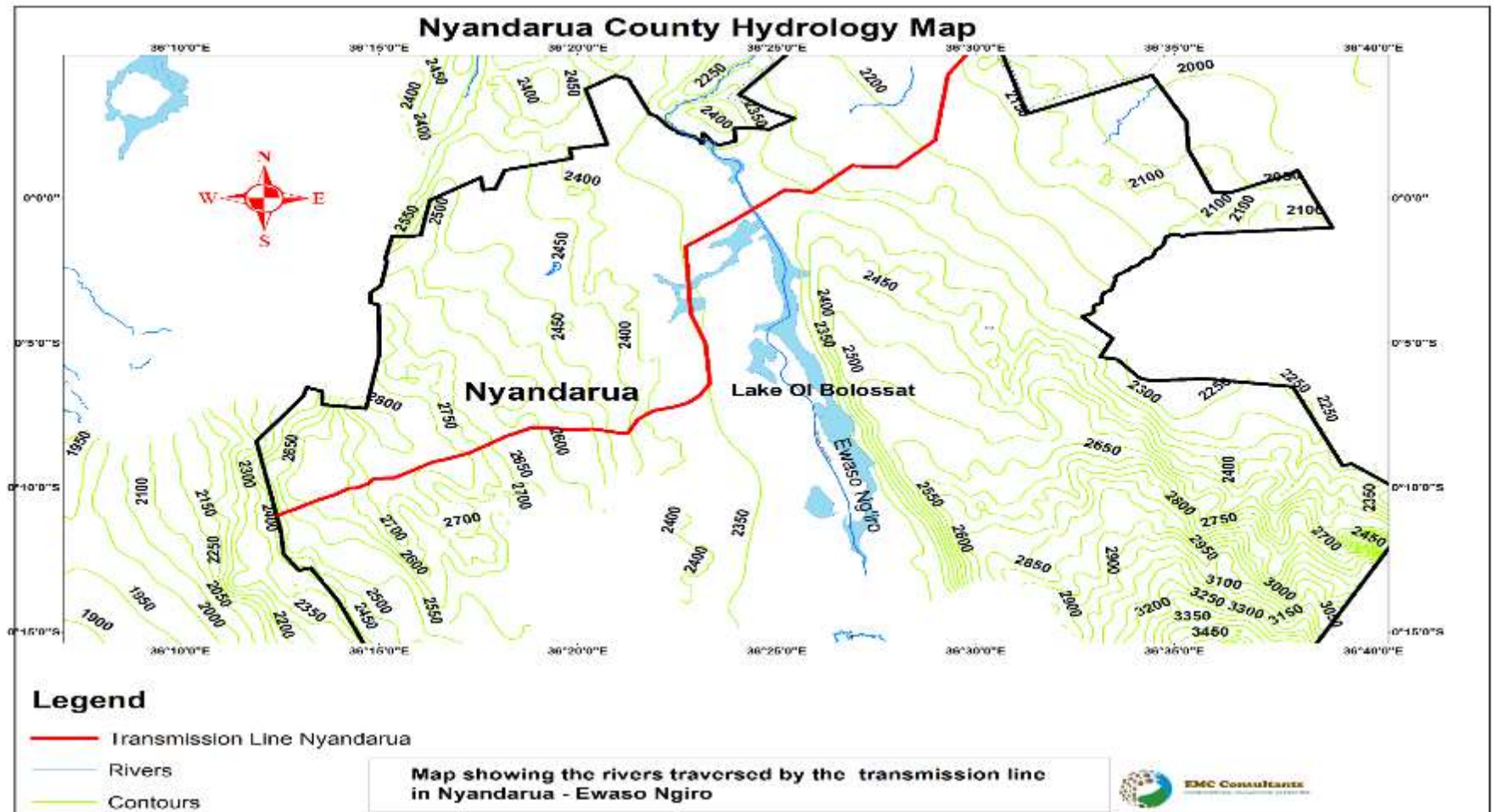


Figure 5-42: Map showing the rivers traversed by the transmission line in Nyandarua

#### 5.1.5.8 Biological Environment

The county has 499.2 km<sup>2</sup> of forest area which is concentrated on the western side of the Aberdare Mountain range with four forest stations in South Kinangop, North Kinangop, Geta and Ndaragwa. It also includes Ol Bollossat wetland covering 33.3 km<sup>2</sup>. Out of the 499.2 km<sup>2</sup> of gazetted forests, plantation type of forest covers 84.3 km<sup>2</sup>, natural forests area 21.2 km<sup>2</sup>, grass land 39.4 km<sup>2</sup>, bush land 84.35 km<sup>2</sup> and bamboo 77.01 km<sup>2</sup>. The total area under farm forestry is estimated to be 97.36 km<sup>2</sup> and is increasing. Most of the trees planted on farms provide a source of income when they are sold to saw millers. The area is rich in flora and fauna, with over 600 plant species, over 480 bird species and various species of mammals. There are also species of fish, reptiles and amphibians as well as a vast number of invertebrates.

##### 5.1.5.8.1 Vegetation

Nyandarua County has characteristic natural vegetation of grassland, acacia, forest, cedar forest with thin undergrowth, reeds, swamp grass, Themeda-pennisetum grasses and floating macrophytes in its wetlands. Tall trees of indigenous species are sparse. The main tree species projecting out of various escarpments are *Juniperus procera*, *Cussonia spicata*, *Euphorbia candelabrum*, *Acacia tortilis* and *Croton megalocarpus* which are frequently cut for fuel. A few exotic tree species such as Eucalyptus, Cupressus and Grevillea robusta have been planted on farmlands. The various water sources have wide range of floating and submerging macrophytes, nitiritus aquatic weeds and submerging macrophytes which normally occur in areas of the lake with clear water. The County is in addition dominated by grasses and shrubs such *Grewia species*, *Scutia species*, *Rhus natalensis* and *Buddleya polystachya* which has replaced the natural vegetation. The swamp vegetation includes *Cyperus immensus*, *Cyperus rigidifolia*, *Cirsium vulgare*, *Phalaria arudinacea*, *Cyperus papyrus* and *Cyperus latifolia*.



Figure 5-43: Vegetation cover in the project corridor

#### 5.1.5.9 Protected Areas

##### 5.1.5.9.1 Bahati Forest

Bahati forest is located in Bahati, one of the 10 administrative divisions of Nakuru County. It lies in latitude 0° 9' 0S and longitude 36° 7' 0E at an altitude 1,911 meters above sea level, it is approximately 16km North-East of Nakuru municipality. The highlands of

Bahati have which latosolic soils are well drained red soils derived from volcanic and basement complex rocks. However, parts of Bahati have planosolic soils which are poorly drained, dark brown clay, with highly developed textured topsoil. Mainly cedar and hardwoods with scattered bamboo, grassland and heath on higher slopes. The forest has been largely planted up except on steep ground in north-east. Common indigenous tree species in the project area are: *Prunus africana*, *Cordia abyssinica*, *Croton macrostachyus*, *Olea africana*, *Ekebergia rueppelliana*, *Croton megalocarpus*, *Juniperus procera* and *Podocarpus falcatus*. The naturalized exotic species are; *Gravillea robusta*, and *Mangifera indica*, guava and avocado fruit species. A variety of animals are found in Bahati forests; they include African hare, kirks Dik Dik, impala, Thompsons gazelle, common zebra, spotted hyena, spring hare, bush squirrel, porcupine, warthog, black faced vervet monkey, impala, and honey badger. The transmission line traverses the Bahati Forest as shown in the figure 5-45. A distance of approximately **1.75km** of forest area (**2.5 acres**) will be cleared as a result of the project.

#### **5.1.5.9.2 Leshau Forest**

The transmission line also crosses the Leshau Forest which was previously a reserve but has since been cleared and converted into farmlands is not considered a forest anymore, even though the map recognises the area as a forest. The distance is 1.14km with no forest cover. The transmission line traverses the former Leshau Forest as shown in the figure 5-45 below.

#### **5.1.5.9.3 Aberdare National Park**

Aberdare National Park which is one area of the IUCN Category II (National Park) was identified in the region of the project area. Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities. The Aberdare National Park was established in 1950 and is located in Nyandarua County and Nyeri. The park is managed by the Kenya Wildlife Service.

The park consists of the Aberdare Range, a mountain chain of volcanic origin, stretching from north to south and of the tight forested foreland located in the east. The park contains a wide range of landscapes, including mountain peaks that rise to 4,300 masl, their deep, v-shaped valleys intersected by streams, rivers, and waterfalls to the east and west, feeding the Tana and Athi River. Between the elevation of Ol Donyo Lesatima (3,999 m) and of Kinangop (3,906 m), an anticline of alpine heath lands stretches in a height of 3,000 m. Aberdare National Park and the ambient surrounding is characterized through forests zones dominated by indigenous vegetation types such as moorland, bamboo forests and rainforests, found at lower altitudes. The sanctuary and its variety of habitats are home for lion, leopard, serval, golden cat, baboon, black and white colobus monkey, Sykes monkey, bongo and for black rhino. Beside the mammals also the avifauna is presented with up to 250 species, including the endangered Aberdare Cisticola, Jackson's Francolin, sparry hawk, goshawks, eagles, sunbirds, and plovers. The proposed transmission route is 35 kms away from the Aberdare National Park and will not directly or indirectly adversely

affect the Aberdare National Park including inherent flora and fauna. The transmission line route is not within any of the known wildlife corridors.

#### **5.1.5.9.4 OI-bolossat Forest**

The area is rich in flora and fauna, with over 200 plant species, over 180 bird species and over 15 species of mammals. The area has characteristic natural vegetation of grassland, acacia, forest, cedar forest with thin undergrowth, reeds, swamp grass, Themeda-pennisetum grasses. Tall trees of indigenous species are sparse. The main tree species projecting out of the escarpment are *Juniperus procera*, *Cussonia spicata*, *Euphorbia candelabrum*, *Acacia tortilis* and *Croton megalocarpus* which are frequently cut for fuel wood and charcoal for domestic use by the local people. A few exotic tree species such as *Eucalyptus*, *Cupressus* and *Grevillea robusta* have been planted on farmlands at the bottom of the escarpment. The open water has a wide range of floating and submerging macrophytes, nitritus aquatic weeds have also invaded the lake. Submerging macrophytes occur in areas of the lake with clear water (Millennium Ecosystem Assessment, 2005). The escarpment is currently dominated by grasses and shrubs such *Grewia* species, *Scutia* species, *Rhus natalensis* and *Buddleya polystachya* which has replaced the natural vegetation. The swamp vegetation includes *Cyperus immensus*, *Cyperus rigidifolia*, *Cirsium vulgare*, *Phalaris arudinacea*, *Cyperus papyrus* and *Cyperus latifolia* (Wamiti et al., 2008). OI bolossat Forest is approximately 400 metres from the proposed transmission line. The OI bolossat forest is not a wildlife corridor and hence the transmission line route will not affect wildlife movement. The OI bolossat Forest is categorised as Endemic Bird Area (EBA)<sup>4</sup> by Birdlife International and has no Important Bird Area (IBA)<sup>5</sup> site (see figure 5-47).

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<sup>4</sup> an area which encompasses the overlapping breeding ranges of restricted-range species, such that the complete ranges of two or more restricted-range species are entirely included within the boundary of the EBA. This does not necessarily mean that the complete ranges of all of an EBA's restricted-range species are entirely included within the boundary of that single EBA, as some species may be shared between EBAs. The natural habitat in most EBAs (83%) is forest, especially tropical lowland forest and moist montane forest.

<sup>5</sup> Important Bird Areas are distinct areas that provide essential habitat for one or more species of birds in breeding, wintering, or migration. Important Bird Areas are identified for their value to species that are: Threatened or endangered; Restricted to a particular biome or region; Restricted to one habitat type; Occurring at high densities during some portion of the year.

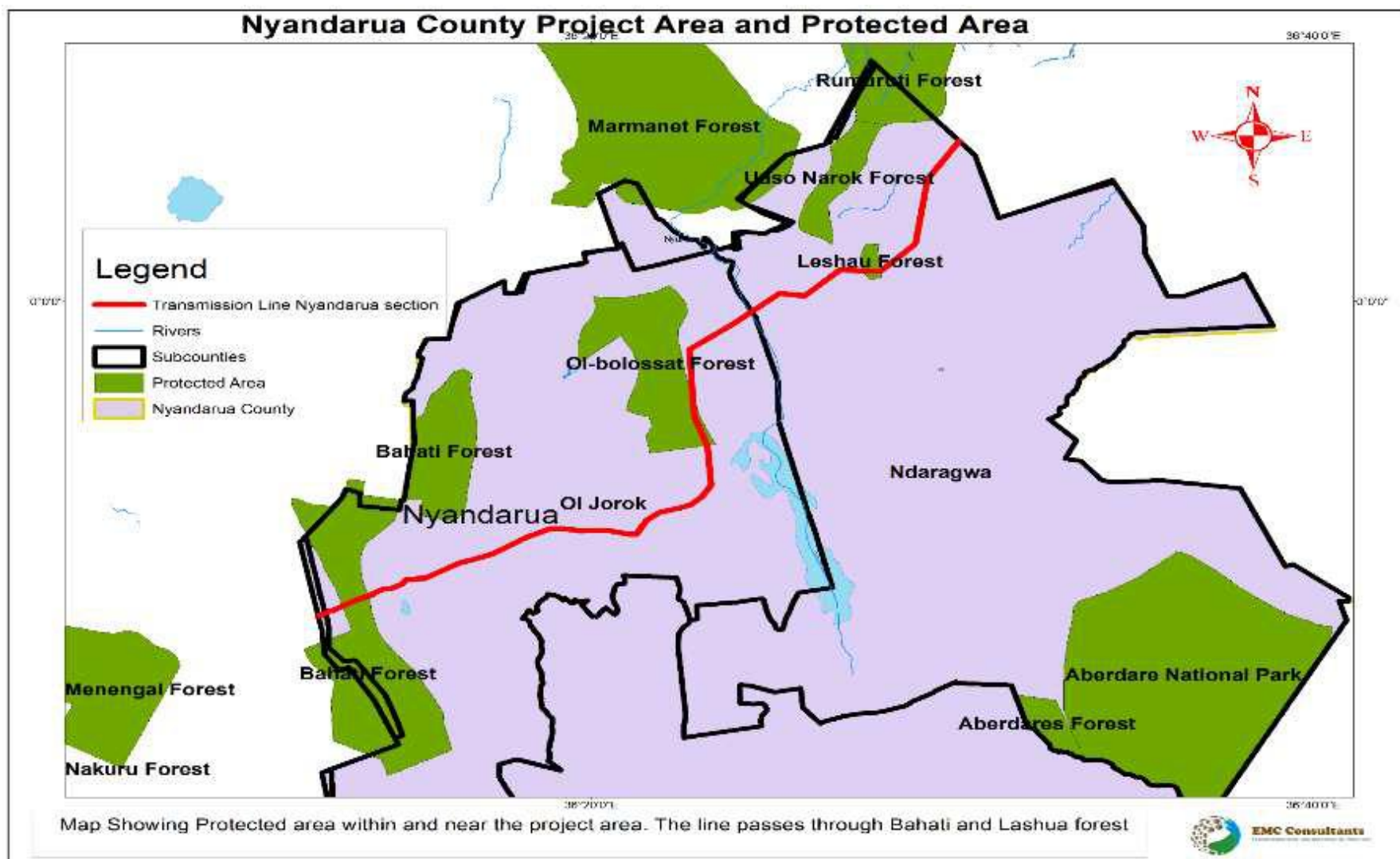


Figure 5-44: Protected Areas in Nyandarua County

#### 5.1.5.10 Avi-Fauna

The county's ecosystem including Satima Escarpments, Aberdare Forests and National Park, Marmanet Forest Complex, agricultural lands and urban centres have over 350 species of birds. Birds in general are an important indicator of environmental health and can give an early warning of undesirable ecological changes. Among the waterfowls, the most abundant groups are Afro-tropical ducks and geese, rails, gallinules and coots. Several Palearctic and Afro-tropical migrant species have also been listed in the African-Eurasian Waterbird Agreement (AEWA) under the Bonn Convention on Migratory Species (CMS).

The area around Lake Ol' Bolossat holds a significant area (39 sq.km.) of unique montane grasslands. Some of the key bird species within the lake grasslands and the surrounding farms include *Sharpe's Longclaw*, *Macronyx sharpei*, a globally threatened and Kenyan high-altitude grassland endemic bird *Jackson's Widowbird*, *Euplectes jacksoni*, also a restricted-range species and described as near-threatened (NT) by BirdLife. Long-tailed Widowbird *E. progne*, a regionally threatened species; *Hunter's Cisticola*, *Cisticola hunteri* (Least Concern) and Grey Crowned Crane *Balearica regulorum* (endangered). Also observed was regionally threatened Long-tailed Widowbird *E. progne*, Hunter's *Cisticola Cisticola hunteri*, Great White Egret *Egretta alba* and African Marsh Harrier *Circus ranivorus*. *Maccoa Duck* *Oxyura maccoa*, Saddle-billed Stork *Ephippiorhynchus senegalensis*, Great Crested Grebe *Podiceps cristatus* and White-backed Duck *Thalassornis leuconotus*. This appears to be the stronghold of the near threatened, restricted-range *Mirafra williamsi*, and most recent records have been from this area. The species is locally common but inconspicuous in rocky lava desert with sparse grass and low *Barleria* shrubs. Other notable species include *Neotis heuglinii*, *Merops revoilii*, *Spizocorys personata* (probably the largest population in Kenya), *Galerida theklae*, *Eremopterix signata* and (on the northern fringes) *Spreo albicapillus*. Many Somali-Masai biome species occur in the general area of county, but it is not known how many are present in the desert itself.



Figure 5-45. Birdlife in Nyandarua County

### 5.1.5.11 Endemic Bird Areas

#### ***Kenyan Mountain Endemic Bird Area***

The transmission line route is within the Kenyan Mountain Endemic Bird Areas (EBA). This EBA includes the mountains around the Rift Valley in the interior of Kenya and northern Tanzania, and on the eastern border of Uganda. These mountains include extensive areas lying above 2,500 m, and most of the main ranges rise to well over 3,000 m; they include the great isolated volcanoes of Mt Kilimanjaro (at 5,895 m the highest mountain in Africa), Mt Kenya (5,200 m) and Mt Elgon (4,321 m). The main habitats are Afromontane forest (from c.900 m up to 2,600 m), bamboo (mainly at 2,400–3,500 m), montane grassland (up to 3,500 m) and moorland (lying above 3,500 m). The southern part of this EBA overlaps geographically with the Serengeti plains (EBA 108), but the birds in the latter area occur mainly at lower altitudes and in non-forest habitats.

**Table 5-19: Species and IUCN Category**

Jackson's Francolin ( <i>Pternistis jacksoni</i> )	LC
Hunter's Cisticola ( <i>Cisticola hunteri</i> )	<b>LC</b>
Aberdare Cisticola ( <i>Cisticola aberdare</i> )	VU
South Pare White-eye ( <i>Zosterops winifredae</i> )	VU
Hinde's Babbler ( <i>Turdoides hindei</i> )	VU
Kenrick's Starling ( <i>Poeoptera kenricki</i> )	LC
Abbott's Starling ( <i>Poeoptera femoralis</i> )	VU
Jackson's Widowbird ( <i>Euplectes jacksoni</i> )	NT
Sharpe's Longclaw ( <i>Macronyx sharpei</i> )	EN

#### **Serengeti Plains Endemic Bird Area**

This EBA includes the semi-arid plains to the south and east of Lake Victoria in north-central Tanzania and south-west Kenya. Its boundaries, defined by the combined distributions of the restricted-range species, correspond to an isolated region of Somalia-Masai *Acacia-Commiphora* deciduous bushland and thicket (White 1983). In Tanzania, the EBA extends southwards from Serengeti National Park to the Lake Eyasi basin, which includes the Wembere steppe. In Kenya, it extends northwards from the border with Tanzania through the plateau to the west of the Rift Valley to the high valley bottom regions surrounding Lakes Naivasha and Nakuru. The northern part of this EBA lies adjacent to the Kenyan mountains (EBA 109), but the birds of the latter area occur mainly in montane habitats at higher altitudes.

**Table 5-20: Species and IUCN Category**

Grey-breasted Francolin ( <i>Pternistis rufopictus</i> )	LC
Usambiro Barbet ( <i>Trachyphonus usambiro</i> )	LC
Fischer's Lovebird ( <i>Agapornis fischeri</i> )	<b>NT</b>
Grey-crested Helmetshrike ( <i>Prionops poliophus</i> )	<b>NT</b>
Karamoja Apalis ( <i>Apalis karamojae</i> )	VU
Rufous-tailed Weaver ( <i>Histurgops ruficauda</i> )	LC

#### **5.1.5.12 Important Bird Area**

There are a number of Important Bird Areas (IBAs) within Serengeti plains EBA in Kenya as highlighted below. None of these IBAs are within the proposed transmission line route and will not be affected by the proposed project.

- Lake Elementaita, Lake Naivasha, Lake Nakuru National Park, Masai Mara, South Nguruman and Kwenia.

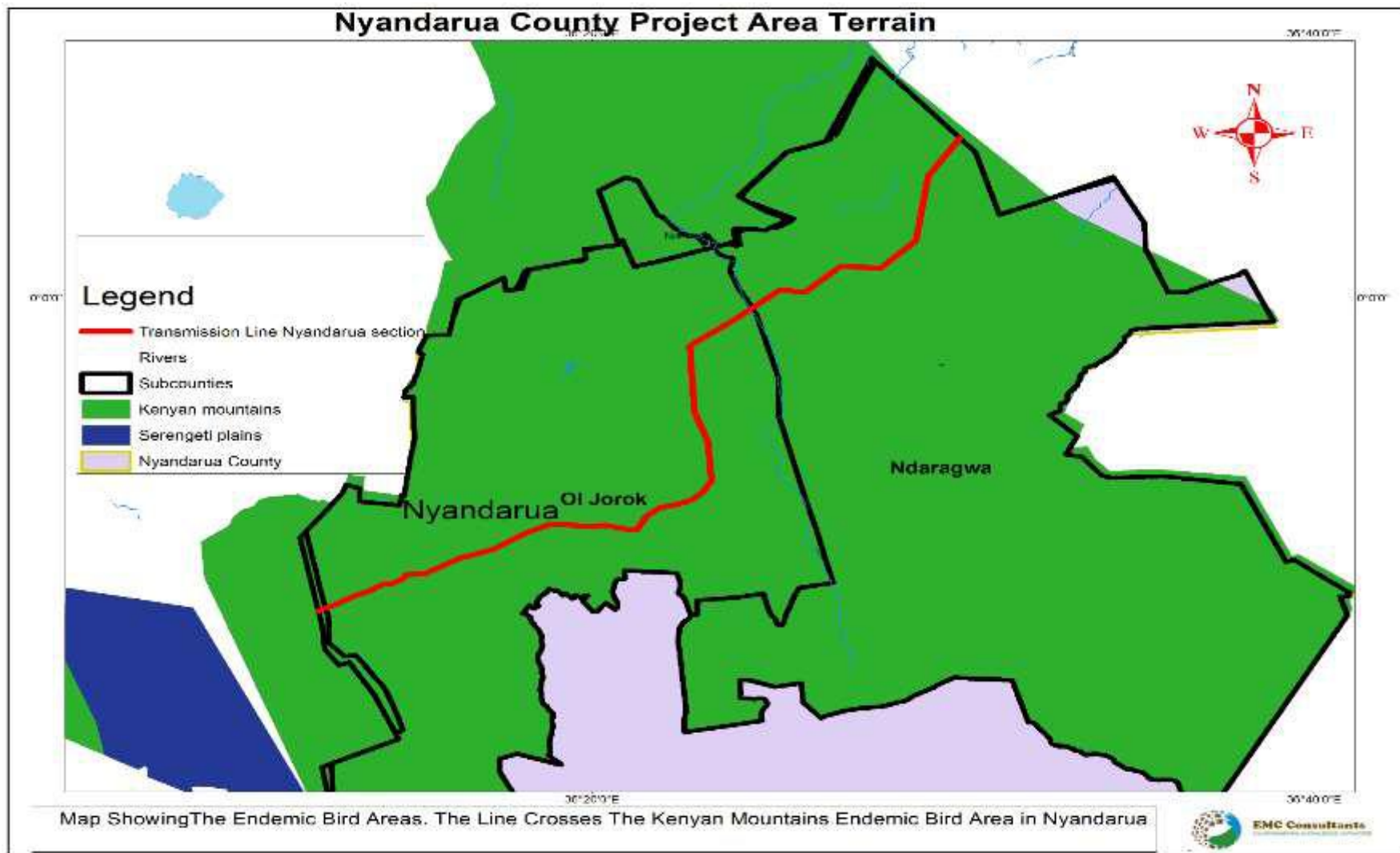


Figure 5-46. Endemic Bird Areas in Nyandarua County

## **5.1.6 Nyandarua County Socio-Economic Baseline**

### **5.1.6.1 Population Size and Composition**

Nyandarua County is home to 596,268 people (male-49% and female-51%), according to the 2019 National Census. The Kikuyu people are the dominant community in Nyandarua, making at least 90 % of the county's population. Other communities such as Luo, Luhya, Kamba and Kisii are also residents especially in the urban centres. These groups of people reside in the county where they primarily engage in various businesses and employment.

### **5.1.6.2 Ethnicity**

Nyandarua County is home to 638,289 people (male-49% and female-51%), according to the 2019 National Census. The Kikuyu people are the dominant community in Nyandarua, making at least 90 % of the county's population. Other communities such as Luo, Luhya, Kamba and Kisii are also residents especially in the urban centres. These groups of people reside in the county where they primarily engage in various businesses and employment. There are no Vulnerable and Marginalized Groups along the proposed route based on the ethnic profile of the local communities. The dominant ethnic community (majority) along the ROW is Kikuyu with Luo, Luhya, Kamba and Kisii forming minority ethnic communities in the project area. No VMGs (communities who meet the requirements of OP 4.10) are affected by the project.

### **5.1.6.3 Settlement Patterns**

There are three major settlement patterns identified in the County; clustered settlements, dispersed settlements and linear/ribbon settlements.

#### **Clustered Settlements**

This type of settlement is found within the main urban centres. It is characterized by highly built-up areas with compact housing. The region has a high population density and the inter-house distance is usually small. Such areas include Ol'Kalou, Engineer, Njabini, Mairo-Inya as well as parts of Ol'Joro Orok and Ndaragwa. These towns are either economic centres or administrative areas with settlement density reducing towards the periphery.



Figure 5-47: Section of clustered settlement in Nyandarua

### **Dispersed Settlements**

Mostly found in the rural hinterland of the County which is largely characterized by farming villages spread across the County. The built-up area is less compact, and the region has a low population density. Most of the rural settlements are influenced by availability of land, soil fertility, pastures, topography, climate and provision of basic services such as water, electricity and roads. Areas with this type of settlement include Shamata, Central, Charagita, Gathanji, Kanjuiri and Gathara Wards.



**Figure 5-48: Dispersed settlement in Nyandarua**

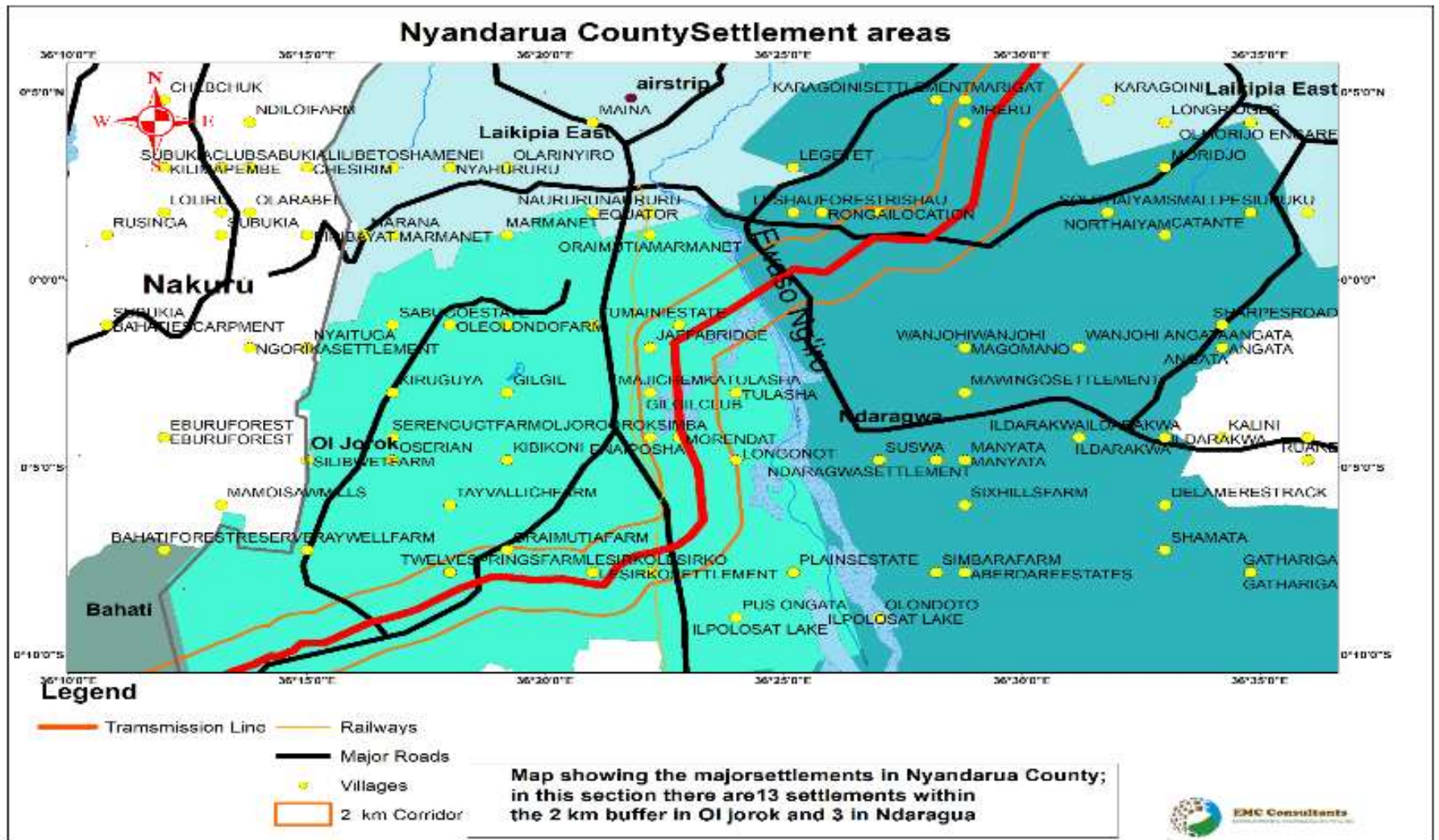


Figure 5-49. Settlements along the transmission line AOI

According to the socio-economic survey targeting the communities around the project AOI, majority (50.1%) of the household members in the project area were males, while the females formed 49.9%.

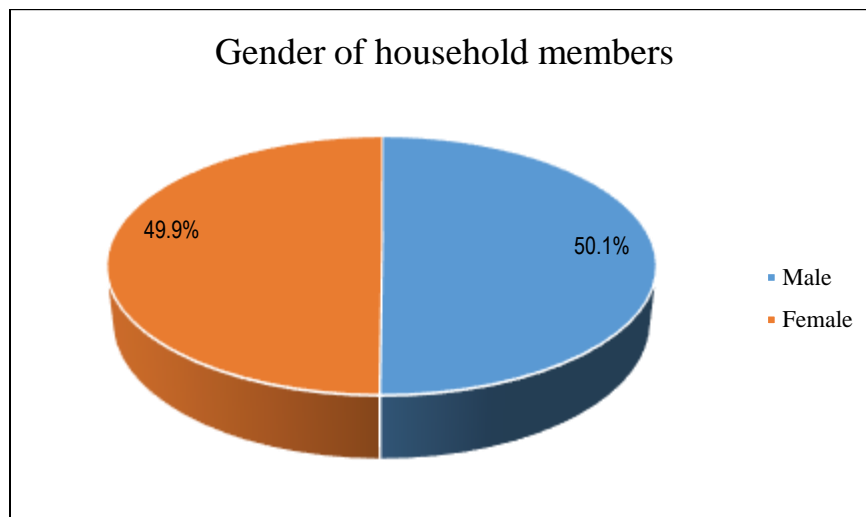


Figure 5-50: Gender Distribution

#### 5.1.6.4 Land and Land Use

The land tenure systems operatives in Nyandarua have been characterized as private/modern, communal/customary, public/state and open access. These systems overlap in some cases, especially where the tenure reform process is incomplete, as is the case in the trust land awaiting registration where individuals have rights over land legally vested in local County Government as trustees. Prior to the Second World War, the lake and its surroundings were used as a dry season grazing area by Maasai pastoralists. After the war, the entire area and its catchment were allocated to three retired British Army soldiers and thereafter, a further sub-division to settle more decommissioned British Army soldiers. The settlers used the land for livestock rearing



Figure 5-51: Greenhouse in Oraimutia, Nyandarua County

## **Agriculture**

There are several irrigation projects in Nyandarua County: namely Kinungu irrigation project with 350 acres, Haki irrigation project, Marngarachi water pan, Muti Umwe water pan, Kwanjora Water Pan Phase 1 and 2 each 10 acres and Munyu Gathanji irrigation project occupying 200 acres. Other irrigation schemes include: Mwihoko Githima irrigation scheme, Thiririka irrigation project, Kaimbaga irrigation project and Mutara irrigation project. Most of the irrigation schemes and projects practised in Nyandarua County are small-scale. Nyandarua County experiences rains for most of the year apart from areas in Lower Ndaragwa Sub County that are relatively dry. Both large and relatively small land parcels are evenly distributed across the County. Small portions of land are found within the areas initially designated as colonial labour settlements. Agricultural activities observed include the cultivation of crops including potatoes, maize, wheat, sorghum, beans, peas, cassava, tomatoes, onions, coffee, tea, and livestock farming of cows, goats, sheep, donkey, poultry and pigs.



Figure 5-52: Sample crops in Nyandarua County

## **Livestock**

Major livestock breeds are both indigenous and exotic. Cooling and pasteurizing facilities exists in both Engineer in Kinangop Sub-County and Ol'Kalou though privately owned. Other facilities that exist with regard to livestock outputs are milk coolers owned by various dairy co-operative societies. Cattle dips are located across the County although their operations vary depending on their location and management. There is no processing plant for milk or any other livestock product. Kipipiri Sub-County holds the only ranch in the County-Ol Magogo, which is run by KALRO.

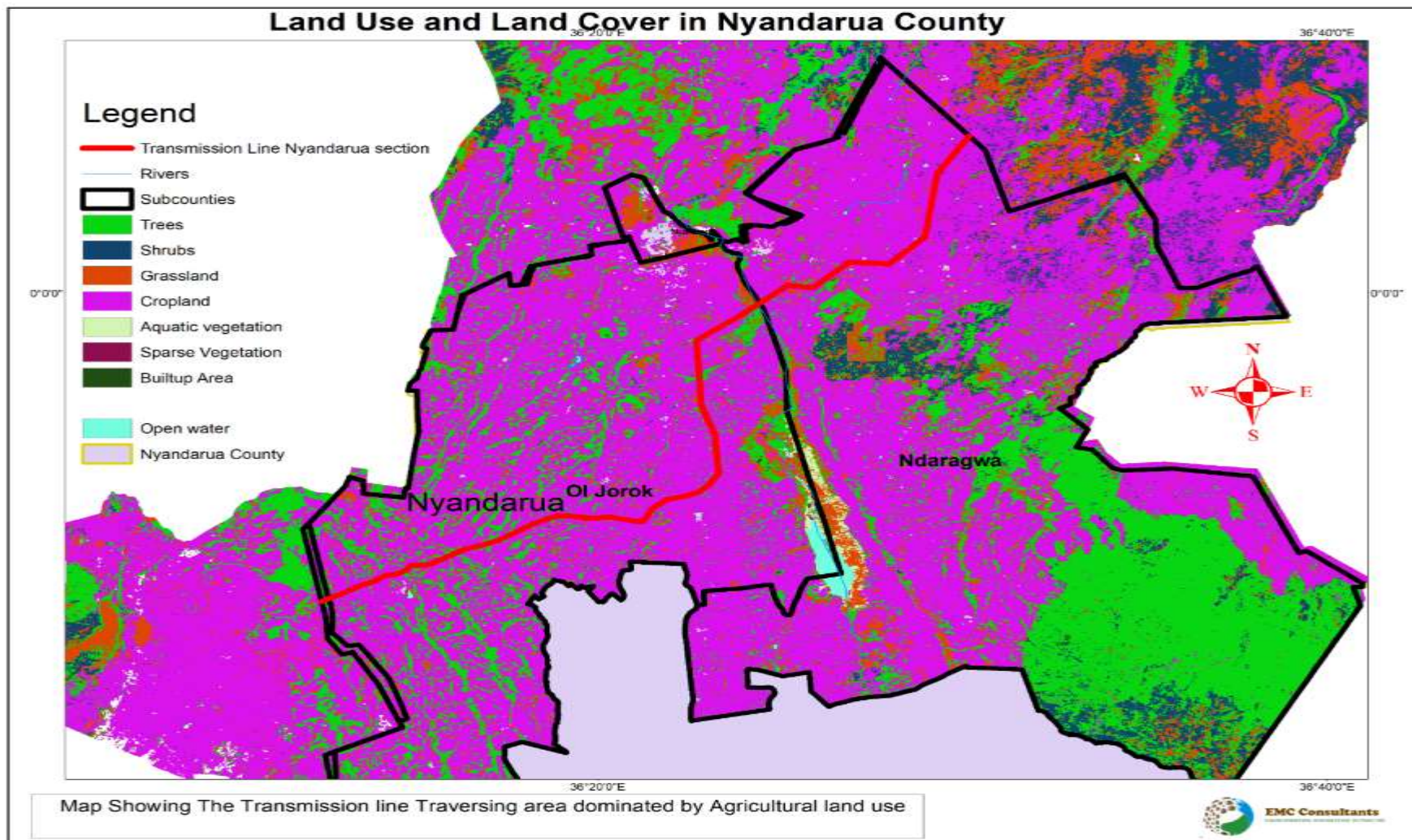


Figure 5-53: Land Use Activities Along Proposed Transmission Line Route

#### 5.1.6.5 Education

The county literacy rate is 86.3%. This is the county population that can read. However, the proportion of the population that can write is 85.2% while the proportion that can read and write is 83.8 %. This implies that about 13.7% of the population cannot read and will be the target for adult education basic literacy programs.

The county has 846 Early Childhood Development (ECD) Centres of which 436 are private, 508 primary schools of which 171 are private and 337 are public, 185 secondary schools where public are 139, 14 Youth Polytechnics and 1 Science and Technology Institute. The county has two branches of universities namely: Greta University and Maasai Mara University. The county has 864 ECD centres with a total enrolment of 26,964 pupils. This enrolment is 54.3% of the target population aged between 3-5 years. This means there are many children who have not been enrolled in ECD. There are 1,828 ECD teachers indicating a teacher pupil ratio of 1:17. The average years of attendance are two years. There is need for increased funding to expand the ECD facilities, increase the number of ECD teachers and there is also need to sensitize the parents about the need to take their children to the ECD facilities at the appropriate age.



Figure 5-54: sample schools along the project area.

The county has 508 primary schools with a total enrolment of 155,732 pupils. This enrolment is 95.3% of the county population aged 6-13 years. The number of primary school teachers is 3,573 with the teacher pupil ratio of 1:40. About three per cent of the children travel for less than one kilometre to school while 93% travel between 1.1-4.9 Km. Four per cent of the children travel for more than five kilometers to school.

The total number of secondary schools in the county is 185 schools with a total enrolment of 49,769. This enrolment is 50.3% of population aged 4-17 years. There are 1063 teachers in the county giving a teacher/student ratio of 1:28. The dropout rate in secondary school stands at 5.8%. Students travelling less than one kilometre to a secondary school account for 12% of the total student population, while those travelling 1.1 to 4.9 km account for 54%. However, those travelling for five kilometers and above are 34%. The transition from primary school to secondary school is 21% meaning that 79% either join tertiary institutions or they drop out of school after completing primary school.

The county has 14 youth polytechnics and one Institute of Science and Technology (Nyandarua institute). There is one university branch of Maasai Mara University in both Kinangop and Kipipiri. This shortage in tertiary institutions has greatly affected the transition rates from secondary school to institutions of higher learning. There lacks an institution offering agro-based courses which would be more relevant to the economy of the county that largely depend on agriculture.

Most of the PAP household heads could read and write (92%). Only 8% per cent of PAP household heads could not read and write in English or Swahili. Kikuyu and Kalenjin language were the most spoken languages at home.

About 36.1 % of the PAPs had attained primary level of education and 26.6% achieving secondary levels of education. These percentages are inclusive of household heads and other members of the household. In the survey conducted, 9.9% and 12.8% respectively did not complete Secondary and Primary level education. 6.9% of the PAHs completed technical training while 0.2% had completed vocational training. A further 3.3% of the PAHs were undergoing education and the remaining 4.2% of PAHs had no formal education.

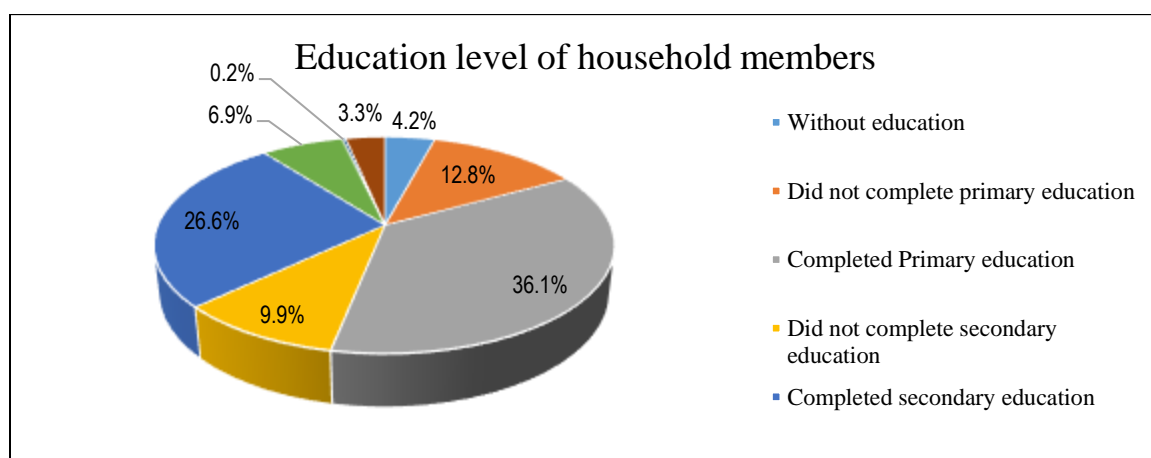


Figure 5-55: Literacy Level

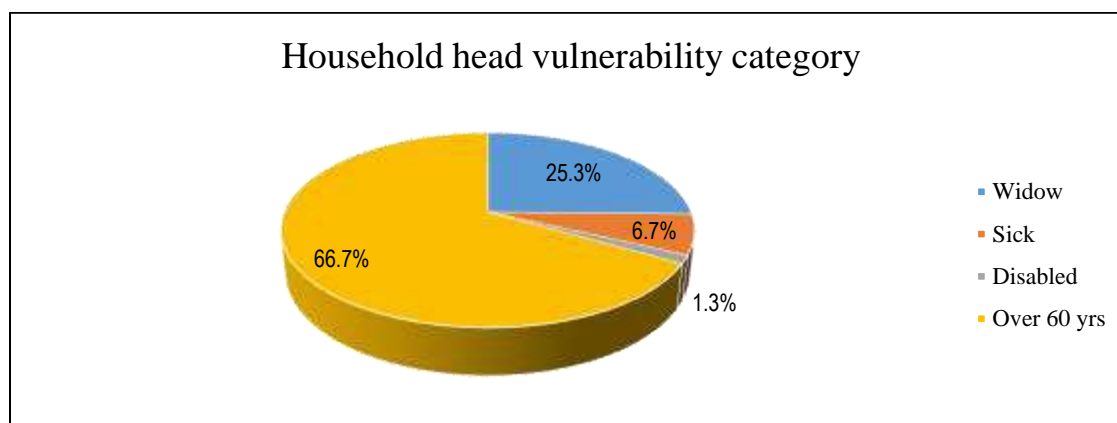
#### 5.1.6.6 Health

There are two level four public health facilities in the county, one mission hospital, three nursing homes, seven level three health facilities, 32 level two facilities and 50 private clinics. The doctor population ratio is 1:155,188 and nurse population ratio is 1:2,150. The average distance to the nearest health center is 3.2 km. In the county, 21 % of the households travel up to one kilometre to access health service 78% travel between 1.1 km and 4.9 km while those who travel above five kilometre account for 1% of the population. Of major concern is that only 15% of the total population in Nyandarua County use mosquito bed nets. This needs to be improved through creating public awareness to the residents.

The most prevalent disease in the county is upper respiratory infections which account for 23.1 % of all reported cases. Other diseases are: lower respiratory infections which

account for 5.9 % of reported cases, malaria at 14.5 % diarrhea is at 1.4 % and stomach aches at 3.8 %. The average morbidity rate for the county is 21.2 %. The male morbidity rate is 19.2 % and female morbidity rate is 23.4 %. Most of these diseases are bacterial infections that can be prevented through proper clothing, appropriate beddings, water treatment and hand wash. Vulnerability identified during the survey within the PAHs as shown below was composed of: -

1. The elderly over 60 years (66.7%)
2. Women headed households/widows (25.3%)
3. The sick/Chronic illnesses (6.7%)
4. Disabled (1.3%)

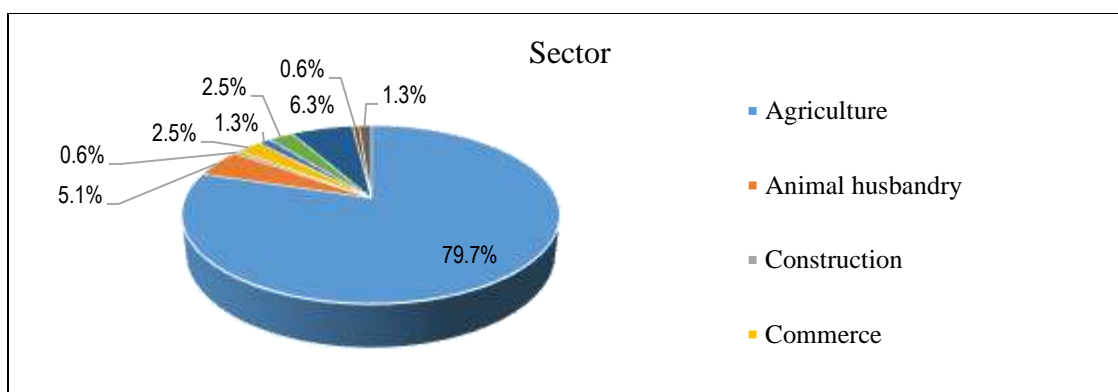


**Figure 5-56: Perceived Level of Vulnerability.**

#### **5.1.6.7 Poverty, Income and Employment**

Most of Nyandarua's population, about 46.2%, is self-employed, 13.0% is in full time employment, 9.4% are casual labourers, 20.1% are students and 11.4% are unemployed. About 24.5% of the households earn between 5,000 and 10,000 Kenya shillings a month, about 22.5% earn from 10,000 to 20,000 shillings monthly and a minority of about 3.3% earn above 50,000 per month. Food crops, livestock and to a large extent horticulture production comprise the major economic activities in the agricultural sector. Cottage and small-scale industries are minor economic activities carried out in the market centres. The role of sawmill as a major source of employment has declined with the fall in available trees for lumber in the County. Commercial tree production is now the only source of timber for the few sawmills that are still operational. The Jua Kali sector remains the most important economic activity in the urban and trading centres. These sectors are the major sources of employment opportunities in the County.

The main source of income as shown in the figure below for the household was agriculture at 79.7% followed by economic support from family and friends at 6.3%. Animal husbandry was at 5.1%, Pension and Commerce was at 2.5% respectively. The civil service sector was at 1.3% and the construction sector at 0.6%.



**Figure 5-57: Economic Activities**

### Workforce

Nyandarua County has a labour force of 52.55% compared to that of the national labour force of 51.9%. It is forecast to be 468,080 by the year 2026, an increment of 155,313 from 2009. In Nyandarua, unemployment rate currently lies at 3.5%, 4.2 percentage points below the national figure of 7.7% (Exploring Kenya's Inequality; Nyandarua County, 2013). This notwithstanding, there is need to increase employment and income earning opportunities in the County. This can be done through commercialization of agriculture, fostering industrial activity and enhancing access to capital and credit facilities particularly for Small and Medium Enterprises (SMEs). Increase in the percentage of working population will reduce the dependency ratio which currently lies at 91:100, thus increasing savings and in turn the investment capacity.

### Unemployment

The employment level in the county is at 16.9%. The rest of the labor force is not economically engaged either because they are at school, are incapable to work or cannot find any work. This unemployment level of 83.1 % indicates the extent to which the resources of the county including human capital remain under exploited. The level of unemployment may also be attributed to job-skills mismatch where the available jobs are not filled with the qualified personnel for that post.

#### 5.1.6.8 Livelihoods

Agriculture employs about 50% of the population with most people employed in the family agricultural holding (Exploring Kenya's Inequality, 2013). Arable/crop farming is the main agricultural activity in Nyandarua with a total arable land of 184,900 ha; in 2016, nearly 46% of this land was under crop farming. About 76.9% of households practise crop farming. Livestock farming is the second major employment sector under agriculture with approximately 65.1% of households rearing livestock: cattle, sheep, goats, poultry, pigs and rabbits. Cattle and sheep account for the largest percentage. Fishing is picking up as a source of employment and income for a number of households. Men in the county also practise Jua Kali activities. These activities require some specialized skills. The men acquire these skills through technical training or apprenticeship. More men than women are involved in businesses because they can access credit more easily than their female counterparts.



Figure 5-58: Sample Economic activities along the project area

#### 5.1.6.9 Gender Based Violence

Nyandarua is now the most dangerous county on gender-based violence with nearly three in every ten people having been rushed to hospital with injuries in 2016. A government funded study, the Kenya Integrated Household Budget Survey (KIHBS), shows that 27.6 percent of residents in the county ended up in hospital after the fight. This is sixteen times the national average of 1.7 percent. Specifically, 25 percent of women have experienced physical violence, 7 percent have experienced sexual violence, and 14 percent have experienced both physical and sexual violence. With such a high burden of GBV in Nyandarua, it is imperative that the county prioritizes investment in the provision of care for survivors of GBV. This investment must, however, be guided by evidence on the cost of providing these services.

#### 5.1.6.10 Energy

Main source of cooking energy is firewood while electricity covers 10.5 % of the county and is mainly found in urban centres of Mairo-inya, Ol'kalou, Njambini and Engineer and several trading centres located in different parts of the county. The total number of households using electricity for cooking is 0.2 %, while 77.8 % of household use firewood as the main source of cooking fuel. The proportion of households using charcoal is 19.3 %, paraffin is 1.4%, and biomass residue is 0.3%. Households using firewood for lighting are 0.3%; paraffin 82.7 %, electricity 10.5 %, and solar 6.0 %.

According to the socio-economic survey the main household sources of energy for cooking was dry plants/wood (79.9%), Coal (7.7%) and LPG Gas (4.7%). Other sources of energy sources for cooking include electricity, kerosene, biogas and others are as shown in the figure below. Electricity (45.2%) is the main source of energy used for lighting; the other sources of energy for lighting formed 54.8%.

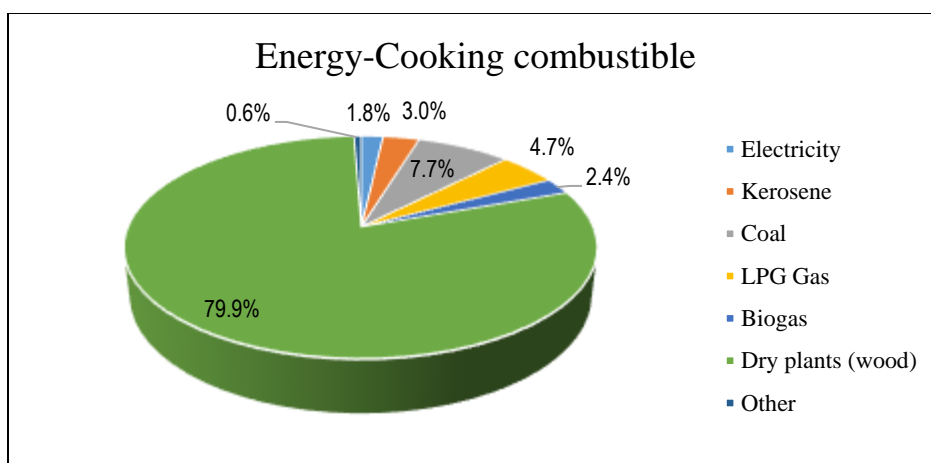


Figure 5-59: Sources of Energy for cooking

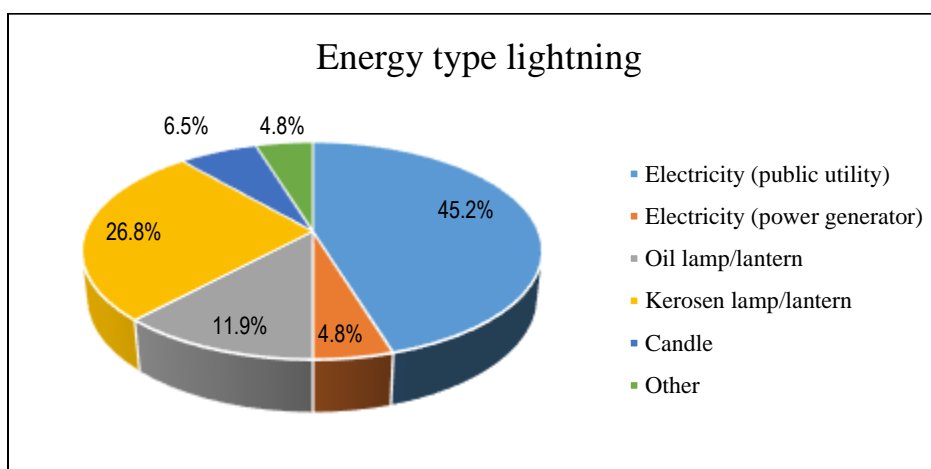


Figure 5-60: Sources of Energy for lighting

#### 5.1.6.11 Water and Sanitation

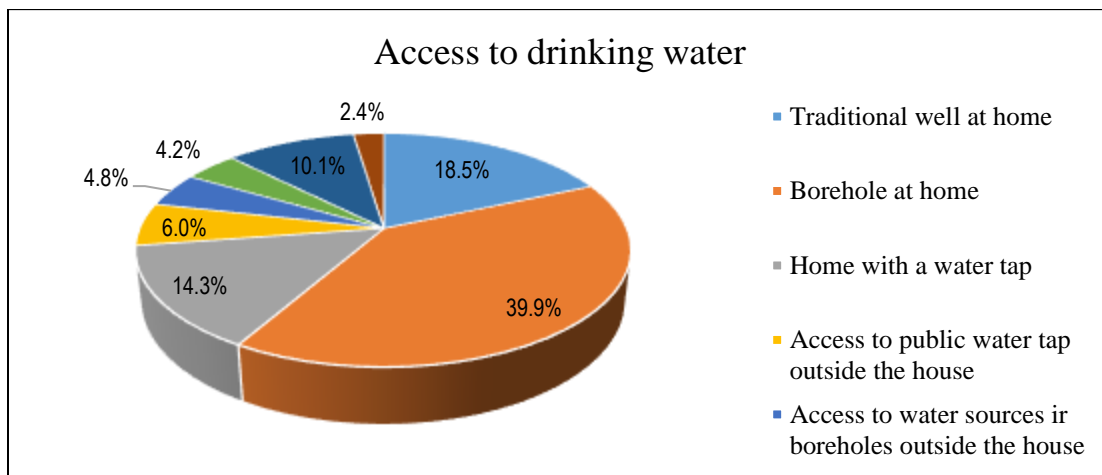
The county is categorized as a water scarce area. The situation has been aggravated by the degradation of water catchments leading to reduced ground water recharge. As a result, boreholes have medium to low yields. The main source of water in the county is rainwater which ends up in dam sand rivers. The major rivers within the county originate from the Aberdare forest and drains into Ewaso-Nyiro and Narok in Rift valley and Tana catchment areas. The county has one lake, 222 dams, 280 boreholes 6244 shallow wells and 96 springs. Main source of water for domestic use is dams and shallow wells. This water issued for domestic, agricultural, and small industrial use. Most of the water used is untreated which poses great health risk. There are two water companies in the county registered by the Rift Valley Water Works Authority (RVWWA). These are: the Nyandarua Water and Sanitation Company and the Ol'kalou Water and Sanitation Company. Most of the areas in the county are not covered under these schemes thus remains unserved. The water supply system is unreliable and there is need to expand water schemes to increase the number of households with access to piped water. The average distance to the nearest water point is 1.5km. 35,321 households have access to piped water while 21,154 have access to portable water. Most of the households depend on water from shallow wells, roof catchments and rivers.



**Figure 5-61: Sample water source and pit latrine along the project route**

The main form of disposal for human waste is pit latrines. 92 % of the households have latrines out of which 81% have pit latrines and three % have flush toilets. There is no sewerage system in the county. On the other hand, the most common mode of disposal for solid garbage is by garbage pit at 32.8 % of the households. 28 % of households dispose by burning while 25 % dispose in their farm gardens. The local authority collects garbage for only two % of the households. On waste disposal, 92 % of the population have access to latrines with 81 % utilizing pit latrines, eight % VIP latrines, and three % flush toilets. There are no sewerage systems in the county. Garbage collection by the town and County Councils within the county cover a small %age as only two % of the waste is collected by the local authorities.

Communities around the project AOI based on the socio-economic survey outcomes concluded that a borehole at home was the most used source of water (39.9%) traditional well at home followed (18.5%), while homes with tapped water; rainwater, public water taps outside the house, water sources in boreholes outside the house, surface water and water vendors were at (41.8%).



**Figure 5-62: Sources of Water**

The main sanitary facility used by the community interviewed was a latrine without septic tank (89.9%). Those who used latrines with septic tanks constituted 4.2%, while those

with flush toilets in the house formed 2.4%, whereas those who used public toilets outside the house and those who had no access to sanitary facilities were both at 1.8%.

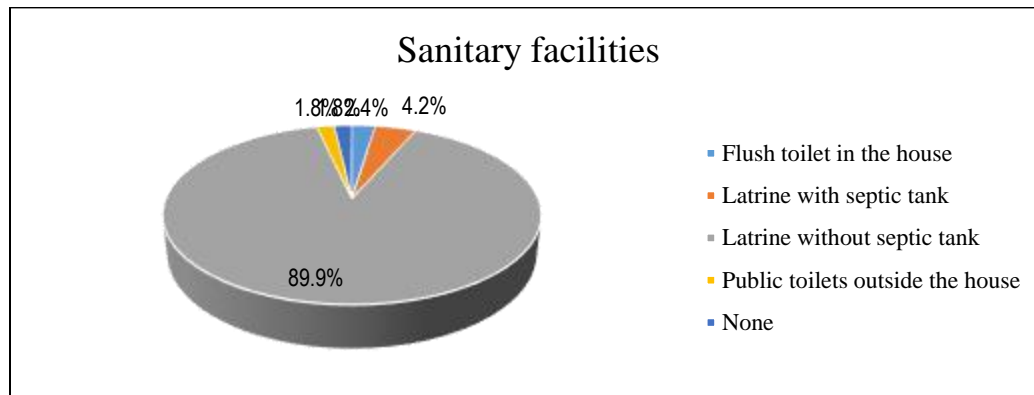


Figure 5-63: Sanitation facilities

#### 5.1.6.12 Tourism and Recreation

**Main Tourist Attractions and Activities** Although the County is within the Mt Kenya and Aberdare Range tourist circuits, tourism remain undeveloped. The County is richly endowed with abundant game for tourist attraction. The main tourist attraction sites include: the Aberdare National Park which has abundant wildlife and recreational activities including mountain climbing and nature trails; Lake Ol’Bolosat which is ideal for bird and hippos watching, boating, water surfing activities and sport fishing; pre-colonial and colonial times settlements where there exist “White Mischief Happy Valley Homes” at the foot of the Aberdare forest where the colonialists lived; the Mau Mau caves at Geta and Kimathi which some Community Based Organisations (CBOs) have endeavored to preserve; and other attractions including scenic terrains, waterfalls, rivers and forests. There are numerous investment opportunities in tourism as the County has few star-rated hotels.



Figure 5-64. Archeological site in Nyandarua County.

#### **5.1.6.13 Trade and Industry**

The County, apart from being predominantly agricultural, has other resources which include forestry, water, tourism, and natural stone for quarrying. There is potential for secondary utilisation of these resources. Potential for agro-industrial processing exists in the dairy and livestock sector, horticulture, and food crop production. Other economic activities include saw-milling, commerce, and small-scale Jua Kali industrial enterprises. The country has an undeveloped industrial sector. The jua kali artisans operate in un-coordinated manner in production and marketing. There are 1023 jua kali artisans and five associations. Great potential in development of industries exist in agro processing. Thread milling which done at small scale in Kinangop could be expanded and replicated in other areas as the raw material (wool) is readily available in the county. The Midlands factory in Njambini deals with potato processing and has contracted market in Nairobi. There is room to expand this factory and establish more to boost potato farming in the county and offer cold storage facilities for green peas and carrots. The pyrethrum processing industries in the county that have since collapsed should be revived. Milk processing and dairy product making should be expanded to enhance value addition. There is also potential for processing of hides and skins. Cut flower farming is also practiced in the county with flower farms in Ol'jororok, Ol'kalou, and Kipipiri. There are about 313 trading market centres. The majority of them have scheduled market days where buyers and sellers congregate for trading on retail basis. Major goods traded in these markets include potatoes, cabbages and tomatoes among other agricultural produce, second-hand clothes, and household items. There are 537 registered wholesale traders and 12,900 retailers in the County. This implies that the bulk of the trade is in retail.

There are no large-scale industrial activities related to manufacturing and processing. There are however numerous small-scale industrial activities such as saw-milling, furniture, and metal fabrication, among others concentrated mainly in the urban and market centres. The metal fabrication works, and wood crafts have now extended to the rural areas because of electricity supply. The contribution of these cottage industries to the local economy cannot be estimated because most entrepreneurs are not willing to disclose information on the amount of money they earn. The closure of forests has led to a closure of most saw-milling enterprises, which had been a major employer.

#### **5.1.6.14 Transport Network**

Road is the primary mode of transportation in the County, with a total road length of Approximately 3,400 kilometres. Earth roads account for 78% of the total road network, while bitumen roads constitute only about 7%, which indicates that there are challenges of mobility within the County. The current road network comprises of hierarchical roads classified as B, C, D, E, F and G classes. The major roads traversing the County are Nyahururu-Nyeri (B21), Ol'Kalou-Miharati (formerly C69, now B20) and Ol'Kalou-Nyahururu (formerly C77, now A4). The existing road network is largely shaped by the human settlement pattern, as well as internal and external growth nodes. There are also numerous Class D and E roads within the County. The connectivity index of Nyandarua is moderately sufficient. Progress on upgrading to bitumen of the B20 Njabini-Dundori road and the consequent maintenance works; the re carpeting of the Gilgil-Nyahururu road; completion of Boiman-Nyahururu road; ongoing works on the Mairo-InyaSubuku road, Dundori-Ol'Joro Orok road, and Gilgil-Tumaini roads have improved transport and

communication within the County. The upgrading of other key roads at Ward level to gravel standards is also in progress. Public transport is provided by matatus, motorcycles (boda bodas) and taxis. The matatus mainly ply the routes defined by the existing road network, and the internal and regional nodes. The major routes within the County link the primary nodes; Ol’Kalou, Ol’Joro Orok, Ndaragwa, Miharati, Engineer and Njambini. External routes link the County to Nairobi, Nakuru, Nyeri, Kirinyaga, Embu, Murang’a, Kiambu and Nyahururu.

**Figure 5-65: Nyahururu Road Network and a section of Ol Kalou Town in Nyandarua County**



#### **Air transport**

The County has a paved airstrip at Gatimu owned by the Government which operates for strategic purposes only and currently has no commercial importance. The airstrip is inadequately serviced and has minimal operations. Ways of revitalizing this airstrip to extend its activities for commercial and tourism use should be explored.

#### **Railway transport**

There is a 60 kms long metre gauge rail connecting Gilgil to Nyahururu that passes through the Nyandarua County with stations in Ol’Kalou and Ol’Joro Orok. Currently, the railway line, which was constructed in 1927, is in disuse and some of its infrastructures have been vandalised. It was constructed to transport milk, livestock, wool, and cereals from Nyandarua and Laikipia to the rest of Kenya. The railway line collapsed due to the failure of KCC as the Nyahururu plant used to be the main client; increased tariffs and low turn-around period has diverted clients to use roads; and inbreeding of sheep resulted in a decline in wool production.

#### **5.1.6.15 Financial Services**

There are four main commercial banks: Equity Bank, Kenya Commercial Bank and Cooperative Bank with branches, ATM networks and agents spread in various market centres within the County. There are 3 microfinance institutions, namely Faulu Kenya, Kenya Women Finance Trust (KWFT) and Small and Micro Enterprise Programme (SMEP). There are 32 SACCOs with 22,000 members. The County has 96 active co-operative societies of which 40 are in agriculture and dairy, 32 are banking related SACCOs, 2 investment co-operative societies, 3 multipurpose co-operative societies, 5 housing societies, 12 transport SACCOs, and 1 Jua Kali and 1 boda boda co-operative societies. These co-operatives have a total of 86,816 registered members.

### **5.1.7 Laikipia County Bio-Physical Environment**

#### **5.1.7.1 Location and Size**

Laikipia borders Samburu County to the North, Isiolo County to the North East, Meru County to the East, Nyeri County to the South East, Nyandarua County to the South, Nakuru County to the South West and Baringo County to the West. The County lies between latitudes 0° 18' South and 0° 51' North and between longitude 36° 11' and 37° 24' East. It covers an area of 9,462 km<sup>2</sup> and ranks as the 15th largest county in the country by land size. Figure 5-63 below shows the geographical position of Laikipia County in Kenya.

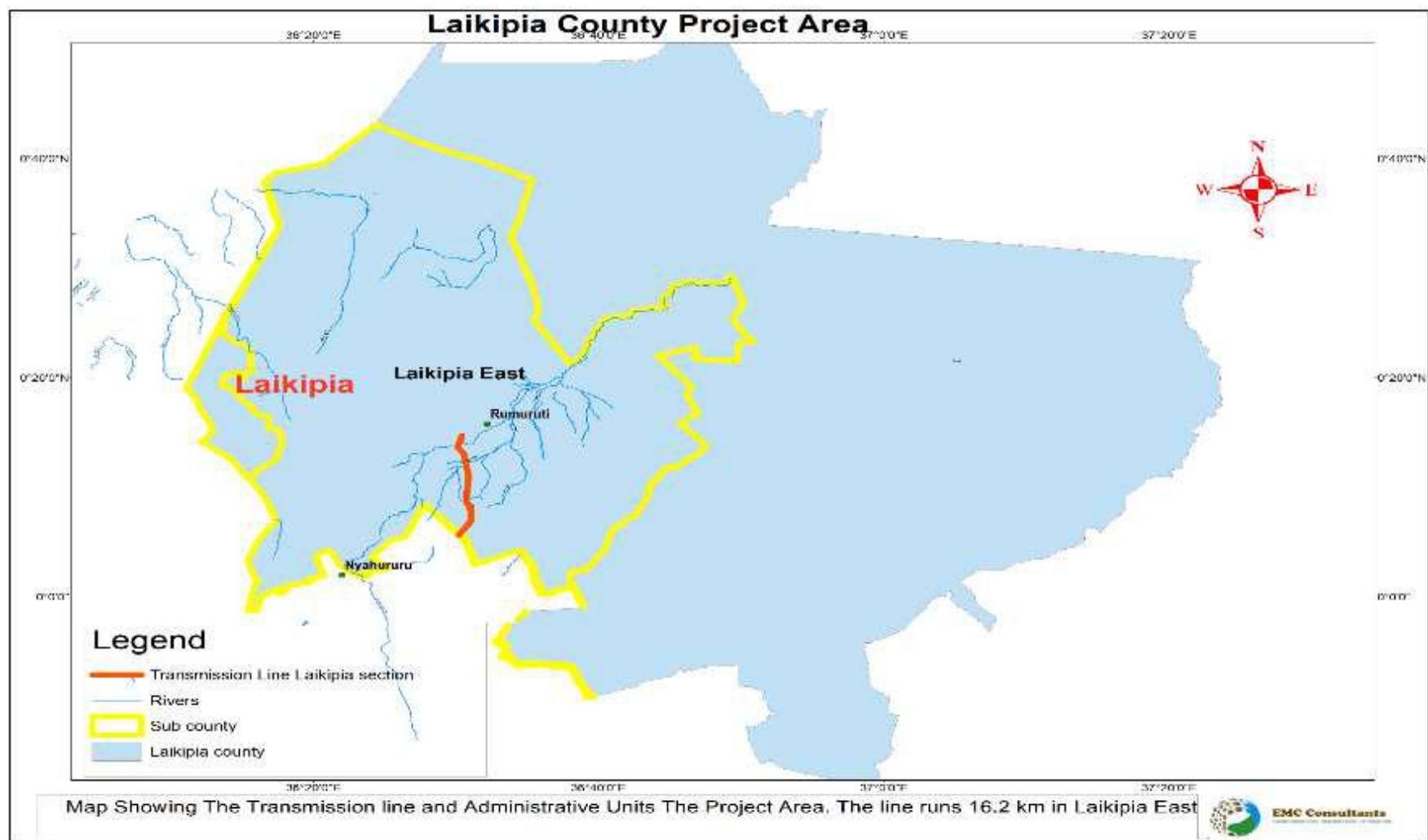


Figure 5-66: Transmission line Route in Laikipia County

#### 5.1.7.2 Administrative and Political Units

Laikipia County comprises of three administrative sub-counties namely Laikipia East, Laikipia North, and Laikipia West (the sub county units are geographically equivalent to the constituencies). The sub county headquarters are at Nanyuki, Doldol, Rumuruti and Nyahururu respectively and further divided into five Administrative districts namely: Laikipia East, Laikipia West, Laikipia North, Laikipia Central and Nyahururu. The county is further sub-divided into 15 divisions, 51 locations and 96 sub-locations respectively. The Laikipia East sub county lies to the east, Laikipia North to the North, Laikipia Central to the southeast, Nyahururu to the south west and Laikipia West to the west of the county. The county has three constituencies namely; Laikipia East, Laikipia West and Laikipia North. It has 15 electoral wards, 5 in Laikipia East, 6 in Laikipia West and 4 in Laikipia North constituencies respectively. The table below shows land area by constituency.

**Table 5-21: Land Area by Constituency**

Constituency	No. of wards	Name of Wards
Laikipia North	4	Mukogodo East, Mukogodo West, Segera, Sosi
Laikipia East	5	Ngobit, Tigithi, Thingithu, Nanyuki, Umande
Laikipia West	6	Olmoran, Rumuruti Township, Githiga, Marmanet, Igwamiti, Salama

**Source: Independent Electoral and Boundaries Commission, 2017.**

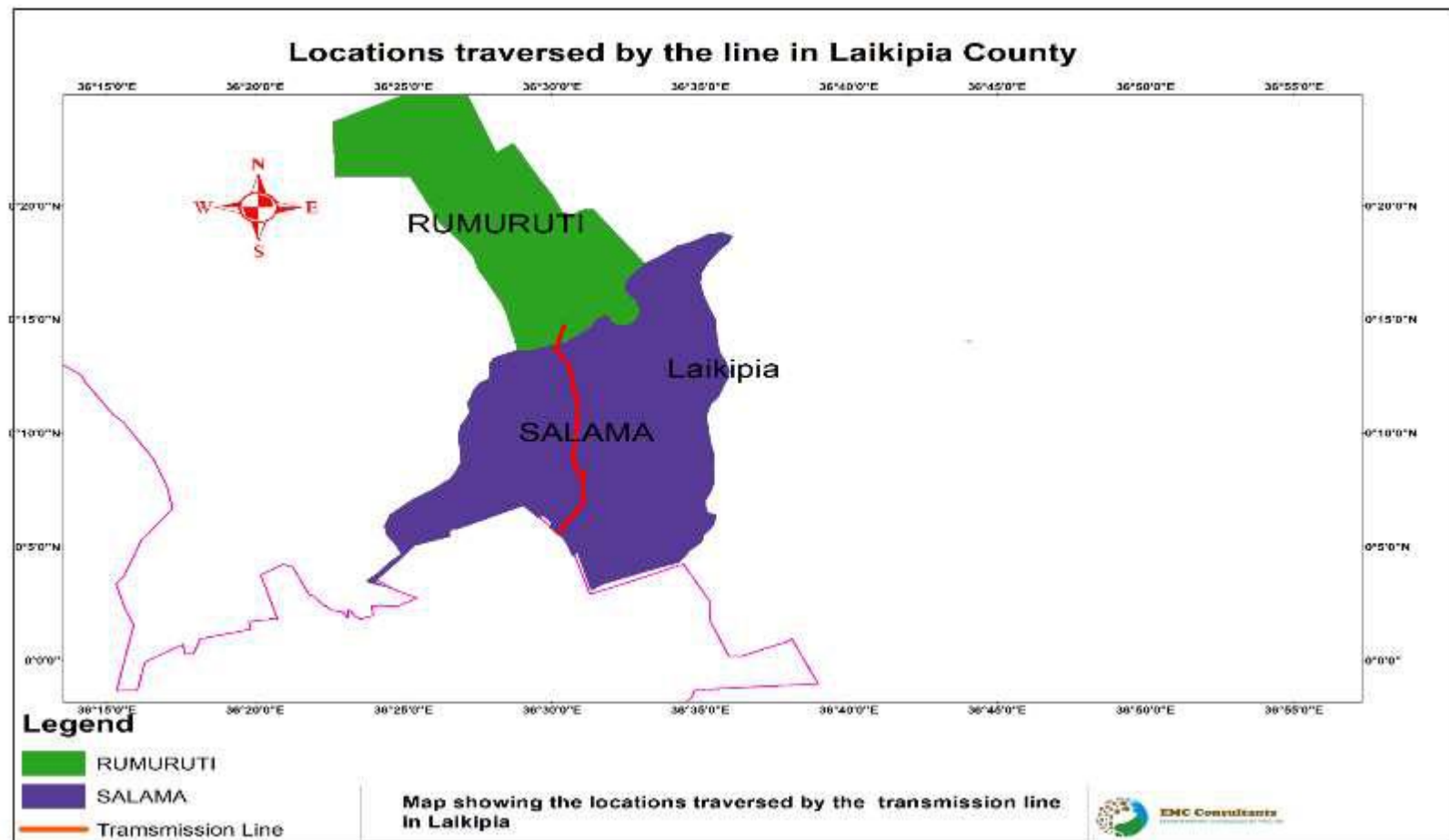


Figure 5-67: Locations traversed by the line Laikipia County

### 5.1.7.3 Climatic Conditions

The County rainfall pattern is bimodal, with long rains being received in March to June while the short rains are experienced in October to December. The county experiences a relief type of rainfall due to its altitude and location. The annual average rainfall varies between 400mm and 750mm though higher annual rainfall totals are observed on the areas bordering the slopes of Mt. Kenya and the Aberdare Ranges. Rainfall varies from 1200 (in pockets) to 400 mm per year on average rainfall is generally distributed through two seasons, the long rains (May-August) and the short rains (October- November) (ALRMP, 2005). North Marmanet receives over 900mm of rainfall annually, while the drier parts of Mukogodo and Rumuruti receive slightly over 400mm annually. The plateau receives about 500mm of rain annually, while Mukogodo Forest receives an average rainfall of about 706mm annually. The seasonal distribution of rainfall in the county is because of the influences of Northeast and South trade winds, the Inter-Tropical Convergence Zone, and the Western winds. The long rains occur from March to May while the short rains are in October and November. The parts neighbouring Aberdare Ranges and Mt. Kenya form an exception to this pattern as they receive conventional rainfall between June and August because of the influence of the trade winds.

The annual mean temperature of the county ranges between 16° C and 26° C. This is because of relief and trade winds resulting to cooler conditions in eastern side which is near Mt. Kenya and hotter in the low-lying areas in the North. The western and southern parts of the county have cooler temperatures with the coolest month being April and the hottest month being February.

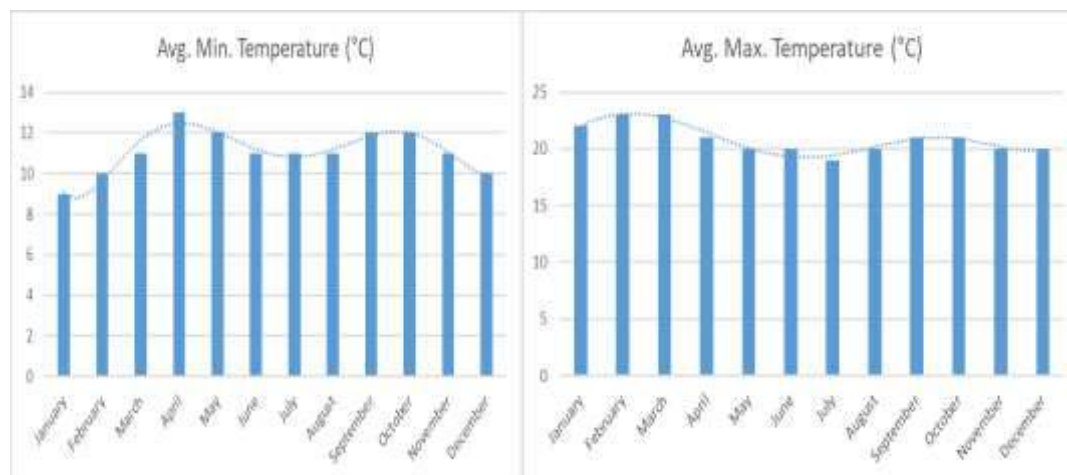


Figure 5-68: Minimum and Maximum temperatures in Laikipia County

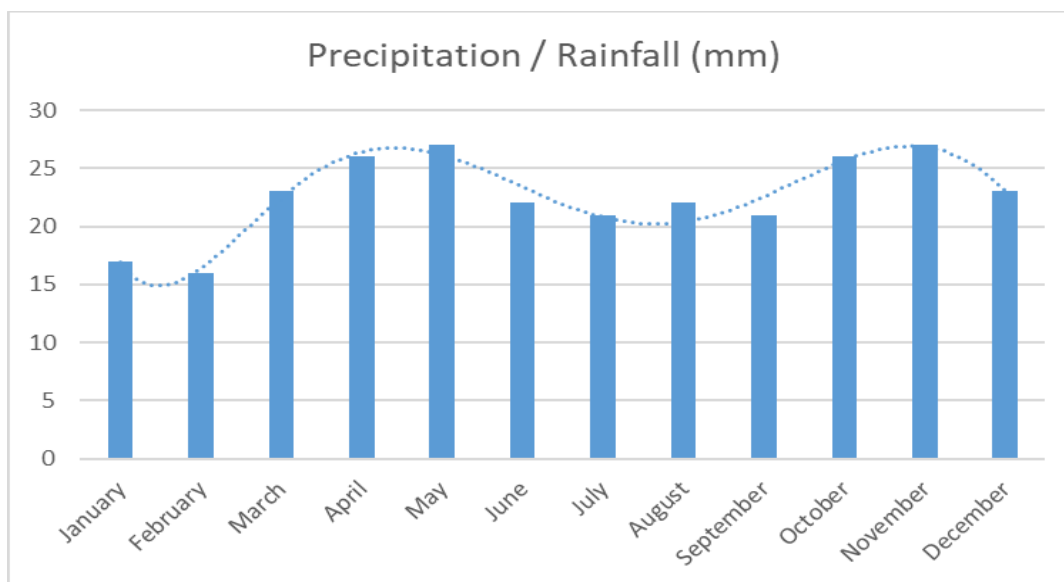


Figure 5-69: Average annual rainfall in Laikipia County

#### 5.1.7.4 Baseline Ambient Environmental Measurements

Tables below are the results of ambient air and noise measurements conducted to understand the baseline situation of the project area specifically in areas with sensitive receptors that may be affected by the project construction activities. Tables shows the locations of the baseline environmental measurements.

##### 5.1.7.4.1 Ambient Air Emission Measurements

Table 5-22: Ambient Air Emission: Air Quality Data - Pm10

Location	Proxy	PM10 ( $\mu\text{g}/\text{m}^3$ )	WHO AQG	EMCA (Air Qual. Reg. 2014)
Cheplogoi Siri Medical Clinic	MP1	21	50 $\mu\text{g}/\text{m}^3$ 24hrs	50 $\mu\text{g}/\text{m}^3$ 24hrs
Kimalel Day and Boarding School	MP2	39		
Patakwani Primary School	MP3	26		
Ol'ngarua Village	MP4	53		
Gatundia Village	MP5	28		

Source: Field Data

Table 5-23: Weather Conditions

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Cloud Cover	Sparse
Date	28th August 2019
Duration of Measurements	1hour

Source: Field Data

**Table 5-24: Ambient Air Emission: Air Quality Data – Sulphur Dioxide, SO<sub>2</sub>**

Location	Proxy	SO <sub>2</sub> (µg/m <sup>3</sup> )	WHO AQG	EMCA (Air Qual. Reg. 2014)
Cheplogoi Siri Medical Clinic	MP1	<8.1	20 µg/m <sup>3</sup> 24hrs	80 µg/m <sup>3</sup> 24hrs
Kimalel Day and Boarding School	MP2	<8.1		
Patakwanin Primary School	MP3	<8.1		
Ol'ngarua Village	MP4	<8.1		
Gatundia Village	MP5	<8.1		

**Source: Field Data****Table 5-25: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Cloud Cover	Sparse
Date	28 <sup>TH</sup> August 2019
Duration of Measurements	1 hour

**Source: Field Data****Table 5-26: Ambient Air Emission: Air Quality Data – Nitrogen Dioxide**

Location	Proxy	NO <sub>2</sub> (µg/m <sup>3</sup> )	WHO AQG	EMCA (Air Qual. Reg. 2014)
Cheplogoi Siri Medical Clinic	MP1	16	40 µg/m <sup>3</sup> Annual 200 µg/m <sup>3</sup> 1hr average	80 µg/m <sup>3</sup> 24hrs
Kimalel Day and Boarding School	MP2	20		
Patakwanin Primary School	MP3	23		
Ol'ngarua Village	MP4	20		
Gatundia Village	MP5	22		

**Table 5-27: Weather Conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celcius
Date	28 <sup>TH</sup> August 2019
Duration of Measurements	1 hour

**Source: Field Data****5.1.7.4.2 Ambient Noise Emission Measurements****Table 5-28: Ambient Noise Level**

Location	Proxy	LAEq	LA Max	LA Min
Cheplogoi Siri Medical Clinic	MP1	42.1	48.1	40.8
Kimalel Day and Boarding School	MP2	36.4	41.7	40.3
Patakwanin Primary School	MP3	31.0	35.0	30.2
Ol'ngarua Village	MP4	35.1	42.0	34.5
Gatundia Village	MP5	47.2	52.1	50.3

**Table 5-29: Weather conditions**

Sunlight	Sunny
Precipitation	None
Wind	Still
Temperature	30 Degrees Celsius
Date	28th August 2019
Duration of Measurements	1 hour

**Source: Field Data**

Figure 5-71 shows the locations of the sensitive receptors in the AoL and which formed the basis for baseline environmental measurements

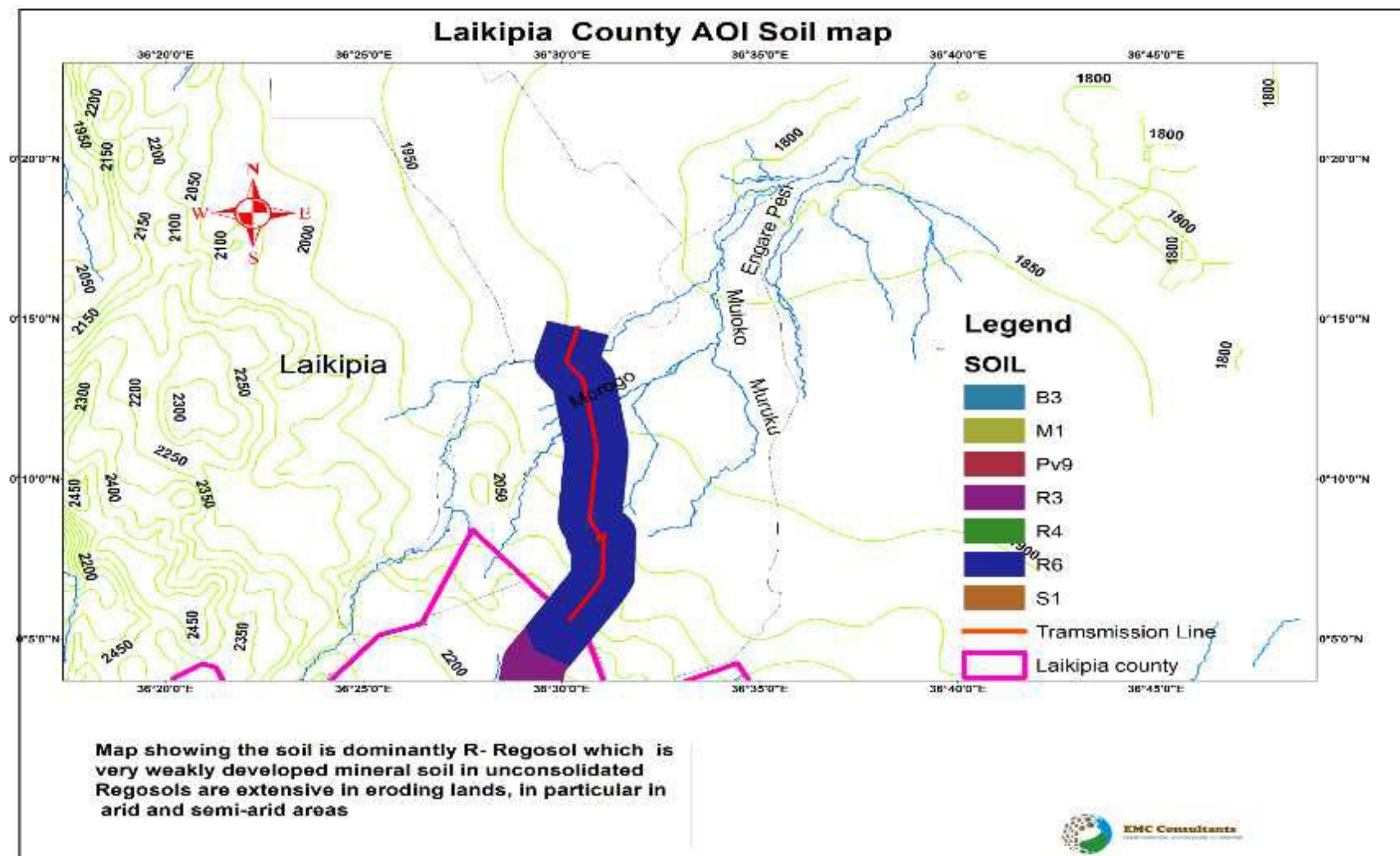


**Figure 5-70. Sensitive Receptors Along Transmission Line AOI**

#### 5.1.7.5 Soils and Geology

The soils in the landscape can be grouped on the basis of the terrain under which they are developed. They have a high level of inherent fertility and the only limiting factors to agricultural production are poor weather characterized by frequent dry spells and poor rainfall distribution in terms of space and time. The landscape has red volcanic soils, clay loam, black cotton soil, sandy soils and sandy loam soils. The most widespread soil type on the plains of Laikipia is 'black cotton', which is c. 50% clay and c. 24% sand (Young et al. 1998).

Figure 5-71. Laikipia County AoI Soil Map



#### **5.1.7.6 Topography**

The altitude of Laikipia County varies between 1,500 m above sea level at Ewaso Nyiro basin in the North to a maximum of 2,611 m above sea level around Marmanet forest. The other areas of high altitude include Mukogodo and Ol Daiga Forests in the eastern part of the county at 2,200 m above sea level. The county consists mainly of a plateau bordered by the Great Rift Valley to the West, the Aberdares to the South and Mt. Kenya massifs to the Southeast all of which have significant effects on the climatic conditions of the county.

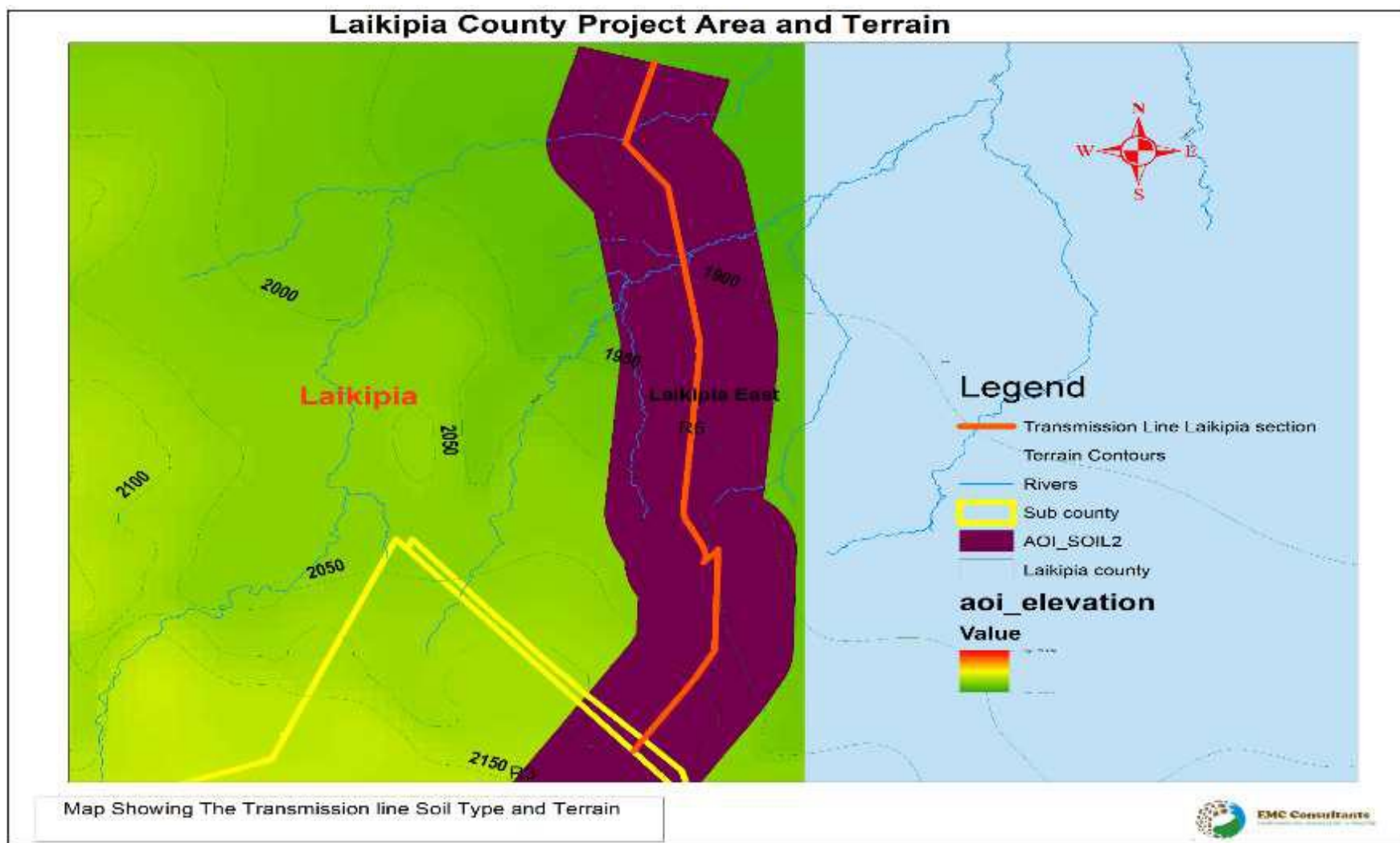


Figure 5-72: Terrain along the project route

#### **5.1.7.7 Hydrology**

The main drainage feature is Ewaso Nyiro North basin with its tributaries having their sources in the slopes of the Aberdares and Mt. Kenya. These tributaries include Nanyuki, Timau, Rongai, Burguret, Segera, Naromoru, Engare, Moyok, Ewaso Narok, Pesi and Ngobit rivers. The flow of these rivers matches the County's topography, which slopes gently from the highlands in the South to the lowlands in the North. The rivers determine to a large extent livelihood patterns in the county. The level plateau and the entire county drainage is dominated by the Ewaso Nyiro North basin with its tributaries which have their sources in the slopes of the Aberdares and Mt. Kenya and flow from South to North. The tributaries include, Nanyuki, Timau, Rongai, Burguret, Segera, Naromoru, Engare, Moyak, Ewaso Narok, Pesi and Ngobit Rivers. The flow of these rivers matches the county's topography, which slopes gently from the highlands in the South to the lowlands in the North. The main river catchments are the Aberdares range and Mount Kenya and Laikipia's water system composed of at least 25 permanent or semi-permanent rivers. The Ewaso Nyiro River is the lifeline of the County to the North. The rivers determine to a large extent the settlement patterns, as they are a source of water for human and livestock consumption as well as irrigation activities. There are two major swamps in the county namely: Marura Swamp, which runs along the Moyot valley in Ol Pajeta Ranch and the Ewaso Narok Swamp around Rumuruti Township.

The proposed transmission line route traverse sections of the Ewaso Ng'iro at intersection point Lon 36°30'7.71"E, lat 0°13'44.31"N and Morogo river at intersection point Lon 36°30'41.80"E, lat 0°12'9.41"N as shown in figure 5-74 below.

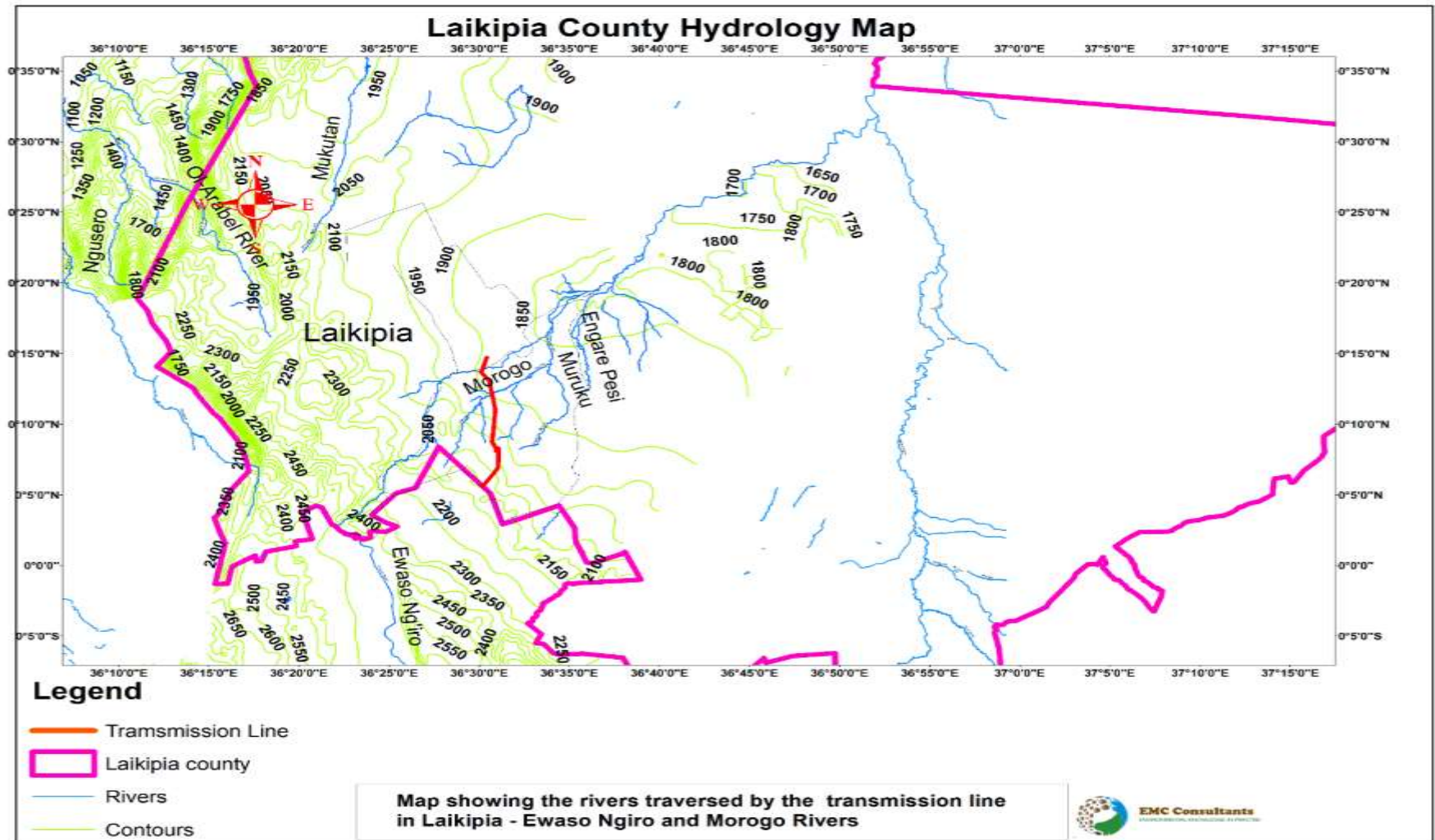


Figure 5-73: Hydrology Features along project route

#### 5.1.7.8 Biological Environment

The county is endowed with several natural resources. These include pasture rangeland, forest, wildlife, undulating landscapes, and rivers among others. The high and medium potential land constitutes 20.5 per cent of the total county's land area while the remaining 79.5 per cent is low potential hence unsuitable for crop farming. The major soils in the county are mainly loam, sand and clay. Black cotton soil, which has inherent fertility, spreads in most parts of the plateaus. The dark reddish brown to red friable soils and rocky soils are mainly found on the hillsides. The limiting factors to agricultural production are the poor weather conditions characterized by frequent dry spells and poor rainfall distribution.

##### 5.1.7.8.1 Flora

Laikipia is in a transition zone for three major vegetation types; 'Somalia-Masai Semi-desert Grassland and Shrubland', 'Somalia-Masai *Acacia Commiphora* Bushland and Thicket', and 'Afri-montane Undifferentiated Montane Vegetation'. Here, the savannahs of eastern Africa grade into both the semi-arid lands of the Horn of Africa and the montane elements of Mount Kenya and the Aberdares Range. The resultant great diversity of vegetation types, ecotones and mosaics accounts, in part, for the high biological diversity of Laikipia.



Figure 5-74: Sample flora around project area

The primary vegetation types are grassland, bushland, woodland, and, on the higher ground, dry forest. Dry forest is typically dominated by pencil cedar *Juniperus procera* (Cupressaceae), wild olive *Olea europaea* (Oleaceae), podocarp *Afrocarpus gracilior* (Podocarpaceae), euclea *Euclea divinorum* (Ebenaceae), acokanthera *Acokanthera schimperi* (Apocynaceae), and croton *Croton megalocarpus* (Euphorbiaceae). Riparian forest is a scarce, but biologically important, vegetation type in Laikipia. It is often dominated by fever trees *Acacia xanthophloea* (Fabaceae). Other large trees in the riparian forest include Gerrard's acacia *Acacia gerrardii* (Fabaceae), *A. gracilior*, water pear *Syzygium guineense* (Myrtaceae), water berry *Syzygium cordatum* (Myrtaceae), cape chestnut *Calodendrum capense* (Rutaceae), East African greenheart *Warburgia ugandensis* (Canellaceae), and figs *Ficus spp.* (Moraceae) (especially sycamore fig *F.*

*sycomorus*). The transmission line does not traverse any wildlife corridor or dispersal areas.

#### **5.1.7.8.2 Fauna**

Laikipia County is richly endowed with wildlife, which is widely distributed in the semi-arid areas extending to Samburu, Meru, and Mt. Kenya wildlife corridors/ecosystems. The County is recognised as one of the most important areas for conservation in east Africa for numerous reasons including the diversity of its wildlife, the number of endangered species it holds (including wild dogs, Grevy zebras and half of the population of Kenya's black rhinoceros) and having one of the largest contiguous areas under conservation. The highest densities of wildlife are found in on what is referred as private protected areas (i.e., mixed ranches) with community protected areas acting as dispersal areas (AFD, 2013). Wildlife, culture, and landscapes are the backbone of tourism development in Laikipia County. Most of the wildlife is found in the large-scale private ranches, which occupy over 50 per cent of the total area of the county. The rest is found in-group ranches predominantly owned by the Maasai, in the gazetted forests of Mukogodo, Rumuruti and Marmanet and the other uninhabited tracts of land in the county. Among the major wildlife species found in this county are the lion, leopard, elephant, buffalo, and the rhinoceros though there are other smaller species also in abundance particularly the African Wild dog and gazelles. The habitats found within Mara and Loldaiga Hills Ranch are numerous and diverse. According to classification, the endangered species in the region includes among others African wild dog (*Lycaon pictus*), Grévy's zebra (*Equus grevyi*), Lelwel hartebeest (including Jackson's hartebeest) *Alcelaphus buselaphus lelwel*. Vulnerable Species include: Savanna elephant (*Loxodonta Africana*), Lion (*Panthera leo*), Cheetah (*Acinonyx jubatus*), Common hippopotamus (*Hippopotamus amphibious*), Reticulated giraffe (*Giraffa reticulate*), Chanler's mountain reedbuck (*Redunca fulvorufula chanleri*) and Eastern patas monkey (*Erythrocebus patas pyrrhonotus*). Near threatened species include Thomson's gazelle (*Eudorcas thomsonii*), White rhinoceros (*Ceratotherium simum*), Leopard (*Panthera pardus*) etc. Critically Endangered spp include: Black rhinoceros (*Diceros bicornis*). Least Concern include: Impala, Waterbuck, Greater kudu, Bushbuck, Spotted hyena, African clawless otter, Monkey, Hyrax. The transmission line does not traverse any wildlife corridor or dispersal areas and there are no conservancies crossed by the transmission line.

#### **5.1.7.8.3 Forests**

The county has gazetted forest area totalling to 580 Km<sup>2</sup> comprising of both the indigenous and plantation forests. The indigenous forests include Mukogodo and Rumuruti, which are under threat from encroachment. The plantation forests include Marmanet and Shamaneik. Laikipia has a network of 10 main forests, which play important social and economic roles. Forests are under the responsibility of the Kenya Forest Service. Forest provides essential services to people, livestock, and wildlife in Laikipia, including watershed protection, dry season grazing, a wide range of traditional non-timber forest products (food and medicinal plants, fungi etc.), habitats and forage, and timber products such as firewood. They also provide a sink for carbon. Laikipia forests are however under threat from human activities such as illegal logging, charcoal production, and intense grazing. The transmission line does not traverse any forest ecosystem in this part of Laikipia County however, Rumuruti Forest is 1.2km from the transmission line.

#### 5.1.7.8.4 Birds

As home to some 450 of Kenya's estimated 1,100 bird species, Laikipia is a birder's paradise. Majority of the birds found in the county are distributed within the various ecosystems around, some of the birdlife observed include among others: White-faced whistling duck, Knob-billed duck, African black duck, Madagascar pond heron, African spoonbill, Black stork, Great white pelican, Great cormorant, Lesser kestrel, Red-footed falcon, Sooty falcon, African fish eagle, Eastern chanting goshawk, Western marsh harrier, African hawk-eagle, Corncrake, Red-knobbed coot, white-throated-bee-eater, Black-winged stilt, Greater painted snipe, Wood sandpiper, Red-fronted parrot, Common cuckoo, Barn owl, Little bee-eater, Crowned hornbill, Jackson's widowbird etc. The transmission line crosses 2 EBA (figure 5.78) Serengeti Plains and Kenyan Mountains. However, the transmission line does to traverse any IBA.

#### 5.1.7.8.5 Insects

Laikipia is home to insects of more species than all of its other creatures and plants combined. Laikipia's most conspicuous and colorful insects are butterflies, of which more than 150 species have been recorded. Butterfly diversity in Laikipia is greatest in forested areas, with numbers peaking after the rains, in May–August and again in November–December. A commonly seen butterfly is the widely occurring *Citrus Swallowtail*, *Papilio demodocus*, whose dark upper wings bear flashy lemon-yellow markings. On sunny days, these butterflies fly low over bushes on forest verges, pausing to hover briefly over flowers, wings aquiver, to sip nectar. Other common butterflies are the *Pansies*, *Junonia spp.*, Blueeyed (*J. oenone*) and Yellow (*J. hierta*), which flit about over close-cropped grass, often settling on the ground, where they slowly fold and open their wings. The Guineafowl Butterfly, *Hamanumida daedalus*, dark grey and speckled like the bird from which it gets its name, is typically seen floating low over paths in Acacia woodland. *Orange Tips*, *Colotis spp.*, of several species frequent the Laikipia savannahs, sometimes in large numbers. Beetles have the distinction of being the largest and most diverse Order of creatures on Earth. This preponderance is reflected in Laikipia, which is home to beetles of hundreds of species, large and small. Some like the dashing, if unwieldy, black-and-yellow Rose Chafer, *Pachnoda sinuata* are familiar garden pests, reviled.



Figure 5-75. Sample Insect in the AoI

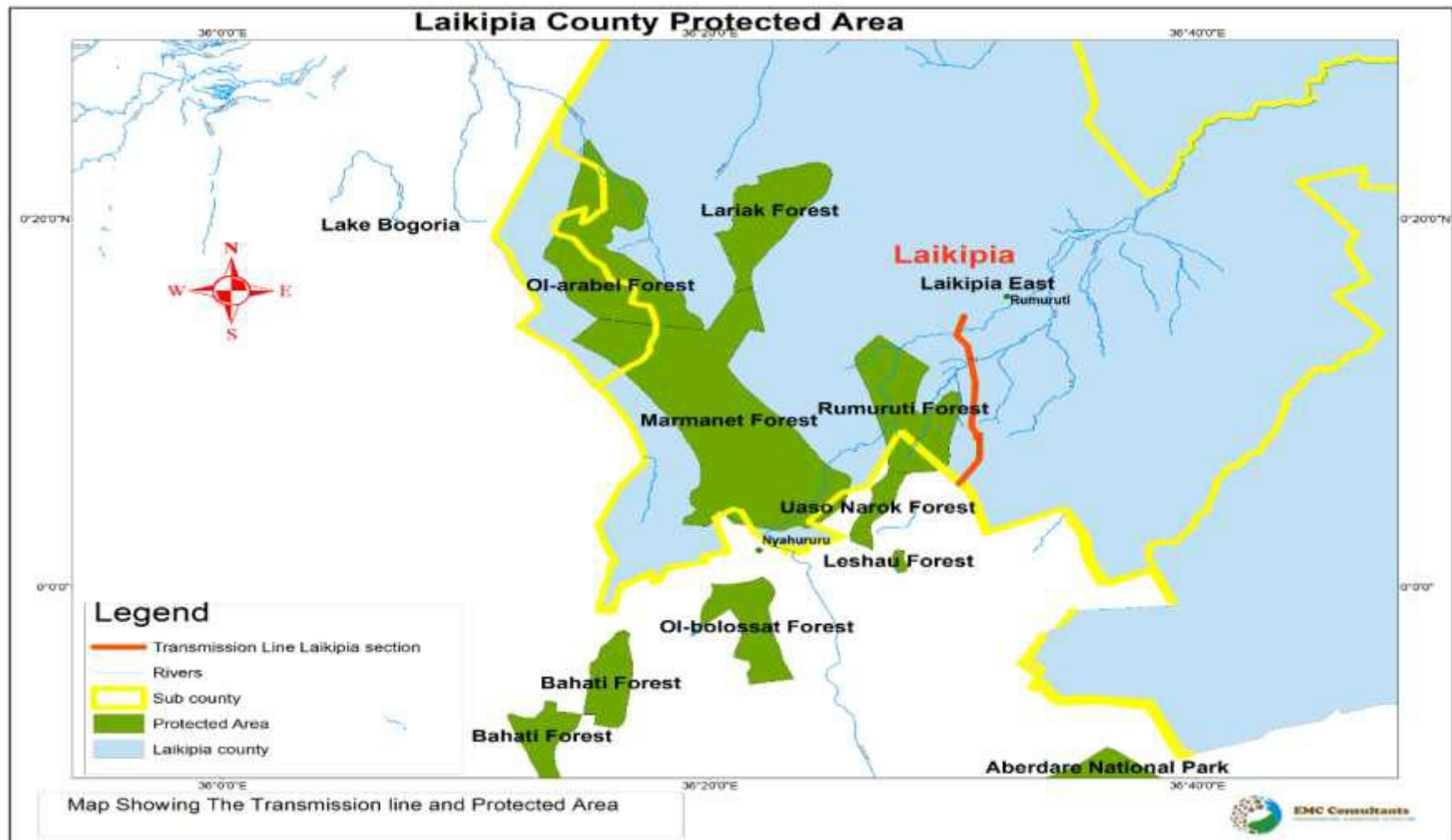


Figure 5-76: Transmission Line Route and Protected Areas

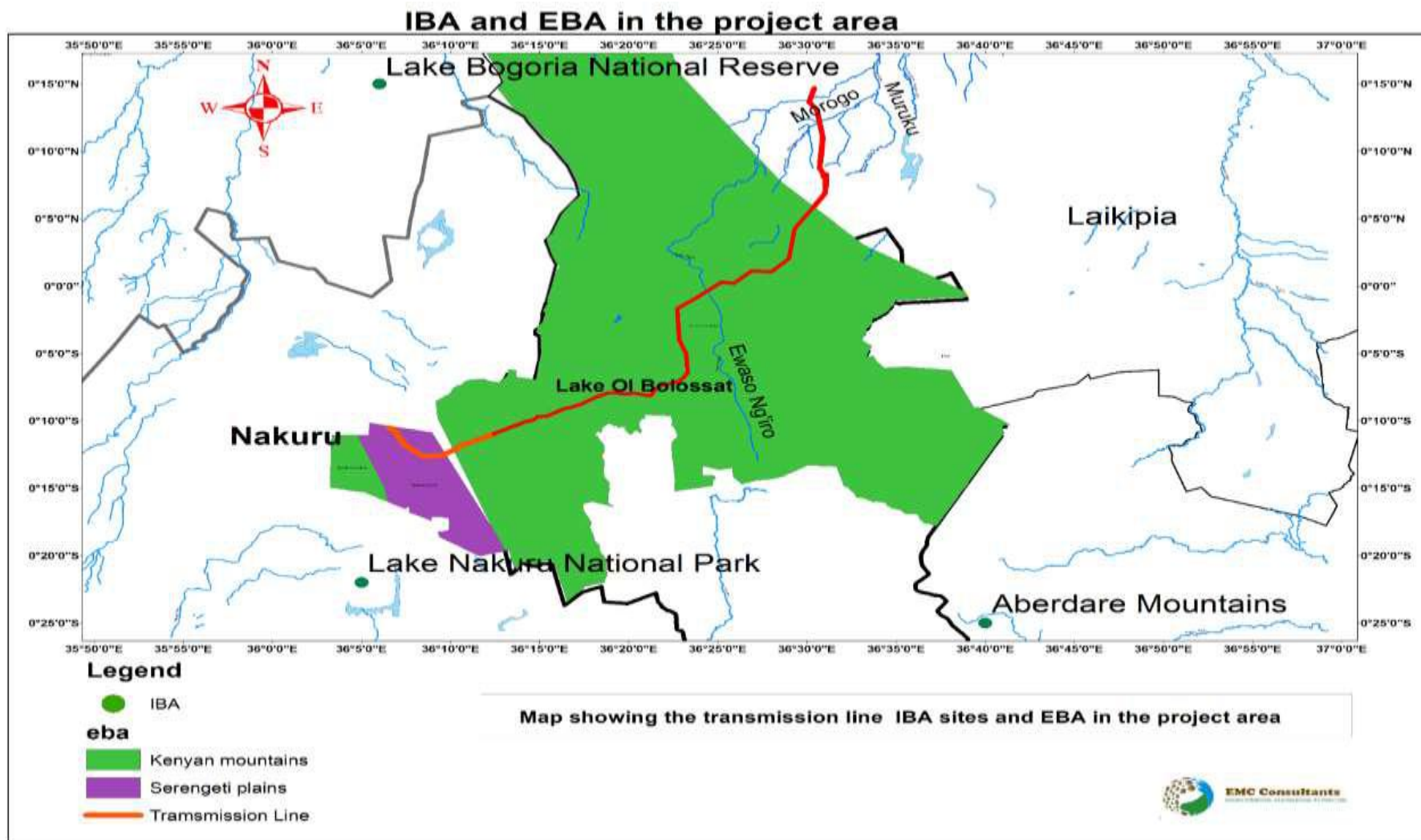


Figure 5-77: Map showing the transmission line IBA sites and EBA in the project area

#### 5.1.7.8.6 Reptiles and Amphibians

The combination of a moderate climate (neither too hot and dry nor too cold and wet) with a diverse array of habitats ensures that Laikipia supports many species of reptiles and amphibians. All depend for their body temperature on that of their surroundings. Most of the reptiles are active by day. The amphibians are nearly all nocturnal. Lizards typically seen basking on rocks or mounds, or in trees and bushes are by far the most conspicuous reptiles. Snakes, while abundant, are much more secretive, usually moving off before they can be seen. In the open grasslands, you can expect to see several terrestrial lizards, including the Variable Skink, *Mabuya varia*, typically brownish and speckled with a pale flank stripe. The Grass-top Skink, *M. megalura*, slender and brown with a dark lateral stripe, has tiny limbs and an extraordinarily long tail (accounting for as much as two-thirds of its length), allowing it to slide swiftly through and over clumps of grass. The Yellow-throated Plated Lizard, *Gerrhosaurus flavigularis*, a large, long-tailed brown lizard with paired yellow dorso lateral stripes, may be seen emerging from holes, while Speke's Sand Lizard, *Heliobolus spekii*, a small, mottled brown species with black barred pale dorsal stripes, typically darts about on more open ground.

Fast-moving Sand Snakes, *Psammophis spp.*, often startled on grassland tracks into making off in haste, may include the sleek Northern Stripe-bellied Sand Snake, *P. sudanensis*, which has a brown back and two prominent yellow dorso lateral stripes. Larger species found on Laikipia's grasslands are the Olive Sand Snake, *P. mossambicus*, which is uniformly olive-brown, and the Speckled Sand Snake, *P. punctulatus*, often more than 1.5 m long, with black and yellow dorsal stripes and a striking orange head. Common in grasslands are the dark-striped, pale grey-brown Kenya Striped Skaapsteker, *Psammophylax multisquamis*, and the pale olive-grey-brown Mole Snake, *Pseudaspis cana*, a stout burrowing species with a short, pointed head.

Dangerous snakes that typically seek refuge in rock crevices and on kopjes in Laikipia include the Puff Adder, *Bitis arietans*, Africa's most dangerous snake, and the Black-necked Spitting Cobra, *Naja nigricollis*. The large, unmistakable African Rock Python, *Python sebae*, is most often seen near water. The Leopard Tortoise, *Geochelone pardalis*, is found in most habitat types.

### 5.1.8 Laikipia County Socio-Economic Baseline

#### 5.1.8.1 Population size and composition

According to the 2019 KNBS Housing and Population Census, the total population for the county stood at 599,227 people of which 259,440 were males and 259,102 were females. The ratio of men to women stands at almost one to one with need for efforts towards gender parity in provision of socioeconomic opportunities. The possible explanation for lower male population across the age cohorts across the age of 19 years are factors related to lower life expectancy amongst males. The table 5-30 below shows the population density by gender in each sub-county.

Table 5-30: Population and density by gender and sub-county

Sub County	Male	Female	Total
Laikipia Central	47,888	47,705	95,594
Laikipia East	52,078	50,732	102,815

Laikipia North	18,067	18,116	36,184
Laikipia East	65,158	64,102	129,263
Nyahururu	76,249	78,447	154,704

Source: KNBS population and census data 2019

#### 5.1.8.2 Ethnicity

Laikipia is cosmopolitan with about 23 communities comprising of Maasai, Samburu, Rendile, Somali, Pokots, Kalenjins, Meru, Kikuyu, and Turkana among others. Majority (52%) of the household members in the project area were female, while the males formed 48%. In the project route, the dominant ethnic group is the Kikuyu and Meru mainly because the route is within Laikipia town with minority groups. The minority groups who are vulnerable and marginalized including the Samburu and Rendile were not identified in the RoW.

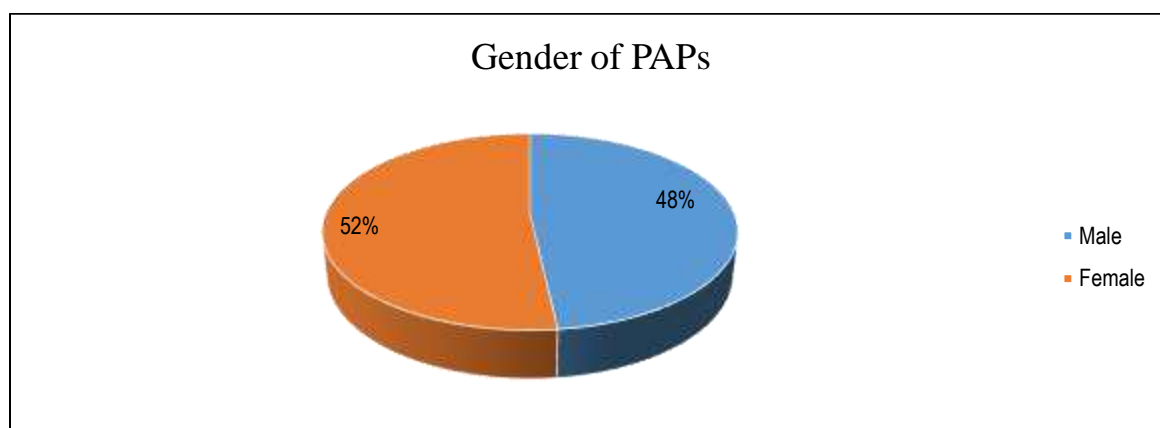


Figure 5-78: Gender Distribution of the Households Laikipia County

#### 5.1.8.3 Settlement Patterns

Laikipia is a cosmopolitan county and largely rural in settlement. The settlement patterns in the county are uneven as and are influenced by the differences in land potential, livelihood zones, infrastructure development, land use system and availability of social amenities. Laikipia Central Sub-County has pockets of both high and low densities dictated by the differences in land potential. Laikipia North constituency is arid and semi-arid in nature and therefore the least populated arising from the limited economic activities such as livestock rearing and sand harvesting. The pockets of high population density include Nanyuki and Nyahururu towns, which are the commercial, administrative, and transportation hubs of the county. There are four major urban centers in the county namely: Nanyuki, Nyahururu, Rumuruti and Kinamba. The growth and expansion of Nyahururu and Nanyuki is attributed to their long-time role as the administrative headquarters for the former Laikipia and Nyandarua districts (in the neighbouring Nyandarua County). They are also major transport hubs for major routes namely: Nairobi-Isiolo-Marsabit, Nairobi-Meru, Nairobi-Mararal and Nakuru-Nyeri. They have the most vibrant commercial activities and formal employment opportunities hence high population density.



Figure 5-79: Sample settlement in Laikipia County

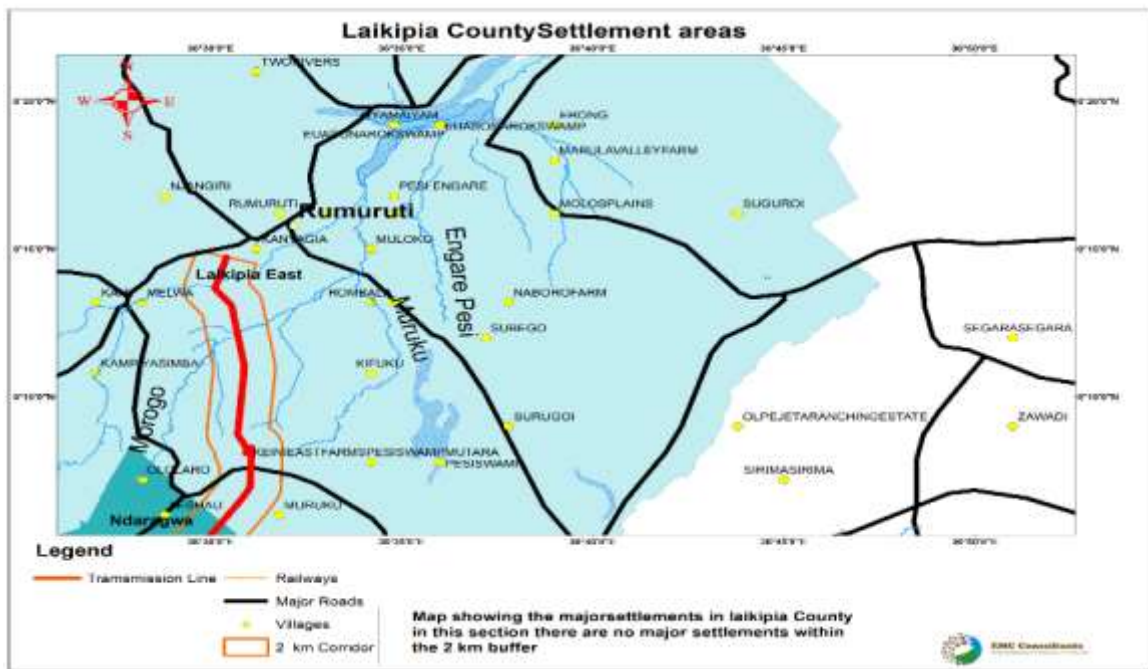


Figure 5-80. Settlements along the transmission line route

#### 5.1.8.4 Land and Land Uses

Of the total land mass, arable land constitutes of 1,984 square kilometers. Non-arable land constitutes of 7,456 square kilometers. The urban area constitutes 243.3 square kilometres. Gazetted forestland stands at 580 square kilometres. There are 6 distinct land use patterns heavily influenced by the climatic conditions and the ecological zones. These include among others; pastoralism, mixed farming, ranching, agro-pastoral, marginal mixed farming, and formal employment/trade/business. The three main types of land categories in Laikipia are private, community and public. The transmission line does not cross into community land or group ranches. All land affected by the transmission line is individual private land and Government of Kenya forest land.



Figure 5-81. Land use in Laikipia County

#### 5.1.8.5 Livelihoods

The County has five main livelihood zones namely; mixed farming, marginal mixed farming, pastoral, formal employment and ranching. The County has seven administrative divisions namely: Central, Lamuria, Mukogodo, Rumuruti, Olmorán, Ngarua and Nyahururu. 64 percent of the County's land mass is utilized under ranching. 90% of Laikipia is "high and dry": mostly too dry for cultivation. The transmission line affects primarily and majorly private mixed farming land.



Figure 5-82: Bee keeping in Laikipia County

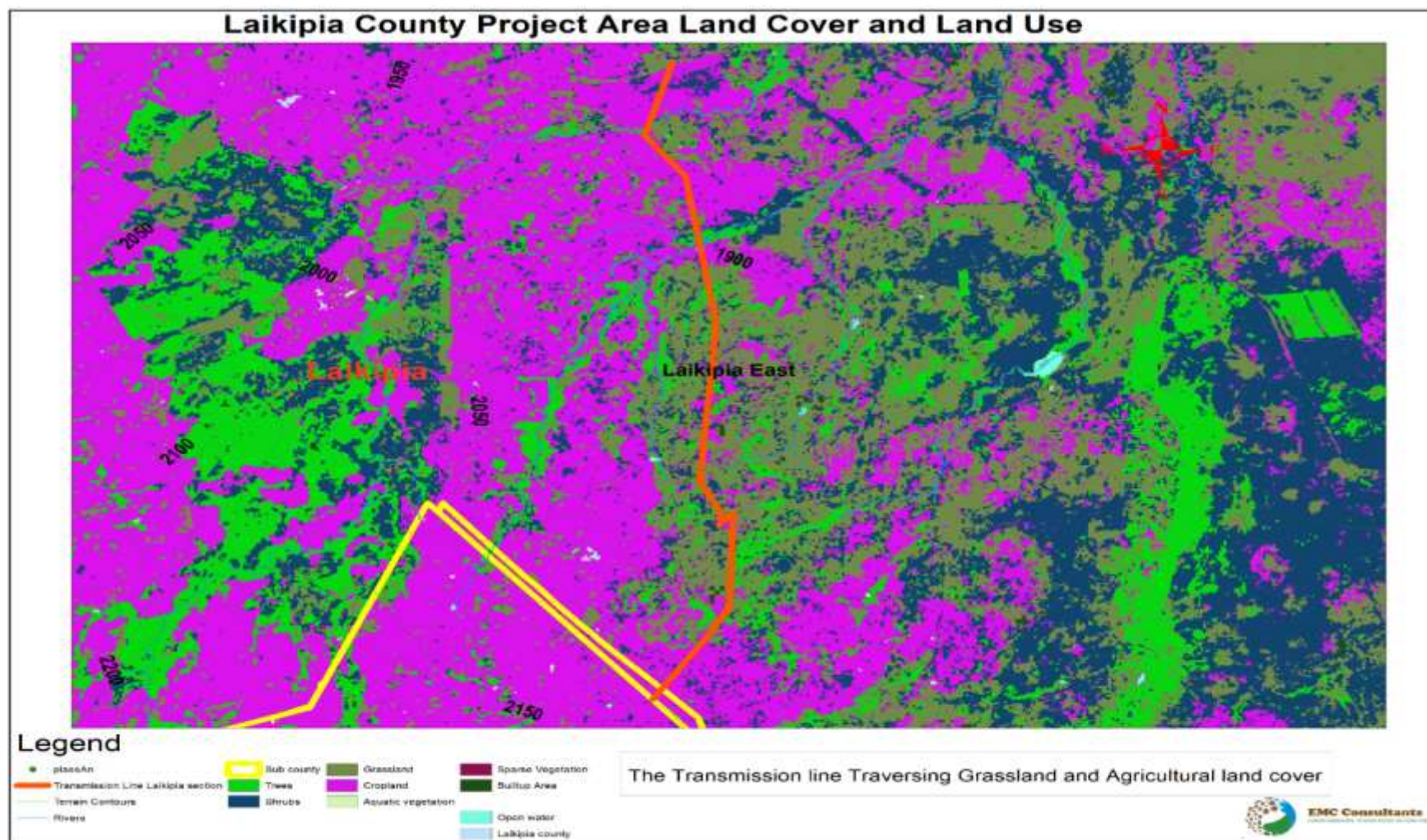


Figure 5-83: Land Use along Transmission Line Route

The average private farm size for small-scale holders is 2 acres while for large-scale holders is 20 acres. Laikipia is dominantly a pastureland with 48 ranches that are greater than 2000 acres in size. The ranches occupy over 50 per cent of the total land area in the county. There are 30 ranches owned by companies and individuals and 13 owned by the community as group ranches. The group ranches are mainly in the northern part occupying about 67,720.2 hectares. Average land holding in the community/group ranches per household is 10.06 hectares. The private ranches practice wildlife conservancy and beef cattle rearing. The average size of the ranches is 4,046.9 hectares. The percentage of landowners in Laikipia County with title deeds is 65.3%. This low percentage is partially attributed to the absentee landlords, long land adjudication, and transfer processes.



Figure 5-84: Wheat crop in Muhotetu, Laikipia and Mechanical harvesting of the wheat crop

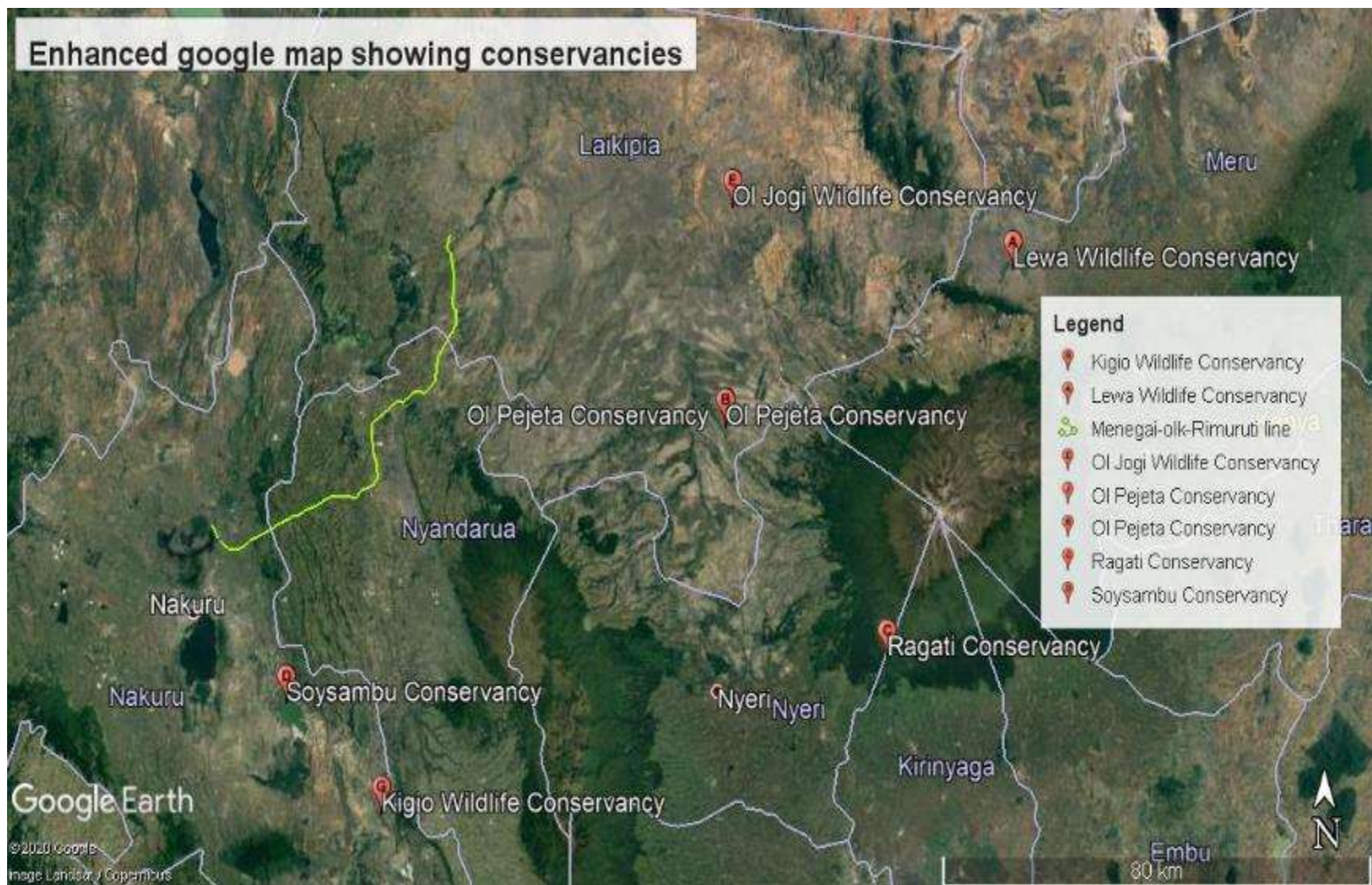


Figure 5-85: Conservancies Close to Transmission Line Route

## Agriculture

The main crops grown include wheat, maize, beans, potatoes and vegetables. Maize takes about 51 per cent of the total planted area. Crop farming is mainly undertaken in the south-western parts of the county due to favorable weather conditions. Efforts are now being put in place to promote the resistant crops such as millet, sorghum, sunflower and black beans (*dolichos*). There is an emerging trend of increased horticulture production both at large-scale and small-scale levels. This constitutes production of cut flowers, tomatoes, French beans, aloe, chillies and watermelons. There are also pockets of pineapple farms, orange trees and coffee bushes. The agricultural potential in the county is quite prospective as characterized by highly potential farming lands particularly in the South Western parts of the county. Over 20 per cent of the county's total land is arable. The total area under crops is about 1,984 Km<sup>2</sup> of which 80 per cent is under food crops. Over 60 per cent of households derive their livelihood from agricultural activities. Livestock production is dominant in the Northern parts of the county. According to the 2009 population and housing census report on livestock, there were 189,685 heads of cattle in the county and 623,648 sheep and goats. Others include poultry, camels, donkeys, rabbits and bees. Livestock infrastructure is supported by 50 holding grounds, stock routes and out spans, two public and three private abattoirs, five auction yards and 33 slaughter slabs. The main livestock products include beef, mutton, milk, eggs, and pork among others.



Figure 5-86: Livestock found in Melwa, Laikipia county

## Apiculture

Bee keeping is one of enterprise undertaken by pastoralists and farmers practicing mixed farming. It is practiced in farm woodlots, perimeter fences and in forests for pollination. Honey as a main product is harvested using traditional log hives and only a few farmers use the modern hives such as Langstroth and Kenya Top Bar Hive (KTBH). In harvesting, most use traditional gears (fire for smoking) which are destructive to the bees occasionally killing the queen. Towards value addition, there are 5 co-operative societies that are at basic levels of packaging honey and related by-products. There are approximately 16,300 beehives (8,600 Log hives, 4,700 Top bar hives, 3,000 Langstroth hives). The average honey production per year is 9,630kgs translating to Ksh 5,778,000. The project activities will not affect apiculture.



Figure 5-87: Beehives in a homestead, Laikipia County

#### 5.1.8.6 Education

There are 518 ECDE centres, 340 primary schools of which 265 are public across the county. There are also 96 secondary schools of which 70 are public. The average distance to the nearest primary school stands at 1.1 to 4.9 kilometers.

There are 340 primary schools with a total enrolment of 89,018 pupils. The number of primary school teachers is 2,303 giving a teacher pupil ratio of 1:38. The gross enrolment rate is 94.5 per cent and a net enrolment of 69 per cent. The completion rate is 92 per cent. Primary education is readily accessible as reflected by the fact that 90 per cent of the population is located between 0 and 4.9 kilometers from the nearest primary school with only 10 per cent located over 5 kilometres. The population of 15 years and above consists of 86.1 per cent persons who can read and write. The percentage of population above three years who are at school stands at 36.5% while those who have left school stand at 25.2 per cent. Only 10.7 per cent of the population above three years have never attended school.

In 2019, there were 96 secondary schools with a total enrolment of 22,939 students. The number of teachers is 857 giving a teacher student ratio of 1:27. The gross enrolment rate, retention rate and the completion rate stand at 62 per cent 80 per cent and 79 per cent respectively. Secondary education is not readily accessible as reflected by the fact that 60 per cent of the population is located between 1.1 and 4.9 kilometers while 35 per cent is located over five kilometers from the nearest secondary school. Only five per cent of the population lies between zero and one kilometers.

There are 5 operational youth polytechnics in the county (Nanyuki, Wiyumiririe, Nyahururu, Marmanet and Salama). The county hosts one University College namely Laikipia University College. There are 3 University campuses namely Laikipia University College Town Campus in Nyahururu, Kenya Methodist University in Nanyuki and Karatina University Campus in Nanyuki. The middle level colleges include Kenya Institute of Management, St Anne Catholic College, Nanyuki Institute of Communication, Accountancy and Technology (NICAT) and Nanyuki Commercial College.

Most of the sampled household heads could read and write (90.4%). Only 9.6% per cent of PAP household heads could not read and write in English or Swahili. Kikuyu language was the most spoken language at home. About 42.2% of the sampled households had

attained primary level of education and 21.6% achieving secondary levels of education. These percentages are inclusive of household heads and other members of the household. In the survey conducted 3.8% of the sampled PAPs had completed technical training, while 2.1% and 6.0% respectively did not complete secondary and primary level education. A further 3.6% of the sampled households had no formal education.

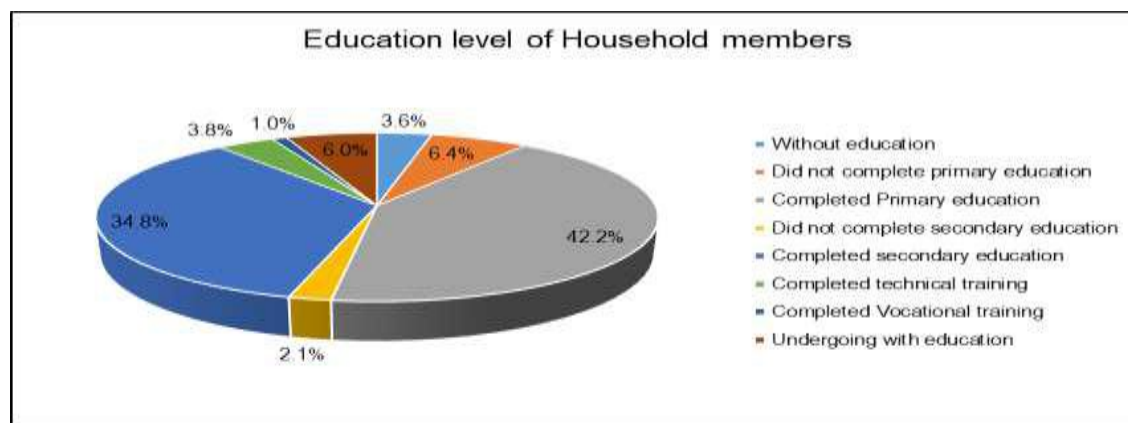


Figure 5-88: Literacy Level

#### 5.1.8.7 Health

The health infrastructure consists of four sub county hospitals at Doldol, Rumuruti, Nanyuki and Nyahururu. The county has eight public health centres and 34 public dispensaries. In addition, there are three private hospitals, one nursing home; one private health centre, six private dispensaries and 33 private clinics. Most of the public facilities have been established with the support of the devolved funds particularly Constituency Development Fund (CDF). The average distance to health facilities is 6 Km. There are about 10 per cent of the households lying in the range of zero to one kilometre from the nearest health facility while 40 per cent lie within the range of 1.1 to 4.9 Km. The remaining 50 per cent of households are found over five kilometres to the nearest health facility. The doctor-population ratio stands at 1:12,500 while the nurse-population ratio is 1: 1,000.

The five most prevalent diseases for under 5 in the county include; Respiratory Tract Infections (RTI), diarrhoea, clinical malaria, eye infections and Pneumonia. The leading diseases for the population of over 5s include; Respiratory Tract Infections (RTI), diseases of the skin, rheumatism and joint pains, diarrhoea and hypertension. The HIV prevalence rate stands at 3.2 percent. Vulnerability identified during the survey within the sampled PAPs as shown below was composed of: -

1. The elderly over 60 years (41.5%)
2. Women headed households/widows (52.1%)
3. The sick/Chronic illnesses (3.2%)
4. Household headed children under 18yrs (1.1%)
5. Orphans (2.1%)

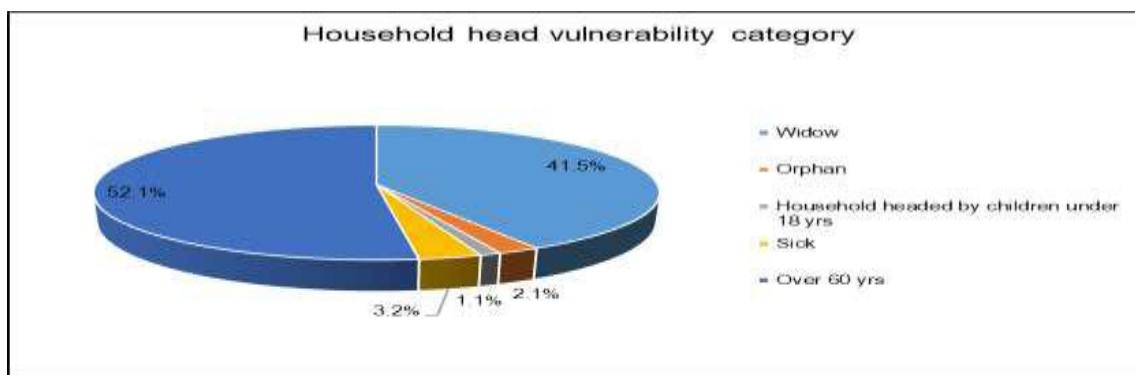


Figure 5-89: Perceived level of vulnerability.

### 5.1.8.8 Poverty and Income

#### Work force

According to the Kenya national bureau of statistics (Population and census, 2019) the labor force of Laikipia county stood at 260,859 persons (comprising of 119,047 males and 220,213 females) representing 43.5 percent of the county population. Based on 2019 national population census, 24.4 per cent of the labour force was employed in the formal sector whereas 42.8 per cent was employed in the informal sector. Most of the labour force under this category runs micro and small enterprises in both the formal and informal sector.

#### Unemployment

In Laikipia County, 16% of the residents with no formal education, 22% of those with a primary education and 32% of those with secondary level of education or above are working for pay. Work for pay is highest in Nairobi at 49% and this is 17 percentage points above the level in Laikipia for those with a secondary level of education or above

#### Livelihoods

The agriculture sector employs up to 60 per cent of the total labour force in the county. The main source of livelihood includes, crop farming and livestock rearing. Other sources of livelihood include, being crop farming, livestock rearing, tourism, retail and wholesale trade. The main source of income as shown in the figure below for the household was agriculture at 88.9% followed by civil service at 3.2%. Animal husbandry, Handicraft and construction work at 0.5% same as Handicraft. Commerce at 2.0%.

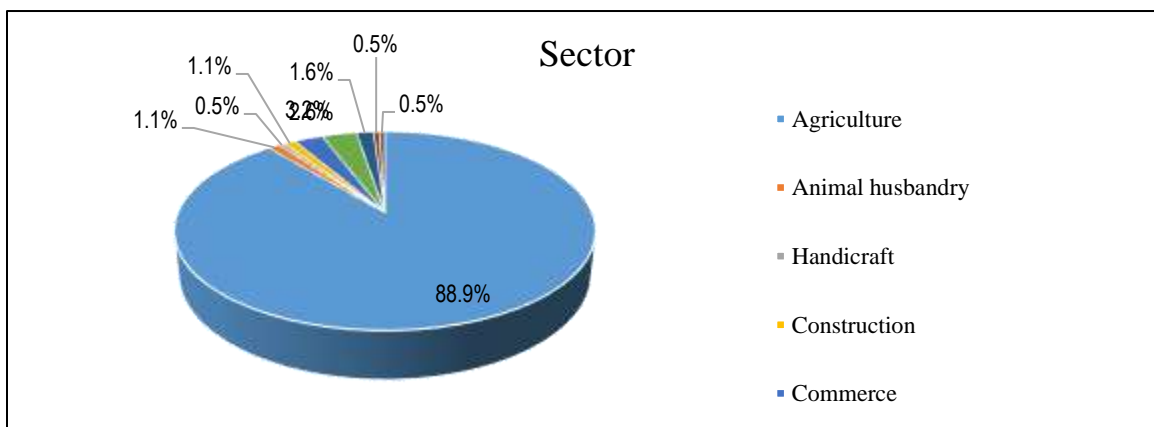


Figure 5-90: Economic Activities

#### 5.1.8.9 Gender Based Violence

Domestic violence is rampant in Laikipia and despite interventions, notably by civil society actors; there has been a steady increase in the number of cases and the severity of domestic violence. According to the Police Administration, women suffer more in domestic disputes caused by their spouses than in any other circumstance. Domestic abuse accounted for 48% of all violations. Women are most likely to suffer abuse from their husbands. The primary research indicates that the most prevalent form of abuse of women is usually a combination of physical assault followed by emotional stress, sexual violence and neglect, both financially and otherwise. However, is still not treated with the same gravity as other cases when they are reported. Often the victim reporting the incident is asked what she did to provoke the violence and is encouraged to resolve the issue at home.

#### 5.1.8.10 Energy

The national power grid serves 156 trading centres and is yet to reach the other 24 centres. The households using electricity for lighting constitute 17.7 percent of the total households. The Last Mile Connectivity Programme has helped to upscale access for the rural households. The county has several learning institutions, health facilities and boreholes supported by solar energy. Being a semi-arid county, reliable sunshine throughout the year provides high potential for harnessing of solar energy. There are also opportunities of up scaling biogas and wind energy. It is expected that once the proposed transmission line is constructed and completed, it will be energised, and the additional power will alleviate some of the gaps that are present at the moment.

The main sampled PAP household sources of energy for cooking was dry plants/wood (76.1%), LPG Gas (7.6%) and Kerosene (3.6%). Other sources of energy for cooking included electricity and biogas as shown in figure 5:92 below.

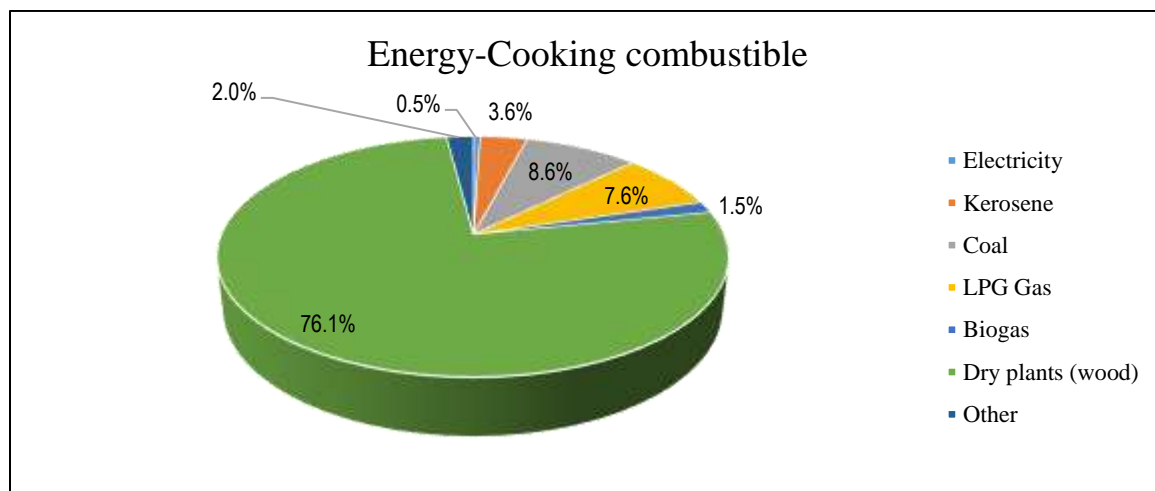
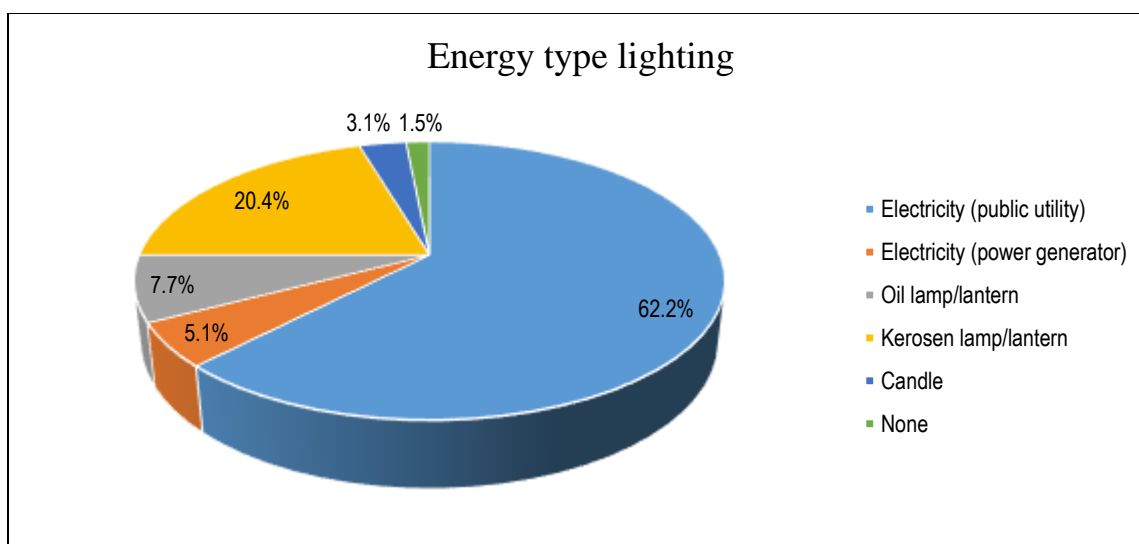


Figure 5-91. Sources of Energy for cooking

Electricity (62.2%) is the main source of energy used in lantern lumps for lighting; the other sources of energy for lighting formed 37.8%.

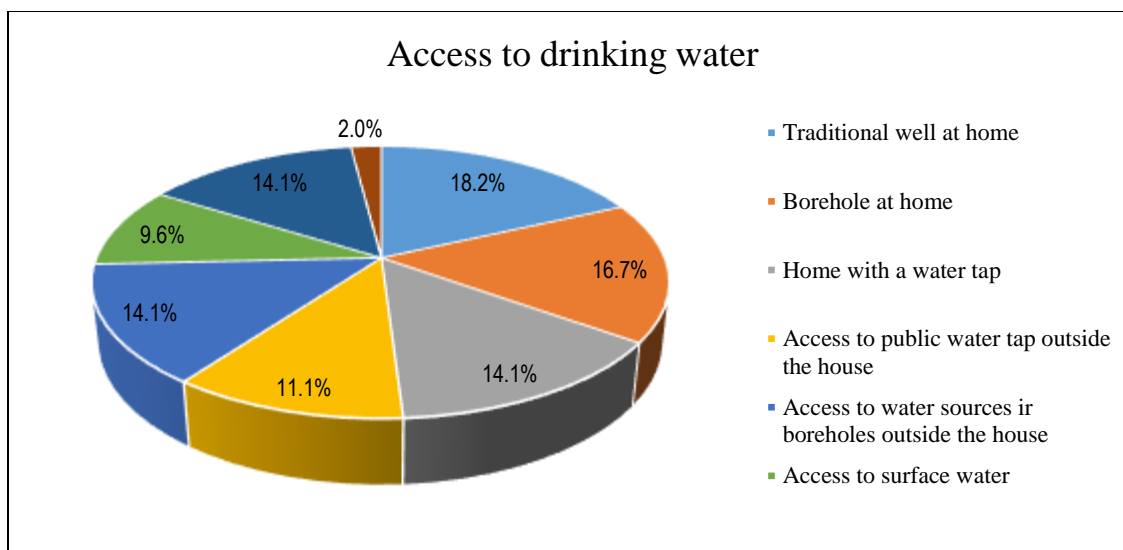


**Figure 5-92: Sources of Energy for lighting**

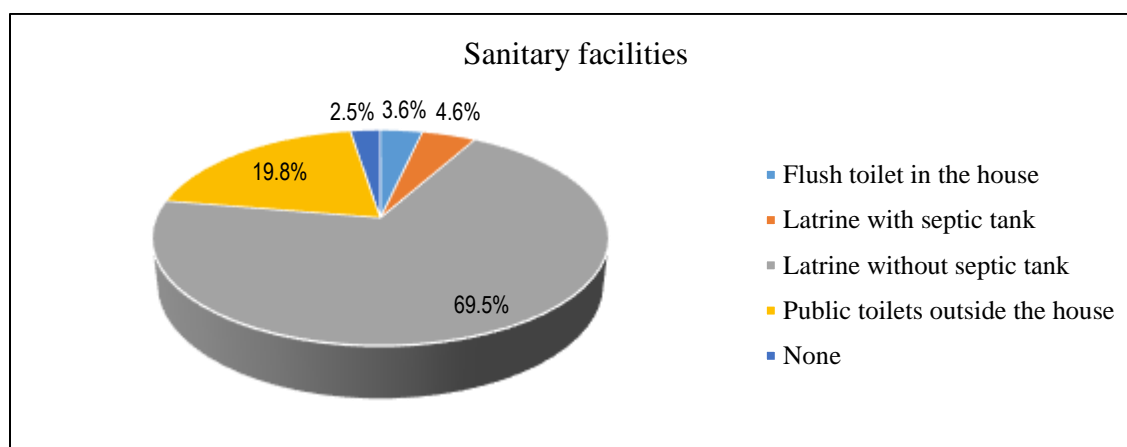
#### **5.1.8.11 Water and Sanitation**

Laikipia is drained by the Ewaso Ng'iro River and its tributaries, which originate from Mt. Kenya and the Aberdares. The main tributaries are Ewaso Narok (Ngare Naro), Narumoru, Likii, Sirimon, Ontulili, Ngare ndare, Melwa, Ngare Naro, Ngobit, Rongai, Timau, Moyak, Pesi, Suguroi, Mutara, Nanyuki, and Burguret rivers. Boreholes, pans, dams, shallow wells, springs and sub surface dams are also a common feature in the county for domestic and irrigation purposes. Rock catchments in the northern parts of Laikipia are increasingly being exploited. There are 79,295 households with latrines in the county. The distribution of main toilet facility reflects that 11.8 per cent use flash toilets, 60.2 per cent use pit latrines, and 16.4 per cent use uncovered latrines or buckets whereas 11.3 per cent use other methods of disposal such as natural bushes. Nanyuki and Nyahururu towns have established sewer and treatment services. On human waste disposal 72.8%, of households use pit latrines with 97% in Laikipia East subcounty in 84.9% in Laikipia west subcounty and 41.9% in Laikipia North subcounty on hand washing, 1.9%, of the population does it four critical times with those washing with soap at 49.7%

The survey outcomes concluded that traditional well at home was the most used source of water (18.2%) boreholes at home followed (16.7%), while water sourced from boreholes within the community; rainwater and taps within the homestead were at (14.1%). Other sources of water formed about 22.8%. The main sanitary facility used by the community interviewed was a latrine without septic tank (69.5%). Those who use public toilets outside the house constituted 19.8%, while PAPs with latrines with septic tanks formed 4.6%



**Figure 5-93: Sources of Water**



**Figure 5-94: Sanitation facilities**

#### **5.1.8.12 Tourism and Recreation**

The major tourist attractions are the wildlife, the unique Maasai cultural practices and the Thomson Falls. The proximity to Mt. Kenya, Meru, Aberdares and Samburu game parks have greatly boosted tourism within the county through provision of hospitality services to the tourists. Laikipia County has the greatest number of wildlife outside of the gazetted protected areas in the country. The wildlife is mainly found in the private ranches, but they are also found in the group ranches of Laikipia North, Mukogodo forest and small-scale holdings in Laikipia West. The most abundant species are the elephants. Other predominant species include Burchelles zebras, Thomson Gazelles, Impalas, Buffaloes, Lions, Elands and Grevy Zebras. The importance of wildlife is manifested by existence of a strong ranching organization called the Laikipia Wildlife Forum. Most of the tourists are hosted in conservancy lodges. The county has four international standard classified hotels i.e. Sweet Waters Tented Camp at Ol Pejeta, Sportsman Arms Hotel at Nanyuki, Thompson Falls Lodge at Nyahururu and Illingwesi Lodge at Illingwesi Community Ranch with a total bed capacity of 306.

#### 5.1.8.13 Trade and Industry

The main commodity markets in the county are in Nanyuki and Nyahururu whereas main livestock markets are at Rumuruti, Doldol and Kimanjo. Other market centers include Olmoran, Sipili, Wiyumiririe, Lamuria and Debatas. Industrial zones are established within Nanyuki and Nyahururu towns. Rumuruti town has planned industrial zones with no activities. There are seven jua kali associations with a membership of 344 artisans who are involved in welding, fabrication, carpentry among other activities. Industrial processing is minimal with milk plants and grain milling being the major firms. Storage and distribution of petroleum products is also undertaken at a low scale. Alcoholic drinks processing/packaging is also an activity in Nanyuki.

#### 5.1.8.14 Transport Network

##### *Road Network*

The total classified road network in the county is 1,038.1 Km out of which over 80 per cent are feeder roads. The bitumen, gravel, and earth surface stand at 207.3, 328.9 and 501.9 kilometres, respectively. The major transport routes serving the county are Nairobi-Isiolo-Marsabit (A102), Gilgil-Rumuruti (C55), Rumuruti-Mararal (A2) and Nakuru-Nyeri (B65).

##### *Rail Network*

There exists an old railway network in covering 23 kilometres serving Nanyuki Town and a small stretch of about 2 Kilometres in Nyahururu Town.

##### *Airport*

The county is served by 1 airstrip near Nanyuki Town. There are several landing grounds across the county majority of which are within main private ranches.

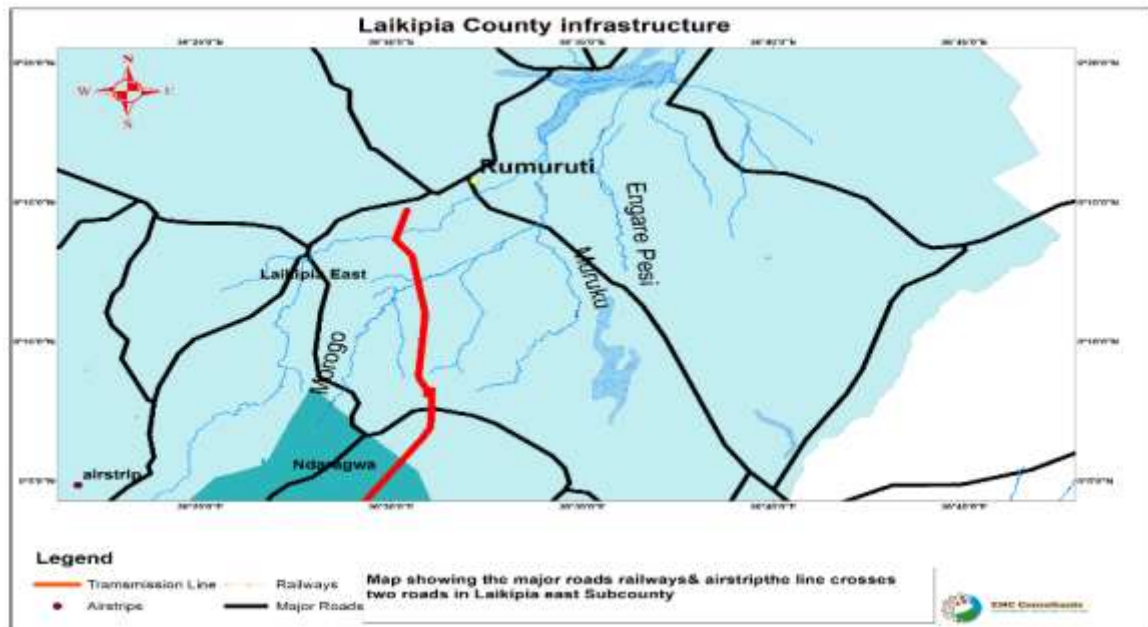


Figure 5-95. Road Infrastructure crossed by transmission line

#### **5.1.8.15 Financial Services**

Number of Institutions Laikipia is served by 16 banks, 2 microfinance institutions and 15 insurance companies operating within Nanyuki and Nyahururu townships. There are 112 SACCOs with 3 FOSAs in the county and 3 main mobile money service providers. Agricultural Finance Corporation runs two branches in Nanyuki and Nyahururu.

#### **5.1.8.16 Archeological Sites**

##### ***Mau Caves – Monument***

The Mau Mau caves located at the foot of the Mount Kenya and along the Nanyuki – Nyeri Highway prevail as a solemn reminder of one of British Empire's bloodiest struggles in East Africa and a beacon of some significant steps to the independence of Kenya. Located at the foothills of Mount Kenya, the Mau Mau Caves were utilized by the infamous Mau Mau fighters as a military rendezvous point, between 1953 to 1959.

##### ***Rock Gongs of Lewa Downs Wildlife Conservancy***

This wildlife paradise is a place with an ancient past including a lakebed where many hand axes have been found dating back several hundred thousand years. When struck in different places with a hammer gongs produce different tones just like a musical instrument. Rock gongs were likely used for divining purposes and ritual communication in the past. It is believed that the paintings have been made by Twa hunter-gatherer people between 1000 and 3000 years ago. The transmission line corridor is not at close proximity to any of these archeological sites in Laikipia County including graves and shrines.

## 6 STAKEHOLDERS CONSULTATIONS

This chapter provides a description of the main stakeholders of relevance to the Project and a summary of stakeholder engagement activities undertaken during the preparation of the ESIA.

### 6.1 Stakeholder Engagement Principles

KETRACO understands that effective stakeholder engagement and public consultation is a cornerstone of successful Project development, and is committed to free, prior, and informed engagement with stakeholders throughout the Project lifecycle. The key principles guiding KETRACO's approach to stakeholder engagement on this Project are:

- To be open and transparent with stakeholders.
- To be accountable and willing to accept responsibility as a corporate citizen and to account for impacts associated with the Project activities.
- To have a relationship with stakeholders that is based on trust and a mutual commitment to acting in good faith.
- To respect stakeholders' interests, opinions and aspirations.
- To work collaboratively and cooperatively with stakeholders to find solutions that meet common interests.
- To be responsive and to coherently respond in good time to stakeholders.
- To be pro-active and to act in anticipation of the need for information or potential issues.
- To engage with stakeholders such that they feel they are treated fairly, and their issues and concerns are afforded fair consideration.
- To be inclusive and accessible to stakeholders so that they feel able to participate; to receive and understand information; and to be heard
- To engage stakeholders using culturally appropriate languages and formats and techniques, in accessible locations, considering mobility, literacy and disability challenges, and in a timely manner to ensure meaningful consultations.

### 6.2 Stakeholder Engagement Objectives

The objectives of this stakeholder engagement were as follows;

- To identify and map all relevant stakeholders, their context, interests, and concerns
- To establish a two-way dialogue to understand concerns, management options and external perspectives
- To promote and secure participation of PAPs by building their capacity for informed participation with special attention given to vulnerable PAPs in key decision making
- To build and maintain trust between stakeholders
- To support the resolution of emerging tension and maintain the project's social license to operate
- To manage stakeholders' expectations
- To facilitate the collection of quality primary and secondary information relevant; to the project processes including monitoring
- To triangulate data collected and analysis done to inform decision making
- To document information disclosed and public consultation efforts

- To comply with regulations and requirements on disclosure and consultation
- To provide information about the project and its potential impacts to those interested in or affected by the project, and solicit their opinion in this regard
- To identify additional impacts/issues and possible mitigation measures
- To inform the process of developing appropriate mitigation measures and facilitate consideration of alternatives and trade-offs (if any)
- To reduce chances of conflict through early identification of contentious issues
- To ensure transparency and accountability of decision-making; and
- To increase public confidence in the project.

### 6.3 Stakeholder Mapping and Identification

Stakeholders include individuals or groups that may influence or be impacted by the Project, as described in Box 6-1 below.

#### Box 6-1: Definition of a Stakeholder

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.”

The level of interest and impact of any given group of stakeholders is dependent on a number of factors including level of authority, socio-economic context, influence, education and cultural factors. Stakeholder identification began at Project inception and planning and has continued through the various stages of the Project development.

Stakeholders identified to date represent the organizations and individuals who may be directly or indirectly (positively or negatively) affected by the Project or who may have an effect on how the Project is implemented. Stakeholders identified for inclusion in engagement activities meet one of the following criteria:

- Have an interest in the Project
- Would potentially be impacted by or have an influence on the Project (negatively or positively); and/or,
- Could provide commentary on issues and concerns related to the Project.

### 6.4 Approach and Methods of Stakeholder Engagement

Below is a summary of the approaches and strategies adopted throughout the stakeholder consultation exercise.

#### 6.4.1 Mobilization

- **Introduction letters:** KETRACO provided the consulting team with official letters of introduction informing all stakeholders about the proposed project, introducing the ESIA consultant, informing about the planned consultation activities and requesting them to support the consultants wherever possible.

- **Mobilisation through local administration:** KETRACO and the consulting team visited the offices of the local administrators and informed them about the proposed project and the upcoming consultation activities. Other than information sharing, these meetings were aimed at requesting the administrators to further mobilise the concerned stakeholders. Local administrators consulted included the local chief, sub chief, ward administrator and the village administrator.
- **Mobilisation by phone and emails:** Other key stakeholders who were not available due to conflicting obligations were contacted either through email or by phone. This mainly applied to custodians of relevant data and literature for the ESIA study.
- **Confirmation of appointments:** Prior to the appointment dates, the ESIA consultant reconfirmed the appointments by contacting the focal persons at each venue at least one day prior to the meeting to verify whether the proposed schedule was still valid for the expected audience.

#### 6.4.2 Interviews and Socio-Economic Surveys

Enumerators were employed during the stakeholder consultation period to undertake socio-economic surveys with key community members and stakeholders. A quantitative survey (targeting 100% of the PAHs along the ROW) was conducted using structured questionnaire designed to generate the required information. The information gathered was used to answer questions related social and economic parameters of the communities within the project site including, the availability or lack of social service facilities, existing levels of access to education, health, potable water and related services. Consultations were held using both formal and informal meetings with carefully selected members of the communities and all PAPs.

#### 6.4.3 Focused Group Discussions and Public Barazas

Stakeholders were further consulted in two ways; through public barazas where members of the community were called to a meeting with the agenda of discussing the proposed Project and through Focus Group Discussions (FGDs), where different groups were isolated and interviewed in a culturally appropriate setting. The FGD groups included women, youth and men. The views and recommendations expressed during the consultation meetings were incorporated in the ESIA report. Generally, the result of the participation showed support for the proposed project, with the community looking forward to the anticipated socio-economic developments associated with the project.



Figure 6-1: Consultation with stakeholders in Bahati, Nakuru County



**Figure 6-2: Consultation with stakeholders in Nyandarua County**



**Figure 6-3: Focused Group Discussion with Women in Lesirko, Nyandarua County**



**Figure 6-4: Focused Group Discussion with Women in Muruku, Laikipia County**

**Table 6-1** presents an overview of the main stakeholder groups of relevance to the Project.

**Table 6-1: Overview of stakeholder groups**

Stakeholder Category	Stakeholder Group	Connection to the Project	Stakeholders
National Government	Key Ministries National Regulatory bodies Government Agencies	National government are responsible for establishing policy, granting permits or other approvals for the Project, and monitoring and enforcing compliance with Kenyan Law throughout all stages of the Project life cycle.	<b><u>Interested Parties</u></b> Ministry of Petroleum and Energy County Commissioner, Nyandarua County County Commissioner, Laikipia County County Commissioner, Nakuru County Deputy County Commissioner, Nyandarua County Deputy County Commissioner, Laikipia County Deputy County Commissioner, Nakuru County Chiefs and Assistant Chiefs in affected locations and sub locations
County Government	County Governments	County Governments are responsible for approval of development plans	<b><u>Interested Parties</u></b> Governor of Laikipia County Governor of Nakuru County Governor of Nyandarua County
Parastatals	Government funded private enterprises in charge of managing specific activities.	Parastatals may have land or other assets which could be affected by the Project.  KETRACO is the owner of the transmission line and electricity network that the Project will connect to KETRACO is responsible for all the Very High Voltage Transmission assets.	<b><u>Interested Parties</u></b> KETRACO, Kenya Forest Service, Kenya Wildlife Service, National Museums of Kenya, Water Resources Authority and Kenya Civil Aviation Authority.
Civil Society Organisations			<b><u>Interested Parties</u></b> Birdlife International
Communities	Project affected communities along the 1,000m buffer including:  Landowners and users; Community members who use access roads to access nearby natural resources;	Households and communities that may be directly or indirectly affected by the proposed Project and its activities.  This includes people living on land affected by the Project, through direct land take or by social and environmental impacts, and other	<b><u>Directly Affected:</u></b> Affected community members and infrastructures Households losing access to land Households losing access to livelihood resources Households with structures at risk of displacement

	Social/public infrastructure and services.	<p>people who visit or use land or resources that may be affected.</p> <p>Primary stakeholders include landowners and land users. These communities need to be engaged around Project impacts anticipated through the project cycle. Land affected households will need to be informed about land acquisition and restrictions to land, to participate in the finalization of agreements around compensation and livelihood restoration and take active ownership of the resulting implementation of these measures.</p>	
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**Table 6-2: Nakuru County Consultations Venues, Dates and Number of Participants**

DATES	VENUE	NO. OF PARTICIPANTS	NO.OF MALES	NO. OF FEMALES
4 <sup>TH</sup> June 2019	Public Consultation – GDC Grounds, Kirima Location, Nakuru	65	51	14
5 <sup>TH</sup> June 2019	Public Consultation – Chiefs Camp - Bahati Location, Nakuru	51	19	32
8 <sup>TH</sup> June 2019	Public Consultation – Chiefs Camp-Wendo and Sabugo Location, Nakuru	47	30	17
19 <sup>TH</sup> June 2019	County Commissioner Office – Nakuru County	04	04	00
19 <sup>th</sup> June 2019	Deputy County Commissioner – Nakuru North Sub County	04	04	00
19 <sup>th</sup> June 2019	Kenya Forest Service–Bahati Station, Nakuru County	03	03	00
20 <sup>th</sup> June 2019	Deputy County Commissioner, Nakuru West Sub County	03	03	00
20 <sup>th</sup> June 2019	Lands Office – Nakuru County	03	03	00
20 <sup>th</sup> June 2019	CEC – Energy & Environment, Nakuru County	03	03	00
		<b>183</b>	<b>120</b>	<b>63</b>

**Table 6-3: Nyandarua County Consultations Venues, Dates and Number of Participants**

DATES	VENUE	NO. OF PARTICIPANTS	NO. OF MALES	NO. OF FEMALES
20 <sup>TH</sup> June 2019	Kenya Forest Services - OI Kalou Station, Nyandarua County	03	03	00
24 <sup>TH</sup> June 2019	County Commissioner, Nyandarua North Sub County	03	03	00

25 <sup>TH</sup> June 2019	Deputy County Commissioner, Nyandarua County	05	05	00
25 <sup>TH</sup> June 2019	Deputy County Commissioner, Nyandarua County	04	04	00
26 <sup>TH</sup> June 2019	CEC Transport and Energy Nyandarua County	05	05	00
5 <sup>TH</sup> August 2019	Public Consultation-PCEA Church, Gecaka Location	32	27	05
6 <sup>TH</sup> August 2019	Public Consultation–Kirimangai Grounds-Kirimangai Location	114	87	27
7 <sup>TH</sup> August 2019	Public Consultation - Hospital Hill Primary School - Lesirko, Location	27	17	10
8 <sup>TH</sup> August 2019	Public Consultation - Chief's Camp – Gatumbiro-Location	71	45	26
9 <sup>TH</sup> August 2019	Public Consultation- Chief's Camp – Gatumbiro, Location	55	41	14
13 <sup>TH</sup> August 2019	Public Consultation - Baari Secondary School –Mairinya, Location	31	28	03
14 <sup>TH</sup> August 2019	Public Consultation - Waka Junior School Hall–Karagoini, Location	67	42	25
14 <sup>TH</sup> August 2019	Public Consultation-Ndivai Baptist Church-Ndivai, Location	61	31	30
<b>Focus Group Discussions (Participants randomly selected from the public baraza)</b>				
5 <sup>TH</sup> August 2019	3 FGD at PCEA Church, Gecaka Location	72	36	36
6 <sup>TH</sup> August 2019	3 FGD at Kirimangai Grounds-Kirimangai Location	72	36	36
7 <sup>TH</sup> August 2019	3 FGD at Hospital Hill Primary School - Lesirko, Location	72	36	36
8 <sup>TH</sup> August 2019	3 FGD at Chief's Camp – Gatumbiro-Location	72	36	36
9 <sup>TH</sup> August 2019	3 FGD at Chief's Camp – Gatumbiro, Location	72	36	36
13 <sup>TH</sup> August 2019	3 FGD at Baari Secondary School –Mairinya, Location	72	36	36
14 <sup>TH</sup> August 2019	3 FGD at Waka Junior School Hall–Karagoini, Location	72	36	36
14 <sup>TH</sup> August 2019	3 FGD at Ndivai Baptist Church-Ndivai, Location	72	36	36
		<b>478</b>	<b>338</b>	<b>130</b>

**Table 6-4: Stakeholder Consultations Venues, Dates and Number of Participants – Laikipia County**

DATE	VENUE	NO. OF PARTICIPANTS	NO. OF MALES	NO. OF FEMALES
26th June 2019	County Commissioner's Office – Laikipia County	03	03	00
20th June 2019	Deputy County Commissioner's Office – Laikipia West Sub County	03	03	00
15th August 2019	Public Consultation – Melwa Chiefs Camp-Melwa Location	32	28	04
15th August 2019	Public Consultation – Mohotetu Chiefs Camp – Mohotetu Location	34	21	13

Focus Group Discussions (Participants randomly selected from the public baraza)				
15th August 2019	3 FGD at Melwa Chiefs Camp-Melwa Location	72	36	36
15th August 2019	3 FGD at Mohotetu Chiefs Camp – Mohotetu Location	72	36	36

The comments and concerns raised by the community during stakeholder consultation and the responses given by both the consultants and the client are highlighted table 6-5 below;

**Table 6-5: Summary of Concerns raised by the Project-Affected Persons**

Theme	Comments and Issues	Response
<b>Waste Generation</b>	Stakeholders were concerned about waste generation and methods of waste disposal during project implementation.	The consultants informed community members that the ESIA report will recommend that a waste management system be put in place; Waste will also be handled and transported by NEMA certified waste handlers.
<b>Noise and Vibration</b>	Questions concerning potential air and sound pollution arising from excessive noise and vibration also arose from community members	The Consultants informed the stakeholders that the project will be using up to date technologies to improve efficiencies to reduce noise and vibrations and further mitigation measures will be recommended in the ESMP.
<b>Water Quality</b>	The community raised concerns on impact of the project on water quality. They stated that water resources may be contaminated by project waste rendering it unfit for human consumption. They were also concerned about over abstraction during project implementation.	The consultants informed the community that the ESIA will propose that a waste management system be put in place.  Stakeholders were also informed that the project had taken into account the estimated water usage for the project and made plans for alternative water sources to ensure adequacy of water for the project without depleting local resources.
<b>Biodiversity</b>	Stakeholders wanted to know whether the project proponent had taken into account the impact of cutting down trees on the basin area (catchment) as well as local weather patterns. Further, they inquired whether they would be compensated for all the trees that would be cut	The team informed the stakeholders that A RAP study will be undertaken separately and all the affected assets including trees will be documented and the owners compensated.

	<p>down to clear the project area.</p> <p>They were also concerned about reduction in flora diversity and change in vegetation cover as only low growing vegetation would be allowed to grow in the project area.</p>	<p>Additionally, the project will be designed in a way that ensures very minimal bush clearance. The PAPs will also have the right to salvage all assets affected</p>
<b>Air Pollution</b>	<p>Some of the stakeholders feared that the project will generate emissions and generate dust leading to air pollution.</p>	<p>The consultants informed the members that the project will be using up to date technologies to improve efficiencies to reduce emissions and mitigation measures will be put in place to reduce emissions in line with national air quality regulations and international best practice.</p>
<b>Employment</b>	<p>Community members inquired whether there will be employment opportunities and what would be the criteria for gaining access to such opportunities.</p> <p>They decried an ongoing pattern of contractors hiring persons who don't reside in their localities to carry out tasks that locals are capable of doing and requested that, in this project, they be given first priority whenever employment opportunities arise.</p> <p>Female participants were especially concerned that they would not be given opportunities to work in the project because of societal perceptions that they are physically weak and are exclusively responsible for domestic affairs. In addition to this, they foreshadowed possibility of rise in incidences of children dropping out of school to take up paid labour in the project.</p>	<p>The consultants informed stakeholders that they have incorporated the development of a Community Engagement Plan and a Labour Recruitment Plan in the ESIA.</p> <p>These plans will cover all employment issues ranging from recruitment, dismissal, hours of work, non-discrimination, child labour, fair remuneration and grievance management.</p> <p>Stakeholders were however cautioned that where specialist skills are required for the project and the skills are not locally available, specialist would be hired from other jurisdictions through a competitive process.</p>
<b>Land use and Compensation</b>	<p>The members noted that they would incur loss of land and property since residents may be required to relocate. They noted that relocation would</p>	<p>The community was informed that a RAP study has been commissioned and will be conducted and implemented in accordance with World Bank Standards and national</p>

	<p>interfere with their economic affairs and separate them from their kin.</p> <p>They inquired about the land acquisition process, timelines for compensation, persons entitled to compensation and the amount of money to be paid per head.</p> <p>They were also concerned that news about compensation may result into land purchase for speculative purposes and that unscrupulous characters may disinherit rightful owners by acquiring fake title deeds.</p>	<p>legislation.</p> <p>This will ensure that all affected persons are compensated in a fair and timely manner. Compensation will be done following proper identification of affected persons and thorough valuation of their assets.</p> <p>They were further informed that the RAP process would incorporate grievance-handling mechanism to settle any disputes that may arise.</p>
<b>Community benefits and Corporate Social Responsibility (CSR)</b>	<p>The communities wondered whether there would be any direct benefits flowing to them as a result of the project.</p> <p>They stated the need for boreholes, market infrastructure and bursaries for school going children as critical community needs.</p>	<p>The consultants informed the community members that they have proposed the development of a CSR plan to the project proponent.</p> <p>The plan will be developed in consultation with the community members, and in line with KETRACO's CSR policy, and it will incorporate priority projects as identified by community members.</p> <p>Aside from this, there will be indirect benefits arising from the project including employment of local residents in particular skilled women, youth and persons with disabilities.</p> <p>They will also benefit from improved roads since roads will need to be upgraded to facilitate transportation of project equipment's, among other benefits.</p>
<b>Health and Safety Issues</b>	<p>The stakeholders were concerned that there would be electromagnetic radiations and risk of electrocution that may affect those residing near</p>	<p>The team informed the community that possible health hazards will be mitigated using up to date state of the art technologies and measures will be put in place to ensure health and safety</p>

	<p>the way leave.</p> <p>Some community members were wary of the presence of the high-voltage wires in their immediate environment, due to perception that it causes cancer</p>	<p>measures are observed at all times through the development and operation of the project.</p> <p>They were reminded that in such projects, the proponent is always required to develop and implement a community health and safety plan and the proponent has been informed to do so through the ESIA.</p>
<b>Social impacts</b>	<p>It was a concern of the community members that the proposed project will increase the population in the project area and its surroundings which could lead to socio-cultural diversification and cultural contamination.</p> <p>There were fears that with the increase in population, there will be an increase in the spread of HIV and AIDS, teenage pregnancies, drug and alcohol abuse and prostitution.</p> <p>Further they stated that enhanced economic status particularly among the women and youth would lead to increased occurrences of SGBV.</p> <p>Concerns were also raised about competition for limited resources due to population influx. This would particularly manifest in inadequate housing and shortage of water supply.</p>	<p>The consultants and the clients' team informed the community that it will put in place sufficient safeguards to mitigate such incidences through for instance, developing and implementing a grievance redress mechanism; putting in place a sexual harassment policy and a HIV/AIDs prevention and awareness plan.</p> <p>The proponent will also work closely with other government agencies, in particular law enforcement and social protection offices to manage project-related incidents. GBV (SEA and SH) resulting from project operations will be managed in line with the GBV Action Plan that will be prepared and will apply the principle of survivor centered approach. The project will facilitate survivor/guardians to access referral pathways that they wish to access, such as legal, police, counselling services etc., which the project is expected to map as part of GBV management.</p>

#### **6.4.4 Post ESIA Consultations**

KETRACO is aware that public consultation is a key component of project implementation and will therefore put in place a Stakeholder Engagement Plan (SEP). The overall aim of SEP will be to address the concerns and opinions of the stakeholders with the ultimate view to assuring a smooth project implementation. KETRACO shall welcome suggestions and information from relevant stakeholders, contractors, visitors, and the general public. Community Liaison Officers (CLOs) will be appointed by the contractor and will address complaints and suggestions from the communities. Further, consultations, which began during the ESIA process, will continue throughout the project life cycle in line with the SEP.

#### **6.4.5 Monitoring/Reporting Stakeholder Engagement Activities**

It will be important to monitor and report on the on-going stakeholder engagement activities to ensure that the desired outcomes are being achieved, and to maintain a comprehensive record of engagement activities and the issues raised.

#### **6.4.6 Data Management**

In order to record activities, assess the effectiveness of the Stakeholder Engagement Plan and associated community dialogue activities, KETRACO will implement a data management and monitoring process. Stakeholder engagement activities will be documented and filed in order to track and refer to records when required and ensure delivery of commitments made to stakeholders. The following stakeholder community dialogue records and documentation will be used and maintained by KETRACO during pre-construction and construction phase:

- Stakeholder list
- Stakeholder engagement log
- Commitments register
- Meeting minute template
- Grievance log
- Media monitoring of press and radio stories relevant to the project and unconventional related issues and activities.

#### **6.4.7 ESIA Study Report Disclosure**

This ESIA study report will be disclosed in accordance with the country's disclosure requirements as well as WB's disclosure policy. The report upon approval by NEMA will be disclosed on KETRACO's website and NEMA's website, as well as on the World Bank's external website. Hard copies will also be made available at the Contractor's office, Chief's office and with the relevant offices at the county. Summaries of the ESIA will be disclosed to PAPs in culturally appropriate languages and formats using feasible engagement techniques such as FGDs and public barazas, in accessible locations and in a timely manner that ensures meaningful consultations and considering any mobility, literacy and disability challenges.

## 7 ANALYSIS OF PROJECT ALTERNATIVES

This chapter describes the analysis of technically and financially feasible alternatives considered in the development of the Project and provide documentation of the rationale for selecting a particular option. The purpose of the alternatives analysis is to identify feasible alternatives that could improve the sustainability of the Project's design, construction and operation.

### 7.1 No Project Alternative

No project alternative is the option of not constructing the proposed power transmission line project at the identified routing i.e. from Menengai to Rumuruti. This alternative would result in no environmental and social impacts in the project area. Whilst this would without doubt result in complete avoidance of impacts, this needs to be balanced with the strategic need for the development of new electricity generation capacity in Kenya.

The Electricity and Petroleum Regulatory Authority undertakes long-term planning for the country's electricity generation and transmission system through the Least Cost Power Development Plan (LCPDP), a 20-year rolling plan updated every year. The most recent version of this study was completed in 2013 and plans for the period 2013 to 2033. The update involves review of the load forecast in light of changed pertinent parameters, commissioning dates for committed projects, hydro data, costs of generating plants and transmission system requirements. Electricity consumption is forecasted to grow in the long term by an average of 7.3% per year (reference scenario), 9.6% Vision and 5.6% Low scenario. This would lead to consumption figures 50% above (vision) and 25% below (low) the values in the reference scenario by 2035. The annual peak load is expected to grow at slightly higher rates from 1,600 MW in 2015 to 6,700 MW in 2035, (with Vision rate of 10,000 MW and low case of 5,000 MW).

The 2011 updated LCDP for Kenya projects a capacity need in the range of 12,739-22,995 MW by 2031, with an intermediate projection of 3,751 MW by 2019. Projected energy demand is expected to increase from 7,296 GWh in 2010 to 22,695 GWh in 2019 and 91,946 GWh in 2030. 2,700 MW in generation capacity could come online by 2030 to reach 5,000MW and a leap from 4,150km in transmission lines to double by 2030. 20-30% of population could be connected to off grid access to electricity (primarily solar) by 2020. This will bring 70-80% of the Kenyan population to on-grid electricity by 2020 from 46% in 2015. These projections are based on an array of planned infrastructural, mining and manufacturing projects including an electrified standard gauge railway (SGR) line, the establishment of a steel smelting plant in Meru, Konza Techno City and several other major energy intensive undertakings. Kenya has only 33% electrification and devolution of energy is on an online plan. Reticulation of energy by county governments is a role expanded in the new energy bill 2018.

Kenya long term PGTMP master plan 2015-2035, identifies and models the expansion paths of the Kenya power system for the period, complying with the defined planning criteria and scenario framework. The plan includes a scenario in which RE is significantly upscaled and another scenario in which Energy Efficiency (EE) significantly affects supply. The PGTMP investment modelling compares energy investments (including

nuclear) by aspects of technology like capacity and also uses PESTEL to rank different investment over the long term for prioritization and scheduling.

This projected growth rate in electricity demand will require corresponding increases in capital outlay to provide the needed incremental generation capacity and associated supply and distribution infrastructure. It is envisaged that the private sector will play a key role in providing the required capital either on its own or through Public Private Partnerships. The government of Kenya has in this course created a platform to entice investors in the energy sector KETRACO being one of them.

The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- There will be no added values to the reference plot.
- There will be no added value to other establishments in the neighborhood.
- The proponent will not benefit from the revenue expected from the facility.
- The government kitty will not benefit from the revenue to be earned due to the establishment of the proposed project.
- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain underutilized.
- Reduced interaction both at local, national, and international levels.
- No employment opportunities will be created for thousands of Kenyans who will work in the project

From the analysis above, it becomes apparent that the No Project Option is no alternative to the proponent, local people, Kenyans, and the government of Kenya. Subsequently, the do-nothing alternative is not a preferred alternative and will not be assessed in further detail during this ESIA phase.

## **7.2 Alternative Transmission Line Route**

The analysis of alternatives route involved the evaluation certain sensitivities associated with the various options. Table 7-1 below summarizes the sensitivity criteria used for the alternative analysis. Each sensitivity aspect was assigned a score and the score was used as a basis for comparison between options.

Table 7-1: Social Sensitivity

Social Sensitivity								
Category	Score	Physical and Economic Displacement	Community Infrastructure and Resources	Socio-Economics and Income-Generating / Subsistence Livelihoods	Socio-Cultural Characteristics and Intangible/Living Cultural Heritage	Environmental Sensitivity	Aesthetic	Community Health & Safety
High	4	Dense permanent Housing (larger populations) or areas highly significant for livelihoods which are not available elsewhere.	Substantial or highly Significant infrastructure present (e.g. school, hospital, medical centre etc.).	Area is essential for principal livelihoods.	Presence of large number/highly sensitive intangible / living cultural heritage sites. e.g., graves or cemeteries or religious buildings.	Landscapes that: feature concentrations of biological diversity Including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels; and Feature ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of naturally occurring species in natural patterns of distribution and abundance; and Feature rare, threatened, or endangered ecosystems, habitats refuges.	Major changes affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view. Contrast may dominate the view and be the major focus of viewer attention	Severe Health effects for a large portion of the community

Medium	3	Small-medium groups of houses, priority areas used frequently for livelihoods, or businesses potentially requiring economic Resettlement.	Some infrastructure present with some alternatives available.	Area is significant for principal livelihoods.	Individual grave sites.	Landscape features that Include ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of naturally occurring species in natural patterns of distribution and abundance.	Clearly perceptible changes in views at intermediate distances, resulting in a either a distinct new element in a significant part of the view, or a more wide ranging, less concentrated change across a wider area. Contrasts may attract attention but should not dominate the view of the casual observer.	Moderate Health effects for a larger portion of the community and severe health effects for a small portion of the community
Low	2	Individual houses or Small communities, Non-priority areas used for livelihoods.	Some infrastructure Present although Typically accessed at Alternatives sites.	Area is used for livelihoods.	Intangible cultural heritage sites known to be used, e.g. views or landscapes.	Ecologically important areas that do not form part of recognized protected areas	Minor changes in views, at long distances or visible for a short duration, perhaps at an oblique angle, or which blends to an extent with the existing view.	Non-permanent Health effects for a Larger portion of The community and moderate health effects for a small portion of the community

							Contrasts may be seen but should not attract the attention of the casual observer.	
Negligible	1	No significant human land use for livelihoods / housing.	No significant areas used to collect resources or House infrastructure.	Area only occasionally used for Livelihood activities.	No significant Culturally sensitive areas.	Other areas not considered sensitive.	Change which is Barely visible, at a very long distances, or visible for a very short duration, perhaps at an oblique angle, or which blends with the existing Acceptable contrasts are primarily natural ecological changes.	Non-permanent Health effects for small portion of the community.

**Table 7-2. Preferred Route**

Topic	Option 1: Transmission Line in accordance with KETRACO's Coordinates		Option 2. Transmission line Route in accordance with ESIA Team Analysis (Avoiding the Forest)	
	Analysis	Scoring	Analysis	Scoring
<b>Environmental Sensitivity</b>	This option would include the construction of the transmission line which will cross inside/into Bahati Forest (1.75km) long and which is considered sensitive. Due to the traversing of the route transmission line into the Bahati Forest the potential impacts on flora and fauna can be tentatively considered as high. Potential noise and air quality sensitive receptors are also high.	<b>2</b>	This option would include the construction of the transmission line avoiding Bahati Forest which is a sensitive ecosystem.	<b>1</b>

<b>Physical and Economic Displacement</b>	No significant human land use for livelihoods/housing.	<b>1</b>	No significant human land use for livelihoods/housing.	<b>1</b>
<b>Community Infrastructure and Resources</b>	No significant areas used to collect resources	<b>1</b>	No significant areas used to collect resources.	<b>1</b>
<b>Socio-Economic and Income Generating Livelihoods</b>	Project route and areas along the 3 Counties used for livelihood activities.	<b>1</b>	Project route and areas along the 3 Counties used for livelihood activities.	<b>1</b>
<b>Socio-Cultural Characteristics and/Living Cultural Heritage</b>	As per the ESIA baseline, no culturally- sensitive areas.	<b>1</b>	As per the ESIA baseline, no culturally-sensitive areas.	<b>1</b>
<b>Aesthetics</b>	There are no other overhead transmission lines in the area, hence moderate impacts.	<b>2</b>	There are no other overhead transmission lines in the area, hence moderate impacts.	<b>2</b>
<b>Community Health and Safety</b>	Overhead transmission structures are clearly marked and have security mitigation measures to prevent harm to the community, both during construction and operation phases. The line snapping and causing injury is a potential risk (although considered to be low). The line hardware used on the overhead transmission line is rated or designed higher than the conductor ultimate tensile strength and the conductor is only pulled to 20% of its ultimate tensile strength. Therefore, the likelihood of a transmission line snapping is possible but unlikely. Specifically, during operation, due to the transmission servitude being maintained, this risk is not material.	<b>1</b>	Same as Option 1.	<b>1</b>
<b>Total Score</b>		<b>9</b>		<b>8</b>

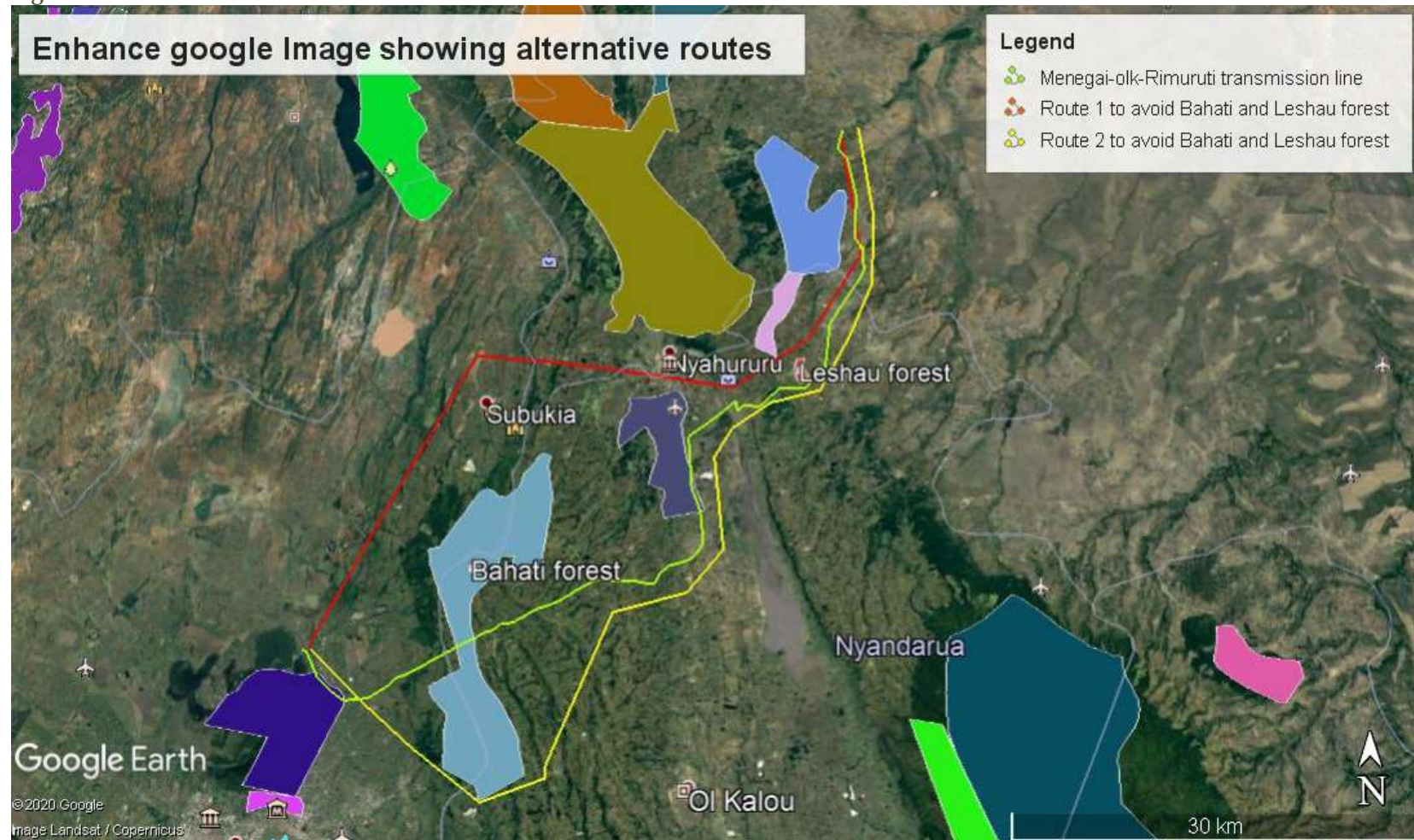
### Preferred Transmission Line Route A:

In proposing the above line route, consideration was given to social and environmental impacts of the project. The transmission line will generally follow open ground with minimum settlement to avoid areas of dense settlement and where impacts on environment and local people e.g. from loss of farmland or grazing land are minimal. The proposed route of the transmission line was done to avoid ecologically sensitive areas such as forests, game reserves, wetlands, hilltops etc. The routing was also done in consideration of cost-effectiveness by avoiding as much as possible excessively steep areas such as hills and areas with high population. Therefore, there would be no added benefit of rerouting the route as all important parameters were considered in mapping the current route.

### Alternative Transmission Line Route B: Avoid Forest

This ESIA is proposing an alternative route (Route B) which would primarily avoid the transmission line crossing into Bahati Forest as shown in figure 7-1 below. This option would thereby ensure that the adverse impacts associated with clearing the vegetation in Bahati Forest is avoided.

Figure 7-1. Alternative Route



### 7.3 Alternative Construction Practises

The table below, shows the different construction practices/methods that may be adopted by the contractor and the associated justification for such construction practices. The contractor will be expected to select the most appropriate methods/alternatives as needed and subject to site characteristics and cost implication.

Table 7-3. Illustrative Differences in Construction Practices followed





No.	Project Type	Construction Technique normally used	Alternative Methods of construction available	Reason
<b>A. Transmission Line</b>				
1	Tower material	Manual labour used to carry material to site of erection from the last accessible point on access road	Tower material reached to erection site by high boom cranes in hilly areas	Cost issues and status of access roads.
2	Tower foundation	Digging, reinforcement cement concrete (RCC)	Digging, casting using mechanical tools and prefabricated casts	Terrain issues and cost of erection
3	Tower erection	It is erected member by member using chain pulleys manually	Tower structure is completely erected lying on ground and then mechanically/aerially erected.	Terrain issues and cost of erection
4	Installation of Tower suspension accessories	They are erected manually by hauling the accessory using chain pulley	Tower material reached to top of erection site by high boom cranes	Terrain issues and cost of erection
5	Paying out	Manually controlled conductor drums used.	Mechanically (diesel/gas) operated conductor drums	Cost issues and lack of equipment
6	Stringing of pulling line over each stinging block for the conductor	The pilot wire is manually strung over valley in mountainous area which is attached to power cable	The pilot wire is sometimes shot using a winch or through drones.	Cost issues and lack of equipment

7	Tensioning and sagging of conductor.	Tension and sag corrected using manual winch, chain pulleys, bull wheel type pullers and other associated equipment	Mechanically operated (diesel/ gas) powered pullers and tensioners to correct the tension and complete sagging operation.	Cost issues and lack of equipment
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## 7.4 Alternative Transmission Materials and Technology

The project considered alternatives of construction materials and processes before and during the construction process where it is environmentally found to be viable. Alternatives and their advantages or disadvantages include;

**Table 7-4. Alternative Transmission Material and Technology**

Type of pylon by material used	
<p><b>Wood pylons:</b> For support pylons a straight trunk impregnated with tar is usually used, which carries one or more cross beams with the conductor cables on the top. For anchor pylons constructions looking like a V or an A are used, because these can stand higher forces.</p> <p>Due to the limited height of available trees, the maximum height of wood pylons is limited (approx. 30 metres).</p> <p>This alternative was considered and <b>rejected</b>.</p>	
<p><b>Concrete pylon:</b> or concrete pole, is an electricity pylon made from reinforced concrete. Concrete pylons are manufactured at the factory and put up at the power line's right of way. Concrete pylons, which are not prefabricated, are also used for constructions taller than 60 meters.</p> <p>This alternative was considered and <b>rejected</b>.</p>	
<p><b>Steel tube pylon:</b> is a pylon, which is manufactured from a steel tube. This type of pylon is generally assembled at the factory and set up on the power line's right of way with a crane.</p> <p>This alternative was considered and <b>rejected</b>.</p>	
<p>A lattice steel pylon is an electricity pylon consisting of a steel framework construction. Lattice steel pylons are used for power lines of all voltages. For lines with operating voltages over 50kV, lattice steel pylons are the form of pylon used most often. Lattice steel pylon is usually assembled from individual parts at the place where it is to be erected. This makes very high pylons possible (generally up to 100 meters-in special cases even higher).</p> <p>This is the <b>preferred</b> option.</p>	

**Table 7-5: Advantages and Disadvantages of Concrete and Wooden poles**

Material	Advantages	Disadvantages
Concrete poles	<ul style="list-style-type: none"> <li>-These materials cost less when compared to steel contraptions.</li> <li>-Will not be eroded or rot</li> </ul>	<ul style="list-style-type: none"> <li>-Likely to collapse due to loose soils</li> <li>-Suitable for lower voltage electricity lines</li> <li>-Requires heavy machinery for installation because they are heavy</li> <li>-Have low tensile strength and needs to be reinforced</li> <li>-Low ground clearance of cables</li> </ul>
Wooden poles	<ul style="list-style-type: none"> <li>-Low installation cost.</li> <li>-Easy to transport.</li> <li>-Readily available.</li> </ul>	<ul style="list-style-type: none"> <li>-Not durable due to rot and decay.</li> <li>-Can easily collapse.</li> </ul>

## 7.5 Energy Evacuation/Transmission Alternative

Overhead energy transmission is the proposed option by KETRACO to evacuate the electricity using lattice steel pylons. However, electricity can also be evacuated through installation of underground transmission cables. The table 7-6 below shows the advantages and disadvantages of both methods and justification for selecting overhead transmission.

**Table 7-6: Alternative Transmission Modes**

Transmission Mode	Advantages	Disadvantages
Underground transmission cable/line	<ul style="list-style-type: none"> <li>-Underground cables ensures that the aesthetic pollution associated with pylons is avoided</li> <li>-Ensures dangers posed by pylons such as birds strikes are avoided</li> <li>- Underground cables are less affected by bad weather, vandalism and acts of terrorism</li> <li>-Risks of accident in construction and maintenance of the lines is reduced when using underground cables.</li> </ul>	<ul style="list-style-type: none"> <li>-Construction and maintenance on the lines is a complex undertaking</li> <li>-The costs of insulated cable and excavation during construction are much higher than overhead construction</li> <li>-Electric faults in underground transmission lines take longer to locate and to repair</li> </ul>
Overhead transmission line	<ul style="list-style-type: none"> <li>-Less civil works compared to underground transmission</li> <li>-Easy to repair and maintain.</li> <li>-Lower installation costs</li> <li>-Appropriate for long distance transmissions</li> <li>-More durable compared to underground transmission lines.</li> </ul>	<ul style="list-style-type: none"> <li>-Affected by extreme weather and may cause outages</li> <li>-Susceptible to lightning strikes</li> <li>-May interfere with flight paths and communication lines</li> </ul>

## 8 ASSESSMENT OF POTENTIAL RISK AND IMPACTS

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project and possible mitigation measures. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected.

### 8.1 Beneficial Impacts

#### 8.1.1 Pre-Construction Phase and Construction Phase

##### 8.1.1.1 Compensation Benefits

The construction of the transmission line and sub-station will lead to acquisition of land and the private land owners will receive cash compensation for loss of land and other assets.

##### 8.1.1.2 Expected Impact on Poverty Alleviation

With the implementation of the project, the power supply will be stable and reliable hence more customers will be connected to the system. The people under power supply will engage in income generating activities in order to improve their economic status.

##### 8.1.1.3 Employment

The construction of the transmission lines including operation and maintenance activities will provide employment opportunities—directly and indirectly—to skilled as well as unskilled manpower primarily to local manpower. During construction, the project will be beneficial through creation of employment opportunities for the local communities. The income, thus enhanced, of the local skilled and unskilled work force would also bring out a multiplier effect to other sectors of the economy.

##### 8.1.1.4 Knowledge/Skills Transfer

Local workers will benefit in terms of knowledge transfer especially from external skilled workers who when paired with the local workers will transfer on-the-job skills to them. Further, local workers may undergo certain training as part of skill enhancement prior to employment.

##### 8.1.1.5 Local Material Supplies

Another positive impact of the project involves local material sourcing mainly sale of materials for use in the project. Some of these can be expected to be sourced locally and the rest through importation. It is expected that the project will generate new income revenues for the local population across the Country in harvesting and transportation of sands, ballast, stones, concrete/wooden poles and gravel. The new income revenues received will create demand for other goods and services causing a trickle-down effect to the entire economy.

### 8.1.2 Operation Phase

#### 8.1.2.1 Up Scaling Electricity Access to the Poor

According to Kenya Power's annual report of 2012/2013, electricity access stood at 4.8million customers as at June 2016. This translates to about 60 % of the total population

accessing electricity. The project will increase electricity access to the residents on the 3 Counties.

#### **8.1.2.2 Project Health Benefits**

Use of kerosene for cooking and lighting poses health problems as reported by World Bank report 2008 on the Welfare of Rural Electrification. The report notes that kerosene lamps emit particles that cause air pollution; these are measured by the concentration of the smallest particles per cubic meter (PM10). The health risks posed by this indoor air pollution mainly include acute lower respiratory infections, but also low birth weight, infant mortality, and pulmonary tuberculosis. Additionally, available data suggest that insufficient illumination (low light) conditions can cause some degree of eye strain and reading in these conditions over long periods of time may have the potential to increase the development of near sightedness (myopia) in children and adults. The project will result in many families replacing kerosene lamps for lighting with electricity there-by reducing disease burden at the family level and on the government.

#### **8.1.2.3 Education Benefits**

Access to constant and reliable electricity supply at the household level and schools will create opportunities for children to study. For example, children from homes with electricity have an advantage because they have more time for study and doing homework in the evening as opposed to children from homes without electricity. This benefit will in the end translate to better results.

#### **8.1.2.4 Improved Living Standard**

Access to stable and reliable electricity will change the standard of living of the people as they can use domestic appliances like iron boxes, fridges, television sets, washing machines to mention but a few. Use of electricity for lighting implies that the people will not be exposed to smoke arising from use of kerosene lamps which predisposes people to respiratory diseases.

#### **8.1.2.5 Security**

There will be enhanced security arising from well-lit social, commercial, individual premises and use of electrical surveillance gadgets that use broadband data services. With the implementation of the project, the level of security will improve across the county.

#### **8.1.2.6 Communications**

Access to reliable electricity will lead to improved communication. This will be enabled by the fact that charging of mobile phones will be easier and cheaper. Access also to mass media like radio and T.V will provide opportunity for people to access a wide range of information which is useful for decision making. Some of information beneficiaries receive include information on markets, farm inputs, livestock and crop management and local affairs, nutrition, diseases, investments and entertainment among others.

#### **8.1.2.7 Gender Considerations**

The vision of National Gender and Equality Commission is “A society that upholds gender equality, dignity and fairness for all”. The Commission is guided by a mission “To effectively and efficiently promote gender equality and freedom from discrimination of all

persons in Kenya”. Access to modern electricity will go a long way towards alleviating the daily household burdens of women, giving them more time, improving their health and enhancing their livelihoods. Available literature on gender and energy suggests that providing electricity to communities and homes will promote gender equality, women ‘s empowerment, and women’s and girls’ access to education, health care, and employment. Lighting and television will improve access to information, the ability to study, and extend the effective working day. This is more so because children can have extended time of study. The women will also benefit more due to access of information especially on health and nutrition since they also spend more time at home. The project will also enhance security in the rural areas as most homes will be lit up, a benefit that is more appreciated by women.

#### **8.1.2.8 Reduced GHG Emissions**

The proposed project may contribute to reduction in Green House Gaseous (GHGs) emissions due to the fact that beneficiaries may not continue to rely on biomass as a main source of energy at the domestic level which leads to felling of trees and hence contributing to the green-house effect.

## **8.2 Adverse Impacts**

Following a scoping process, this impact assessment was focused on interactions between the Project activities and various resources/receptors that could result in significant impacts.

### **8.2.1.1 Pre-Construction Phase**

#### **8.2.1.1.1 Land Acquisition and Involuntary Displacement Impacts**

This construction of the transmission line will lead to loss of land or restrictions on land use and land-based livelihoods during construction. Potential impacts include: -

- Physical displacement.
- Economic displacement.

### **Baseline Conditions**

Relevant baseline conditions that may potentially influence impacts are summarized as follows:

- The transmission lines cross primarily rural and peri-urban areas where subsistence agriculture and animal husbandry are predominant in the ROW. Other economic activities such as small-scale trading/street vending, informal temporary jobs (including farm labour, construction-related work, etc.), businesses (formal and informal), and employment in the public sector, are also observed in the rural and peri-urban areas but not in the ROW.
- Small-scale agriculture of seasonal crops and some permanent crops as well as animal husbandry activities are mainly practiced for self-consumption and small-scale commerce of surplus agricultural production.
- Most families in rural areas have animals that are free to roam around settlements, mainly chicken, goats, pigs, and ducks for subsistence.
- Charcoal and wood are the main sources of energy for cooking in the settlements

- Vulnerable groups include households with particularly low incomes and high land dependency for subsistence and income generation. These households can be found throughout the Study Area and are prevalent in the rural settlements where agriculture is the primary livelihood activity. Households with disabled and elderly household members as well as female or child-headed household are also particularly vulnerable to potential loss of livelihoods related to land access restrictions.
- The average parcel size was reported to be less than 5 acres. Households may share the use of different plots to grow different crops.
- In urban/peri-urban areas, land access is less dependent on inheritance and is generally transferred through sale
- Physical structures found along the Study Area mainly includes residential houses. Most houses are mud walled with fewer being built with concrete block. Block houses are mostly found in established urban and peri-urban settlements.

### **Impact Assessment – Pre-Construction**

#### **Loss of Livelihoods as a result of Loss of Agricultural Resources.**

The loss of agricultural land and grazing areas and agricultural crops (livelihood sources) will be as follows:

- Temporary tower site working areas inside of the 30m OHTL RoW:
- Temporary loss of access of land for the establishment of the temporary tower sites working areas (average 40m x 50 m). These construction sites will be located entirely inside the 30m OHTL RoW.
- Permanent loss of access to land in the 30m OHTL RoW.
- Removal of all trees and crops.

The loss of access to land associated with the 30m OHTL footprint corridor, temporary tower sites working areas, and maintenance corridor will result in the loss of land used for seasonal crops, removal of trees, and restrictions to animal grazing.

With respect to animal grazing activities, potential impacts during the construction phase stem from farmers having restricted access to grazing land due to the establishment of the tower sites working areas and access roads. Regardless of the fact that animal grazing is usually undertaken over a wide area;, affected farmers will be compensated in line with the RPF provisions. In the case of land compensation, KETRACO will ensure to provide land with higher or equal productive potential and locational advantages.

The total size of land to be acquired by the project to serve as the line as well as RoW is approximately **375.78** acres in size based on the Resettlement Action Plan report. Land losses in terms of severity will be experienced in the following locations namely Kirimangai, Gatumbiro, Karagoini, Thayu, Oraimutia, Sabugo, Gatimu and Muruku where the number of PAHs losing land is significant. The number of PAPs losing over 90% of their land is only 5 % of the number of PAHs. The loss by the PAPs is mostly economic in terms of displacement accounting for over 90%, with physical displacement accounting for only 10%. It should be noted however that some land-requirement information is not

available at this stage such as the amount of vegetation clearance required for access roads or the potential establishment of a new workers camp.

The Project impacts include loss of private residential structures, community facilities (churches, stadium, chief's office) as well as loss of cultivable and grazing land due to land acquisition along the proposed transmission line. Forest land owned by Kenya Forest Service will also be lost as a result of the project since the line passes through a gazette forest. The project will adversely affect **637** households consisting of **1,661** individuals (PAPs) and 4 community institution. There are two (2) national government entities to be affected by the project. These are a section of Bahati Forest located in both Nyandarua County and an Assistant Chief's office in Thayu location in Nakuru County. The project will also partially affect a community facility (Mutanga Stadium) managed by Nyandarua County Government. Three (3) public institutions in the form of churches will also be affected by the project. The churches are located in Nyandarua County. A total of **176** structures are affected as a result of the project. All identified impacted structures are located within RoW and will require dislocation to clear the RoW limits and will be compensated to entirety due to functional non-viability of these structures.

**Table 8-1: Pre-Mitigation Impact Assessment**

Impact				
Temporary loss of livelihoods and household income as a result of temporary land take and loss of access to land during construction				
Impact Nature	Negative		Positive	
	Neutral			
Impact Type	The temporary land take during construction activities may lead to a temporary loss of livelihoods and household income.			
	Direct		Indirect	
Impact Duration	Induced			
	Potential loss of livelihoods and household income due to a direct interaction between the Project (i.e. land taken) and land users/owners.			
Impact Extent	Temporary		Short Term	
	Long Term		Permanent	
Impact Scale	The majority of the construction land take will be reinstated after construction (18-24 months). Permanent impacts are expected on livelihoods related to fruit trees removal in the 30 m OHTL footprint corridor.			
	Local		Regional	
Impact Frequency	International			
	Impact limited to the Study Area			
Impact Magnitude	Total land required for the project in the construction phase (503 ha).			
	The impact is expected to be continuous over the 18-24 months of construction. Some permanent impacts such as the restriction will also extend to the operation phase.			
Resource/ Receptor Sensitivity	Positive		Negligible	
	Small		Medium	
Impact Significance	Large		Based on the parameters above and the embedded measures in place to minimize land take and land clearance the magnitude is considered small.	
	Low		Medium	
Impact Sensitivity	High		The sensitivity of the receptors is considered high considering the dependence on agriculture as a main source of livelihood in the area.	
	Negligible		Minor	
Impact Significance	Moderate		Major	
	Considering the magnitude is small and sensitivity is high, the impact on livelihoods and household income during construction activities is considered of Moderate significance.			

### Displacement of Physical Structures and Potential Resettlement (Pre-Construction)

The proposed transmission line route has been designed by KETRACO to avoid the displacement of physical structures to the extent possible. The proposed route has reduced the number of sensitive receptors at risk of removal inside the 30m OHTL footprint corridor from the RAP approximately **176** physical structures will be affected. These structures include a mix of residential and non-residential structures, farms, animal shelters, and commercial buildings.

Considering the measures in place to minimize the number of structures at risk of being physically resettled, the magnitude of the impact is considered **medium**. The receptors sensitivity is considered **high** given the low incomes and presence of households with disabled and elderly household members as well as female or child-headed households. Impact significance is therefore considered **Major**.

**Table 8-2: Pre-Mitigation Impact Assessment**

ImpactDisplacement of physical structures and potential resettlement during construction				
Impact Nature	Negative		Positive	
	Neutral			
	The temporary land taken during construction activities may lead to the permanent relocation of residential and non-residential structures.			
Impact Type	Direct		Indirect	
	Induced			
	Potential relocation of physical structures and potential loss of employment and livelihoods related to economic structures due to a direct interaction between the Project (i.e. land taken) and land users/owners.			
Impact Duration	Temporary		Short Term	
	Long Term		Permanent	
	Although land take for construction is temporary, the displacement of physical structures is considered permanent.			
Impact Extent	Local		Regional	
	International			
	Impact limited to the Study Area.			
Frequency	The impact is expected to be a one-time impact occurring before the start of construction activities.			
Impact Magnitude	Positive		Negligible	
	Small		Medium	
	Large			
	Based on the measures in place to reduce the number of physical structures at risk of displacement, the magnitude is considered to be medium.			
Resource/ Receptor Sensitivity	Low		Medium	
	High			
	The sensitivity of the receptors is considered high given the low incomes and presence of households with disabled and elderly household members as well as female or child-headed households			
Impact Significance	Negligible		Minor	
	Moderate		Major	
	Considering the medium impact magnitude and medium sensitivity of receptors, the impact related to the displacement of physical structures is considered to be of major significance.			

## **Mitigation Measures**

### **Pre-Construction**

As introduced previously, the main embedded measures for land and livelihood related impacts developed by KETRACO will be delivered through avoidance through detailed routing and design which was aimed at;

- Avoiding or minimizing the number of towers sites working areas in agricultural areas or areas of community resources.
- Minimizing clearance of the maintenance road as in some cases clearance may not be necessary since other access roads are available.
- Minimizing as far as possible tree cut-off and tree trimming in the temporary tower sites working areas.

In addition, KETRACO has developed a Resettlement Action Plan (RAP) to ensure that Project Affected Persons (PAPs) receive adequate compensation for the loss of crops and related loss of income and, when required, are provided with access to alternative land of equal productivity. Compensation will also take into account the investment required to prepare new agricultural plots (for alternative land) and to return the reinstated land to initial productivity levels for seasonal and permanent crops. The objectives of the RAP are as follows:

- To provide compensation for loss of assets at replacement cost and for the loss of income opportunities from seasonal and permanent crops. This also includes community-level compensation for the loss of community resources inside the 30m footprint corridor and related livelihood and subsistence losses.
- To provide compensation for PAPs who lose their pasture grounds or are restricted from grazing grounds due to project activities
- Ensure that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- Resolve conflicts related to land ownership by supporting PAPs resolve succession related conflicts, supporting registration process for unregistered community land for PAPs in community owned land and converting group ranch land into community land in accordance with Community Land Act 2016 in order to facilitate smooth compensation and relocation. Engage a legal consultant to support in resolution of succession cases; support grievance redress committee to resolve land related conflicts etc.
- Improve or, at a minimum, restore the livelihoods and standards of living of displaced persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status (including the provision of alternative land for cultivation with equal or better soil productivity, and the provision of improved replacement housing). The provision of improved assets and alternative land constitutes a positive outcome that contributes to offsetting the inconvenience and disturbance and potential risk to livelihoods of the economic and physical displacement.

- Pay particular attention to the needs of vulnerable groups, identifying additional compensation and livelihood restoration measures as necessary.

## Operations

### Permanent Loss of Livelihoods and Household Income Due to Permanent Land Restrictions

The following restrictions will apply during operations to ensure access for the maintenance of the transmission lines and towers:

- Crop trees: planting of trees is not allowed inside the 30 m footprint corridor.
- These restrictions will result in reduced areas available for cultivation and other livelihoods.
- The permanent land take and restrictions to trees is a direct negative impact which is permanent in nature. The amount of land where restrictions will apply are relatively small in the overall context of the land around the settlements. Given the verbal confirmation of local leaders that adequate replacement land is available the magnitude of the impact is considered low. Receptor sensitivity is considered high considering the level of dependence on agriculture as the primary source of subsistence and livelihoods. The potential impact is therefore considered moderate.

**Table 8-3: Pre-Mitigation Impact Assessment**

Impact	Permanent Loss of Livelihoods and Household Income during operations				
Impact Nature	Negative		Positive		Neutral
	The permanent land restrictions will lead to a permanent loss of livelihoods and household income. Permanent restrictions to the planting and cultivation of crop trees in the 30m footprint corridor may also result in livelihood losses considering the amount of time and money required for new crop trees to bear fruit and reach maturity.				
Impact Type	Direct		Indirect		Induced
	Potential loss of livelihoods and household income due to a direct interaction between the Project (i.e. land taken and restrictions) and land users/owners.				
Impact Duration	Temporary		Short Term	Long Term	Permanent
	The loss of livelihoods and income associated to the restrictions for operation activities is considered to be permanent during the project operational life.				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area				
Impact Scale	The scale of the impact is considered low as the amount of land where restrictions will apply are relatively small in the overall context of the land around the settlements.				
Frequency	The impact will be felt continuously throughout the 50 years of operation as the restrictions will apply throughout.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above and the relatively small amount of land permanently required for the project, the magnitude is considered small.				
Resource/ Receptor Sensitivity	Low		Medium		High
	The sensitivity of the receptors is considered high given the levels of dependence over agriculture for subsistence and livelihoods and their vulnerability to potential losses of livelihoods.				
	Negligible		Minor	Moderate	
				Major	

Impact Significance	Considering the magnitude and sensitivity are small and high, the impact on livelihoods and household income during operation activities is considered to be of moderate significance.
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## Mitigation Measures

### Operations

Impacts during the operations phase will be managed by KETRACO as operator of the line. Mitigation measures will include the following:

- Responsibilities will include monitoring and providing the necessary follow-up to support households to restore their livelihoods throughout the operations phase.
- The grievance mechanism established during the construction phase will be maintained during operations to ensure that local communities and stakeholders have an adequate channel to voice concerns.

### Residual Impact

Provided the above mitigation measures are implemented, the residual impact related to temporary land taken during construction and permanent restrictions and land take during operations is reduced to *minor* levels.

**Table 8-4: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Temporary loss of livelihoods and household income as a result of temporary land take and loss of access to land	Construction	Moderate	Minor
Physical displacement of PAPs during construction	Construction	Major	Minor
Permanent loss of livelihoods and household income due to permanent land take and restrictions	Operation	Moderate	Minor

## 8.2.2 Construction Phase

### 8.2.2.1 Construction Air Pollution Impacts

Air pollution during construction include gaseous and dust emissions which may have an impact on air quality. Project activities that have potential to impact air quality include emissions of air pollutants from temporary power generators, construction equipment and vehicles. The construction of the transmission line and sub-station will entail the use of motorized machinery and vehicles which will lead to air pollution which will impact human health and the environment in general. Pollutants from motorised equipment during construction will include:

1. CO – Carbon monoxide;
2. HC–unburned hydrocarbons generated through combustion processes and fugitive fuel evaporation, including benzene, a known carcinogen;
3. CO<sub>2</sub> - Carbon dioxide;
4. NO<sub>x</sub>– Nitrogen oxides including NO<sub>2</sub> - nitrogen dioxide and NO – nitric oxide;

5. PM10 – fine particulate matter including soot/black; and
6. Sulphur dioxide (SO<sub>2</sub>): SO<sub>2</sub> is of concern because of its impacts on health and vegetation.
7. Dust is defined as all particulate matter up to 75 µm in diameter and comprising both suspended and deposited dust, whereas PM10 is a mass fraction of airborne particles of diameter 10 µm or less. Dust and PM10 emissions arise from a number of sources, so both construction activities and emissions from vehicles associated with the construction site need to be considered.

Construction vehicles are generally fueled with diesel, and thus, SO<sub>2</sub>, PM, NO<sub>x</sub>, VOC and CO emissions are expected to occur along the route. In addition to these mobile source emissions, there will be also stationary emissions from the activities in the sub-station and maybe camp site (if decided upon by contractor). These emissions will be mostly due to power generations in diesel generators if used. Most site equipment (bulldozers, diggers, etc.) can be considered as similar to medium or heavy-duty trucks. Vehicles are used for the transport of materials and equipment on and off site as well as carriage of personnel to and from site using minibuses and cars. Since the project construction phase duration will be about 18-24 months long, air quality impact generated from these activities will not be static. Although the general terms of the construction of phases are similar, their application locations will follow each other. The quantities of motorized equipment (trucks, excavators) etc. will be minimal due to the short length of the transmission line. In addition, quantities of material to be loaded and unloaded, number and type of construction equipment and machinery all which are contributors to air emissions are also expected to be minimal due to project limited scope and footprint.

The above pollutants are only likely to be significant where coal or heavy fuel oil are in use. As these fuels will not be used for the Project, significant impacts on air quality from these pollutants are therefore considered unlikely. The above pollutants are of concern due to the adverse effects on human health and natural ecosystems in the local environment.

Construction activities will also create dust in particular where vehicles are using unpaved roads close to properties and agricultural areas. Dust emitted from excavation, earth moving, loading, handling and transportation of materials. Dust deposition from road traffic is not likely to be a more significant issue than exhaust emissions, as many of the roads used by construction vehicles are paved. The construction of the proposed transmission line and sub-station has the potential to cause emissions of dust Total Suspended Particles (TSP) from land clearing, earthworks, movement of vehicles over unpaved surfaces and roads, handling of friable materials etc. These sources have the potential to increase ambient concentrations of particulate matter, resulting in nuisance at nearby settlements and to affect crops and natural vegetation through dust deposition.

**Table 8-5: WB and WHO reference standards and guidelines for NO<sub>x</sub> PM, Sox.**

Parameter	WHO Air Quality Guidelines
Sulphur Dioxide, SO <sub>2</sub>	20 µg/m <sup>3</sup>
Nitrogen Oxides, NO <sub>x</sub> as NO <sub>2</sub>	200 µg/m <sup>3</sup> (1hr)
Suspended Particulate Matter	200 µg/m <sup>3</sup>
PM10	100 µg/m <sup>3</sup>

PM2.5	25 µg/m <sup>3</sup>
Ozone	100 µg/m <sup>3</sup>

## Baseline Conditions

### Pollutant Levels

Based upon the potential impacts, the pollutants of interest are oxides of Nitrogen, and particulate matter. Baseline dust and PM<sub>10</sub> is influenced by a wide range of emissions, including man-made and natural sources. Along the route it is anticipated that there will be locations where the dust and PM<sub>10</sub> baseline is elevated and close to and frequently above air quality standards due to existing levels of human activities including vehicle traffic. This includes the urban areas and in settlements where there are unpaved roads, at individual properties close to unpaved roads and properties close to agricultural activities. On this basis, the baseline dust and PM<sub>10</sub> airshed is considered to be degraded but only on a localized basis.

NO<sub>2</sub> is emitted from combustion sources and these are almost exclusively man-made. In the absence of significant local sources, NO<sub>2</sub> concentrations are not expected to approach or exceed air quality standards. On this basis, existing levels of NO<sub>2</sub> will be below air quality standards throughout the route and the airshed is considered to be undegraded. The net impact of the project on air quality is not significant and temporary and will be limited to construction period.

### Receptor Sensitivity

The sensitivity of receptors in the Area of Influence are defined as follows: For sensitive human receptors:

- High locations where there are particularly vulnerable receptors, including hospitals with high dependency and intensive care wards
- Medium locations where people are generally present permanently, including dwellings, schools, and settlements; and
- Low—where people are only present for short periods, such as agricultural areas and fishing areas.

Figure 5-7, 5-39 and 5-71 in section 5 describes the sensitive human receptors within the AOI and include schools, hotel, and a church. There are no sensitive human receptors within the AoI.

For sensitive ecological and agricultural receptors:

- High – habitat sites with international designations, such as Ramsar sites
- Medium—habitat sites with statutory national protection, and sites where agricultural activities are producing particularly sensitive crops, such as fruit or green vegetables; and
- Low—local or national habitats sites with no statutory protection, and other agricultural areas

Based on a review of the proposed route and the access roads the following specific sensitivities have been identified:

- Sensitive human receptors are defined as Medium where there are permanent settlements of dwellings, and low elsewhere; and

- Sensitive ecological and agricultural receptors are defined as **Low** in all locations, as there are no protected habitats with the exception where the line crosses protected forest reserve Bahati Forest all in Nyandarua County.

The transmission line is not within close proximity of key sensitive receptors including educational and health facilities therefore, the emissions from the construction activities are not expected to significantly affect such sensitive receptors.

## **Impact Assessment**

### **Exhaust Emissions**

No detailed traffic data is available at this stage. However, the numbers of Heavy-Duty Vehicles (HDV) and Light Duty Vehicles (LDVs) are expected to be well below the thresholds for potentially significant impacts. On this basis, the magnitude of impacts associated road traffic exhaust emissions are predicted to be Negligible. Combined with the Medium and Low receptor sensitivities identified the overall significance of impacts is Negligible at all locations.

### **Dust and PM10**

There are the potential for impacts to arise from:

- Traffic on unpaved roads
- Earthworks
- Construction activities; and
- Trackout<sup>6</sup>

The Project will generate traffic on unpaved roads close to dwellings and within settlements. As this is expected to be more than five HDVs/day, and at some locations for more than four weeks, the magnitude is large. The Project will require earthworks along the length of the route. These works will include stripping vegetation from the route, construction of access roads and the route haul track, excavations for the concrete bases for the pylons. Due to the scale of these activities, the Magnitude is Medium. Due to this, the Magnitude is Negligible.

The exact number of HDVs that will be generated is unknown. However, this is expected to range from 10 to 15 HDVs per day category using unpaved site roads. On this basis, the magnitude of trackout is medium. Combined with the Medium and Low receptor sensitivities identified the significance of unmitigated impacts are:

- Traffic on unpaved roads are **Major** where there are receptors within 50m of unpaved roads used by construction traffic, or the haul route;
- Earthworks are **Major** where there are receptors within 350m of locations where earthworks are being undertaken, including route stripping, construction compounds and excavations
- Construction activities are **Negligible** at all receptors; and

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<sup>6</sup> Track-out or carry-out is dirt, mud or other debris tracked onto a paved road surface or area accessible to the public by a vehicle.

- Trackout are **Major** at receptors within 50m of routes used to access the construction route where these are within 500m of the access point to the route or construction compounds.

On this basis there is a need for mitigation to be implemented to reduce dust emissions/impacts.

**Table 8-6: Pre-Mitigation Impact Assessment**

Impact	Degradation of the Airshed during Construction				
Impact Nature	Negative	Positive		Neutral	
	Increase in airborne pollution.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is expected to be temporary as emissions arise throughout the construction phase.				
Impact Extent	Local	Regional		International	
	The impact will arise locally in the footprint of the project and immediate surrounds. Impacts will also arise further afield close to unpaved public roads used to access the work sites during construction.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Intermittent – impacts will typically only arise during working hours				
Likelihood	Inevitable				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low		Medium		High
	The sensitivity of human receptors is Medium in dwellings and settlements, Low elsewhere. The receptors of agricultural activities is Low.				
Impact Significance	Negligible		Minor	Moderate	Major
	Dust emissions have the potentially to have Major significant impacts at nearby sensitive human receptors.				

### Mitigation Measures

Mitigation measures are split into general considerations for all construction activities, and specific mitigation measures for traffic on unpaved roads, earthworks and track-out. As general measures for all locations:

- Develop a Dust Management Plan
- Record all dust and air quality complaints, identify cause (s), take appropriate measures
- Liaise with local communities to forewarn of potentially dusty activities
- Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring
- Undertake inspections to ensure compliance with the Dust Management Plan
- Plan potentially dusty activities so that these are located as far from receptors as feasible
- Erect solid screens if feasible around stockpiles and concrete batching
- Avoid run off of mud and water and maintain drains in a clean state

- Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible
- Impose speed limits on haul routes and in construction compounds to reduce dust generation
- Minimise drop heights when loading stockpiles or transferring materials; and
- Avoid waste or vegetation burning.

For traffic on unpaved roads:

- Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the **Dust Management Plan** and will consider water availability and any stakeholder grievances; and
- On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.

For earthworks:

- Revegetate exposed areas as soon as feasible
- Revegetate or cover stockpiles if feasible;
- Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow.

For trackout:

- Where trackout is onto paved roads, use wet road cleaning methods to remove dirt and mud build up;
- Avoid dry sweeping of large areas; and
- Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.

### **Decommissioning Air Pollution Impacts**

Air pollution during decommissioning include gaseous and dust emissions from temporary power generators, equipment and vehicles. The pollutants include Carbon Dioxide (CO<sub>2</sub>), Volatile Organic Compounds (VOC), carbon monoxide (CO), Nitrogen Oxides (NO<sub>2</sub>) and particulate matter (PM). Excavation, earth moving, loading, handling and transportation of materials will also give rise to fugitive dust. The significance of the impacts on air quality from the decommissioning activities is considered minor. The numbers of vehicles and mobile equipment are expected to be well below the thresholds for any significant impact associated with traffic exhaust emissions. The traffic management plan developed during construction will be used during this phase. The impact on air quality is predicted to be negligible.

### **Residual Impact**

The residual impacts associated with road traffic exhaust emissions are **Negligible**. With the implementation of suitable mitigation and with adequate monitoring, residual impacts associated with dust and PM<sub>10</sub> from construction activities are **Negligible**.

**Table 8-7: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Road Traffic Exhaust Emissions	Construction	Negligible	Negligible
Dust and PM 10 from construction activities.	Construction	Major	Negligible

#### 8.2.2.1.2 Noise Emission and Vibration Impacts

Potential noise impacts may arise as a result of the construction activities associated with the transmission line and sub-station. There will be risks and impact of noise and vibration resulting from the construction equipment and machinery on people. Potential sources of noise and vibration during construction will include clearing and grubbing of the transmission corridor, excavations, earthmoving, construction traffic etc. Construction activities and equipment are not expected to result in significant levels of vibration. Equipment that might cause high levels of vibration (such as impact piling or vibratory compaction) will not be used. Blasting as construction activity may occur in areas where the rock profile requires blasting prior to installing of the transmission lines (pylons) etc. Effects of blasting will include noise and vibration that may adversely impact the fauna, local communities and workers health and safety. The equipment used in construction will generate minimum noise during construction of the transmission lines and will not adversely affect communities and fauna.

It is expected that existing access roads can be utilized. Before construction begins, it may be necessary to carry out maintenance work on these roads. Typically, this would involve minor re-grading using a grader. This is not expected to give rise to significant noise impacts and has therefore been scoped out of further assessment. Few if any new access roads will be required. Where required, basic access tracks will be established to each structure position by moving obstacles such as rocks, levelling high points and filling in holes. This is not expected to give rise to significant noise impacts and has therefore also been scoped out of further assessment.

#### Baseline Conditions

The ambient noise environment at settlements along the transmission line corridor is influenced by activities within settlements including people activities, animals (such as birds), occasional cars, vegetation blowing in the wind, and weather (wind, rain). The noise baseline survey conducted for the ESIA determined that daytime noise levels,  $L_{Aeq}$ , were generally low and in the range 35 to 41 dB. Noise monitoring was not carried out during the night as significant night-time noise effects from the construction and operation of the Project are not expected.

The transmission lines extend approximately 77 km in total. Concrete foundations will be used to support the steel lattice tower structures, which will be installed using a mobile crane. A sound power level of 105 dB (A) has been assumed for the noisiest phase of construction, which is expected to be foundation works. This includes a concrete mixer truck, a tracked mobile crane, a compressor and a poker vibrator working simultaneously.

When assessing effects from noise, impact significance is not determined in the same way that it is for most other technical disciplines i.e., using a matrix of impact magnitude and receptor sensitivity. Consideration of receptor sensitivity is made at the start of the assessment, and impacts are only assessed where sensitive receptors are identified. Receptor sensitivity is represented by impact criteria determined by reference to appropriate standards or guidelines. The significance of an impact is derived from the impact magnitude but takes account of other factors such as the duration of the impact and the design of the receptor.

IFC and World Bank Group General EHS Guidelines provide guidance on acceptable noise levels based on WHO standards and these are set out in Table 8-8.

**Table 8-8: IFC/World Bank Group Noise Level Guidelines**

	Maximum Allowable Ambient Noise Levels, LAeq,1hr, dBA Free field	
	Daytime	Night-time
	07:00 – 22:00	22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

The transmission line is not within close proximity of key sensitive receptors including educational and health facilities as well as residential areas and therefore, the emissions from the construction activities are not expected to significantly affect such sensitive receptors.

## Impact Assessment Construction

Although the overall construction program may last for up to 18-24 months, construction works to install each tower will affect individual Noise Sensitive Receptors (NSRs) for approximately one month. Installation work will be carried out during the day only. Noise levels exceeding the daytime criterion for a medium magnitude impact are predicted at distances of 19m or less. However, the predictions conservatively assume all equipment will always be located at the closest part of the site to the receptor which is unlikely to be the case in practice. In addition, contractors are required to safeguard the work site to protect the safety of people and animals which may include erecting a temporary fence around the site. Most towers will be located well away from such that impacts would be negligible. Small magnitude impacts of minor significance may affect a small number of the closest receptors during the daytime only. The sensitive receptors close to the line are outlined in Figure 5-7, 5-39 and 5-71 in section 5.

**Table 8-9: Pre-Mitigation Impact Assessment**

Impact	Noise during Construction			
Impact Nature	Negative	Positive	Neutral	
	Elevated noise levels from operation of construction equipment.			
Impact Type	Direct	Indirect	Induced	
	Impact is a result of noise generated by construction activities.			
	Temporary	Short Term	Long Term	Permanent

Impact Duration	Impacts are expected to be short term (up to one month) at any individual NSR in the vicinity of a proposed steel lattice tower worksite				
Impact Extent	Local		Regional		International
	The impact will be limited to the NSRs within the immediate surrounds of each tower worksite.				
Impact Scale	Local				
Frequency	Impacts may occur during daytime periods over a short-term duration at each tower worksite.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered negligible to small.				
Resource/ Receptor Sensitivity	Low		Medium		High
	Dwellings are considered to have a high sensitivity to noise.				
Impact Significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is small to negligible and the sensitivity is high, the overall significance is considered to be negligible to minor.				

There will be noise and vibrations generated during the construction phase, but it will be typical of any construction site. The noise impact during construction is expected to be negative and short-term. The major receptors are expected to be the construction workers as well as any immediate neighbouring residential premises. Sources of noise will be trucks and the off-road vehicles in transit, use of compressor to break hard ground and the use of motorized chain saws for vegetation clearing. The noise from the project vehicles is only significant in areas where the proposed line passes through dense settlements such as close to the towns' neighborhoods. The noise from compressors will only be significant where hard ground-breaking is carried out close to settlements. Noise from the motorized chain saws will only be experienced in the wooded areas but it will not be a significant impact since the density of settlements is not very high. Impacts of noise include noise-induced hearing loss for the project employees and nuisance for the affected settlements.

### Operation

During the operational phase, high voltage overhead power transmission lines can generate noise by a phenomenon known as 'corona discharge'. The associated noise levels are weather related, and the transmission lines are normally quiet during dry weather with corona noise sometimes occurring during wet weather conditions. However, ambient noise levels also increase significantly during periods of rain. This increased ambient noise level is expected to mask effects from corona discharge noise and this impact has been scoped out of further assessment.

### Mitigation

Mitigation measures are set out below, which have been assumed for the base case assessment. They are assumed to result in a 5 dB (A) reduction in the overall noise from construction plant teams. The following standard mitigation measures will be employed:

- Siting noisy equipment as far away as possible from NSRs, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable

- Where practicable noisy equipment will be orientated to face away from the nearest NSRs
- Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only
- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable
- Where practicable, stationary equipment will be located in an acoustically treated enclosure
- For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals
- Throttle settings will be reduced, and equipment and plant turned off, when not being used
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and
- Fitting of mufflers or silencers of the type recommended by manufacturers

### **Decommissioning Noise Emission and Vibration Impacts**

Potential sources of noise and vibration include excavations, earthmoving, and traffic. The equipment generates noise levels below values that will adversely affect communities and fauna. To further minimize exposure to noise, work will be carried out during the day only. The significance of the noise impacts during decommissioning has been rated as negligible.

### **Residual Impact**

Standard mitigation measures listed above have been assumed for the base case noise assessment. No impacts above small are predicted and therefore no further mitigation is required. Consequently, the residual impacts are the same as those presented above.

**Table 8-10. Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)	Impact (Post)
Noise from construction activities affecting nearby dwellings	Construction	Negligible-Minor	Negligible	

#### **8.2.2.1.3 Soil Erosion and Contamination Impacts**

Construction activities will have direct physical impacts to soil. Possible direct physical impacts to soil include erosion resulting from activities such as excavation of foundations for electricity pylons, clearing of vegetation for infrastructure such as roads, laydown areas, construction zones and workers camp (if applicable).

The excavation of soil for the construction of pylon foundations will disrupt the soil cohesion and also may result in surplus soil due to the use of concrete for the foundation. If not properly restored or managed, this soil may erode and wash into nearby surface water bodies adversely impacting these. Any temporary soil stockpiles established during construction of infrastructure will be at risk of erosion from wind and rainfall. Impacts to soil from unplanned events, such as accidental release of hazardous materials is discussed elsewhere.

### **Baseline Conditions**

The potential for soil erosion to occur during the construction phase is based on a number of factors including the type and physical properties of soil, the topographic slope, the vegetation cover, and the nature and duration of construction activities which disrupt the soil. The proposed transmission line traverses the 3 Counties, which is characterized by different soil types as reflected in the baseline description chapter. The sensitivity to erosion of soils along the proposed transmission line depends on the type and properties of the soils.

### **Impact Assessment**

The excavation of foundations and the construction of temporary roads and equipment laydown areas will have a direct negative effect on soil cohesion, thereby increasing the risk of erosion along the entire footprint of the project. The impact is likely to occur, but the extent of the impact is likely to be limited to the footprint of the activities, particularly the construction and use of access roads, laydown areas (i.e., local extent).

The impacts of construction activities on soil erosion are anticipated to last for the duration of the construction phase only (i.e., short term). Given the subtropical location of the Project and the nature of vegetation present, it is anticipated that cleared areas will revegetate naturally and relatively quickly (assuming rainfall patterns similar to the current averages persist), minimizing the risk of erosion.

During construction there is the potential for spills of fuels and oils during construction activities, fueling, maintenance of machinery and vehicles. Spills could occur in a number of locations along the transmission line RoW. Spills have the potential to affect terrestrial environments and could lead to the deterioration of soil, water, and sediment quality. This could lead to knock on effects for flora and fauna and local community users.

If hazardous materials such as fuel were to be released to the soil and surface water resources, this would be limited to the local extent, depending on the volume spilt and rate of spillage. Within the Project AoI there are limited surface water resources such as streams and rivers which could be impacted if the spill were to occur within proximity of the resource.

**Likelihood:** -Incidental spills of fuels are infrequent but do occur; most frequently due to malfunction of handling systems, poor practice of workers and force majeure. Spills are most likely to occur during refilling and transportation of substances. Large releases of hazardous materials are rare, and it is considered unlikely that a spill would occur of emergency scale.

### **Operational Phase**

The RoW will be reinstated following construction with soil spread and graded and the area revegetated. Following reinstatement, no significant soil erosion is anticipated.

**Significance of Impacts:** -For impacts to soils, the spatial scale is considered to be local. The impact could be long term and is a direct negative impact. The overall magnitude is considered to be medium. There are areas along the transmission RoW which are used for cultivation and therefore the sensitivity is considered of medium sensitivity.

**Table 8-11: Pre-Mitigation Impact Assessment**

Impact		Soil Erosion during Construction			
Impact Nature	Negative	Positive		Neutral	
	Loss of soil cohesion contributing to erosion.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and soil along the footprint of the project.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is expected to be short term, however in the case of serious erosion the impacts may be experienced long term.				
Impact Extent	Local	Regional		International	
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource/Receptor Sensitivity	Low	Medium		High	
	The sensitivity of the soil along the proposed transmission line to erosion is considered to be medium to low.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is small and the sensitivity is medium to low, the overall significance is considered to be minor.				

## Mitigation

The following mitigation measures will be implemented to minimize the potential for soil erosion:

- Vegetation clearing and topsoil disturbance will be minimized.
- Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion.
- Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means.
- Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season.
- Topsoil shall be evenly spread across the cleared areas when reinstated.
- Accelerated erosion from storm events during construction shall be minimised through managing storm water runoff (e.g., velocity control measures).
- Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile.

- Spread mulch generated from indigenous cleared vegetation across exposed soils after construction.

### Decommissioning Soil Erosion and Contamination Impacts

Decommissioning activities will have direct physical impacts to soil including erosion resulting from excavation to remove stainless steel pylons. This will disrupt the soil cohesion and also will result in surplus soil extracted from the foundation. The removed soil will be backfilled into the excavations in the order of removal to preserve the soil profile. Given the subtropical location of the Project and the nature of vegetation present, it is anticipated that cleared areas will revegetate naturally and relatively quickly. There is also the potential for spills (e.g., of fuels and oils from fueling, maintenance of machinery and vehicles), these have the potential to affect terrestrial environments and could lead to the deterioration of soil, water and sediment quality, the extent of this will be limited to the project site. The overall magnitude is considered to be **minor**. The mitigation measures employed during construction, will be used to mitigate this impact.

### Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to negligible to minor along the entire route of the transmission line.

**Table 8-12. Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Impact Significance (Post Mitigation)
Loss of soil resources due to erosion	Construction	Negligible-Minor	Negligible to minor

#### 8.2.2.1.4 Surface Water Quality Impacts

Construction activities associated with the transmission lines and sub-stations can have significant effects on the surface water resources along the proposed project route and good environmental management, including control of runoff, sediments, storage of fuels and good practice should be followed. Project activities will interact with water resources in the following ways:

- There will be direct interaction during clearing and construction near to or in surface water bodies.
- There will be indirect interaction in the case of erosion of soils into water bodies.
- There will be direct interaction from the abstraction of water from surface water bodies for construction (e.g., for dust control).
- There will be direct interaction from the discharge of treated domestic wastewater to surface water bodies (in the event camp sites are established).
- In addition, if vegetation and soil clearing are not properly managed, there is the potential for soils to run into water bodies and increased sediment load. This in turn may have a detrimental effect on water quality and affect surface water users.

During the construction of the transmission line, water will be required for several purposes including for use in the workers' accommodation camp (if determined), transmission line construction process which requires water, cleaning of the vehicles and equipment, keeping

down construction dust impacts among others. The potential impacts and risk of the project relating to surface water supply are:

- Stresses on local water resources from construction water abstractions from surface and/or ground water; and
- Potential indirect effects from water demand caused by local population expansion due to in-migration.
- Overall raw water supply requirements for the construction of will be very low and necessary during concrete mixing only and keeping down the dust.

### **Baseline Conditions**

The proposed transmission line is located within the catchment basin of the Ewaso Nyiro Basin/River. The number of water courses present along the project route are limited and the transmission line routing only crosses one surface water body. The potential risks of detrimental impacts on water quality will be higher where construction activities are close to surface water bodies or from the potential de-stabilization of soils and channel banks that may lead to erosion and deposition of sediment into water bodies.

### **Construction Phase**

Below are risks and impacts on surface water that are likely to be encountered as a result of the project during the construction phase:

1. The construction of the project may cause temporary disturbances and negative effects on surface water resources. These negative impacts could increase without proper scheduling or programming of the works or particular activities. In other words, there are likely to be impacts of construction of the project on water quality where required mitigation activities are not implemented correctly.
2. Stockpile and other materials may enter any other surface water resources near to the Project site where there are inadequate containment measures. Such surface runoff may carry sediments or harmful wastes, and these may collect in rivers or any other surface water resources and therefore there will be negative impacts on water quality.
3. In addition, in the project site there may be storage areas for chemicals, fuels, oils, etc., used for construction activities including refueling of vehicles. These materials must be stored according to the regulatory requirements, including the related regulation. Otherwise, there may be risk of leakage of all chemicals to the surface water resources, and so there may be impact on water quality.
4. In addition, all chemicals, fuels, oils etc. used for construction activities must be handled, transported, and used according to related regulation and procedures. Otherwise, there may be risk of spill of these by accidents etc. Therefore, there may be impact on water quality.
5. There may also be risks of pollution from the uncontrolled runoff or accidental spillage of fuels and lubricants, or from the inadequate or unsafe disposal of wastewater from construction sites.
6. Land cleared during the construction of the transmission line and associated service infrastructure will have a direct negative effect on surface water quality by increasing the turbidity and concentration of total dissolved/ suspended solids, with potentially adverse effects on river biota.

No information is available about the turbidity and concentration of suspended solids in rivers in the project area, however given the extent of human settlement and agricultural activities it is probable that these are elevated already and therefore that these rivers have a low to medium sensitivity to change. The volume of soil like to be disturbed by proposed project activities is likely to be *minor* and therefore the extent of the impacts from sediment addition to the river is considered to be local. Owing to the subtropical location of the project and the high probability that cleared areas will revegetate naturally thereby limiting erosion, the duration of this impact is anticipated to be short term.

The nature of the construction activities for the transmission line render the erosion of soil and subsequent siltation of rivers along the route possible. The *small* magnitude of this impact on surface water quality and the *low* sensitivity of these rivers to increased turbidity means the significance of this impact is assessed as *minor*.

**Table 8-13: Pre-Mitigation Impact Assessment**

Impact	Siltation of surface water				
Impact Nature	Negative	Positive		Neutral	
	Eroded soil entering surface water bodies.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is expected to be short term, however in the case of serious erosion the impacts of siltation of surface water may be experienced long term (into the operational phase).				
Impact Extent	Local	Regional		International	
	The impact will be limited to the footprint of the project and immediate surrounds. The dilution of sediments in the river will render this impact negligible at the regional scale.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low	Medium		High	
	The sensitivity of the rivers along the proposed transmission line to siltation is considered to be medium to low.				
Impact Significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is small and the sensitivity is medium to low, the overall significance is considered to be minor.				

### Operation Phase

Once the RoW is reinstated, no direct disturbance of surface water bodies is anticipated.

### Mitigation

The mitigation measures listed for soil management above are also applicable to surface water quality. In addition, the following mitigation measures will be implemented to minimise the potential for siltation of surface water:

- Activities shall be conducted >100m away from water bodies, except where crossings are required.

- All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment; and
- Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan.

### Decommissioning Surface Water Quality Impacts

Decommissioning activities could have significant effects on the surface water resources along the project route. The impact will be limited to the footprint of the project and immediate surrounds. Good environmental management, including control of runoff, sediments should be followed. The volume of soil to be disturbed by proposed project activities is projected to be **minor** and extent of the impacts from sediment addition to water bodies is considered to be local. The mitigation measures employed during construction, will be used to mitigate this impact.

### Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to **negligible** to **minor** along the entire route of the transmission line.

**Table 8-14: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)	Impact (Post)
Availability and quality of water	Construction	-Minor	Negligible to minor	

#### 8.2.2.1.5 Impact on Flora and Vegetation

According to data from the survey carried out for the ESIA, some of the areas to be crossed by the transmission line are of a considerable biodiversity, particularly within areas of Bahati Forest which is a sensitive habitat and vulnerable to changes to its components. To clear a RoW for the project infrastructure, it will be necessary to remove some native vegetation particularly. This will cause impacts, such as loss of biodiversity, fragmentation of habitat, changes in light conditions and possible invasion by invasive alien species (e.g., *mathenge*), whose competitiveness and growth rate are considered high

**Table 8-15: Summary of Potential Impacts to Flora and Vegetation**

Construction Phase	Operation Phase
Loss and fragmentation of areas of native forest due to project infrastructure and RoW	<ul style="list-style-type: none"> <li>• Fragmentation of habitat</li> <li>• Spread of invasive alien species</li> </ul>
Change in the structure of the vegetation communities	

This impact of the project on flora along the transmission line will be direct and permanent in nature, since trees and vegetation will be removed to clear the RoW, install the infrastructure and carry out regular maintenance, and along that strip no tree regeneration whose height may compromise the safety of the transmission lines is allowed.

### Baseline Conditions

The baseline conditions along the proposed transmission line reflects the vegetation dominated by grasses and shrubs, to forest, and to modified habitat due to urban expansion

and agriculture and logging activities. As indicated in baseline section, in the proposed area with the exception of Bahati Forest area where the transmission line will cross, there are no other protected areas (e.g., national parks or forest reserves) within approximately 10 km distance from the transmission line routes.

The vegetation cover around most of the urban and rural areas has been largely modified to give room for anthropogenic activities. The open space, plantation areas, cultivation and vegetable farms that have been observed within the transmission line routes are modified areas and are unlikely to have any natural vegetation with any conservation significance. Moreover, flora and vegetation in cultivated areas are unlikely to have any conservational significance, except for the section where the line crosses Bahati forest. Even though the line also crossed Leshau Forest, the forest has been encroached and converted into settlements and farmlands and is not considered a forest anymore.

The transmission line is going to traverse Bahati Forest for about 1.7kms and hence the flora within this forest section will be affected. Bahati Forest is located in Nyandarua County while Leshau Forest is also located in Nyandarua County. The floral trees species include i.e. cedar, Leleshwa (*Tarconanthus camphorates*), Euphorbia, Acacia, *Prunus africana*, *Cordial abyssinica*, *Croton macrostachyus*, *Olea africana*, *Ekebergia rueppelliana*, *Croton megalocarpus*, *Juniperus procera* and *Podocarpus falcatus*. The naturalized exotic species are; *Gravillea robusta*, and *Mangifera indica*, guava and avocado fruit species. The forest is a habitat for different fauna and also provides fuel wood to the local communities.

## **Impact Assessment**

### **Construction Phase**

During construction, improved access to some presently remote areas also increases human pressure on the vegetation resources for example where trees are cut for fuel wood and land is converted for agriculture use. Disturbance will also occur due to construction activities which will generate noise, vibration, and human and vehicle presence. However, these impacts are likely to be temporary and short-lived impacts as the construction work will be progressive (overall programme of 18-24 months) and most of these will take place along areas already disturbed by the existing transmission line infrastructure. The removal and vegetation associated with vehicle movement can also lead to the establishment of favourable conditions for the massive and rapid dissemination of invasive alien plants. Based on the available data it is not expected that the above-mentioned aspects will result in negative impacts on any sensitive species.

This direct impact is permanent, since the tree and shrub vegetation will be removed to clear the RoW, install the infrastructure and carry out regular maintenance, and along that strip no tree regeneration whose height may compromise the safety of the transmission lines is allowed. The habitats within the transmission line RoW are primarily modified and are considered to have a low sensitivity in most of the areas. The impact is direct and negative; resulting from the vegetation removal and disturbance during the construction phase. The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be medium. Based on the

analysis provided above, the impact of vegetation removal, habitat fragmentation and degradation will be a ***moderate*** negative impact pre-mitigation (Table 8-16).

**Table 8-16: Pre-Mitigation Impact Assessment**

Impact	Flora and Vegetation during Construction				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to vegetation and habitat loss and fragmentation as a result of the RoW or degradation to environment and habitat during construction				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the existing vegetation along the transmission line				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered permanent as the areas where vegetation will be removed for the construction of the line will have to be permanently kept with vegetation for maintenance purposes during the operational phase.				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered medium scale. Although the impact will occur across the whole length of the proposed transmission line RoW and access roads, large sections of the lines are in built up areas with modified habitat (i.e. urban areas, agricultural land and along the existing corridor) and thus there is a decreased risk of impacts to vegetation in these areas.				
Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	Although the transmission line will cross some disturbed and modified habitats that occur along the transmission line RoW, it will also cross a sensitive forest patches and river. The sensitivity is considered medium.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is large and the sensitivity is medium, the overall significance is considered to be of moderate significance.				

### Operation Phase

During the operational phase there is the potential for impacts on vegetation and flora as a result of the existence of the transmission line, particularly due to the maintenance including periodic clearing of the RoW which perpetuate habitat fragmentation. Due to the location of the transmission lines within the exiting corridor where three other lines are present it is not expected that there will be larger impacts on the existing flora and vegetation during the operation phase. However, there is the potential for spread of invasive alien species due to the maintenance works.

Due to the inexistence of surrounding protected areas nor sensitive habitats the impact of the operation of the transmission line is expected to have a low sensitivity. The impact is directly negative, will be permanent during the project life period, maintenance will be conducted periodically. The extent of the impact is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be small.

Based on the analysis provided above, the impact of direct loss of vegetation and flora and degradation and fragmentation of habitat will be of **minor** significance pre-mitigation (Table 8-17).

**Table 8-17: Pre-Mitigation Impact Assessment**

Impact	Flora and Vegetation during Operations				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to vegetation and potential grow of invasive species as result of the maintenance works during operation				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the transmission line infrastructure in the RoW				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered permanent as the RoW will be kept free of vegetation during operation				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered low scale as most of the impacts related to vegetation removal occurred during the construction phase. However, there will be a degree of habitat fragmentation.				
Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	The sensitivity is considered low as most of the major impacts on the vegetation and flora will occur during the construction phase.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is small and the sensitivity is low, the overall significance is considered to be of minor significance.				

## Mitigation

The following standard mitigation measures will be employed:

- Avoidance of impacts should be prioritised. This is especially where the transmission line crosses Bahati Forest. In order to protect these habitats, it is strongly recommended to closely/re-route follow the main road along these transmission-line segments. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary. Servitude (also called easement) is to be cleared in line with Kenyan standards for minimum vegetation clearance distance
- Rivers, water courses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing
- Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary
- There should be no deviation from the access road position without prior discussions with the authorities
- Firewood collection by the project's employees should be strictly forbidden.

- Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants – construction of new camps is unlikely to happen
- Materials (e.g., pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and
- Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible.

### **Decommissioning Impact on Flora and Vegetation**

The impacts on flora and vegetation will be **minor** and temporary impacts as the decommissioning work will take place on areas already modified by the transmission line infrastructure. It is not expected that the activities will result in negative impacts on any sensitive species. Based on the analysis provided above, the impact of vegetation removal, habitat fragmentation and degradation will be **negligible**.

### **Residual Impact**

The impact significance is Moderate after mitigation measures during construction and Minor post mitigation for operations (Table 7-18). There will be some habitat loss and fragmentation as well as potential increase of invasive species as a result of the construction, however most of the habitat is modified and not expected to have conservational value, except for sections where the lines cross the forest area (Bahati). With the proposed mitigation measure the residual negative impacts on flora are assessed to be of a low magnitude.

**Table 8-18: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Impact Significance (Post Mitigation)
Disturbance to vegetation and habitat loss and fragmentation as a result of the ROW or degradation to environment and habitat	Construction	Moderate	Minor
Disturbance to vegetation and potential grow of invasive species as result of the maintenance works	Operation	Moderate	Negligible

#### **8.2.2.1.6 Impacts on Fauna**

The natural environment along the transmission line has been largely transformed along with the reception of the section of where the line crosses Bahati Forest and former Leshau Forest. The open space, plantation areas, cultivation and vegetable farms that have been observed within the transmission line routes are modified areas and have no natural fauna of any importance. Moreover, fauna in cultivated areas are unlikely to have any conservational significance. The habitats within the transmission line RoW are primarily modified and are considered to have a low sensitivity.

### **Baseline Conditions**

With the exception of Bahati Forest where the transmission line will cross, there are no protected areas within approximately 10 km distance from the transmission line routes. The natural environment has been largely transformed along the route of the overhead

transmission lines. The open space, plantation areas, cultivation and vegetable farms that have been observed within the transmission line routes are modified areas and are unlikely to have any natural vegetation with any importance. Moreover, fauna in cultivated areas are unlikely to have any conservational significance.

However, in the sections of the transmission line, where it crosses inside the Bahati Forest, the inherent fauna will be directly affected. The cutting down of the trees which are a habitat to various fauna as well as the disturbance associated with the construction will adversely affected the fauna. The potential impacts are restricted to disturbance of wildlife in terms of their feeding and general movements, and only at the point of intense construction activities, i.e., at the towers and the station. Disturbance could be caused by presence of labour force, noise, and vibration. The other possibility is by hunting for game meat by construction workers. Fauna species in the Bahati Forest include African hare, kirks Dik Dik, impala, Thompsons Gazelle, common Zebra, spotted hyena, spring Hare, Bush squirrel, porcupine, warthog, black faced vervet monkey, Impala, and honey Badger.

### Impact Assessment Construction Phase

During construction, fauna within the near surrounds of the development area will be disturbed due to noise, vibration, and human and vehicle presence. Disturbance impacts during construction are likely to be temporary and short lived. Impacts as the construction work will be progressive (overall program of 18-24 months). Although disturbance and displacement impacts are likely to be temporary and limited in their magnitude, if combined with the impacts of direct habitat loss, it could lead to disturbance of wild fauna. Based on the survey carried out for the ESIA, it is not expected that there will be any sensitive species in the Project area of international or local importance.

The habitats within the transmission line RoW are primarily modified and are considered to have a low sensitivity with the exception of Bahati Forest. The impact is direct and negative; resulting from the land take and disturbance during construction. The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be medium. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be a **Minor** negative impact pre-mitigation.

**Table 8-19: Pre-Mitigation Impact Assessment**

Impact	Avifauna during Construction			
Impact Nature	Negative	Positive	Neutral	
	Disturbance to avifauna species and loss of habitat as a result of the RoW or degradation to environment during construction.			
Impact Type	Direct	Indirect	Induced	
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the fauna population along the transmission lines			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The effect is considered temporary as it will only occur during the construction period			
Impact Extent	Local	Regional	International	
	Impact is limited to AoI			

Impact Scale	The impact is considered medium scale. Although the impact could occur across the whole length of the transmission line RoW's and access roads, large sections of the lines are in built up urban areas and there is a decreased risk of impacts to fauna in these areas.				
Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High	The sensitivity is considered low due to the disturbed and modified habitats that occur along the transmission line RoW.	
Impact Significance	Negligible	Minor	Moderate	Major	Considering the impact magnitude is medium and the sensitivity is low, the overall significance is considered to be of minor significance.

### Operation Phase

During the operational phase there is the no significant impacts expected on fauna populations as a result of the transmission line and pylons and by electrocution. The extent of the impact is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be low. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be of Minor significance pre-mitigation (Table 8-20).

**Table 8-20: Pre-Mitigation Impact Assessment**

Impact	Fauna during Operations				
Impact Nature	Negative	Positive	Neutral		
	Increase in fauna mortality during operation				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the erection of the transmission lines and the fauna species along the RoW				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered permanent throughout the life cycle of the project				
Impact Extent	Local	Regional	International		
	Impact is limited to the Project AoI				
Impact Scale	The impact is considered medium scale. Although the impact could occur across the whole length of each of the transmission line RoW's, large sections of the lines are in built up urban areas and there is a decreased risk of impacts to fauna in these areas.				
Frequency	The frequency is expected to be occasional				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is expected to be small due to wildlife mortality				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity is considered low, birds of conservational significance are not expected along the transmission line RoW.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the magnitude of the impact is small and the sensitivity is low the overall significance is considered to be of minor significance				

The following mitigation measures are recommended during operations:

- All areas disturbed by construction activities shall be landscaped and rehabilitated;

- Vegetation that does not grow high enough to cause interference with the overhead power lines, or cause a fire hazard, should not be trimmed or cut unless it is growing in the road access area
- Speed of project vehicles should be controlled at a maximum limit of 40 km/h to minimise roadkill
- No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)
- All animal dens in close proximity to the work areas must be marked as no-go areas.
- Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.

### Decommissioning Impacts on Fauna

The impacts on fauna will be **minor** and temporary impacts as the decommissioning work will take place on areas already modified by the transmission line infrastructure. The modified areas have low sensitivity with no natural fauna of unique importance or conservational significance. The impact of direct loss of fauna and degradation of habitat will be **negligible**

### Residual Impact

The impact significance is **Negligible** after mitigation measures during construction and **Minor** post mitigation for operations (*Table 8-21*). There will be some habitat loss as a result of the construction, however the habitat is modified and not expected to have conservational value.

**Table 8-21: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Disturbance to fauna species and degradation to environment during construction	Construction	Minor	Negligible
Disturbance to fauna species and degradation to environment during operation and maintenance.	Operation	Minor	Minor

#### 8.2.2.1.7 Impacts on Avifauna

In terms of avi-fauna, project potential impacts will be focused on the avian populations within the development area and near surrounds, by habitat loss associated with the construction activities, such as displacement from breeding and foraging habitat and habitat degradation; there are also indirect impacts associated with changes to ecosystem and biophysical processes.

**Table 8-22: Potential Impacts to Avian Fauna**

Construction Phase	Operation Phase
<ul style="list-style-type: none"> <li>• Disturbance due to noise, vibration and human and vehicle presence</li> </ul>	Bird strikes along transmission lines

- Loss of habitat as a result of RoW or other project infrastructure

### Baseline Condition

Along the project route and within the project area of influence, the transmission line does not cross into any area designated as an Important Bird Area (IBA). In the Counties of Nakuru, Nyandarua and Laikipia, there are IBA sites which are hosts to various bird species as described in chapter 5. However, the transmission line route is not in any migratory corridor for the birdlife or IBA and therefore the bird strike impacts associated with transmission lines is not likely to occur especially to important bird species. Within the Bahati Forest, there are bird species which are likely to be affected by the transmission line (bird strikes), however, these species are categorized as species of Least Concern (LC) under the IUCN Red List.

### Impact Assessment

#### Construction Phase

During construction, avifauna within the near surrounds of the development area will be disturbed due to noise, vibration, and human and vehicle presence. Disturbance impacts during construction are likely to be temporary and short lived. Impacts as the construction work will be progressive (overall program of 18-24 months). Although disturbance and displacement impacts are likely to be temporary and limited in their magnitude, if combined with the impacts of direct habitat loss, it could lead to disturbance of wild fauna. Based on the survey carried out for the ESIA, it is not expected that there will be any sensitive species of international or local importance in the Project area.

The habitats within the transmission line RoW are primarily modified and are considered to have a low sensitivity. The impact is direct and negative, resulting from the land take and disturbance during construction. The extent of the impact presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be medium. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be a **Minor** negative impact pre-mitigation.

**Table 8-23: Pre-Mitigation Impact Assessment**

Impact	Avifauna during Construction			
Impact Nature	Negative	Positive	Neutral	
	Disturbance to avifauna species and loss of habitat as a result of the RoW or degradation to environment during construction			
Impact Type	Direct	Indirect	Induced	
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the fauna population along the transmission lines			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The effect is considered temporary as it will only occur during the construction			
Impact Extent	Local	Regional	International	
	Impact is limited to AoI			
Impact Scale	The impact is considered medium scale. Although the impact could occur across the whole length of the transmission line RoW's and access roads, large sections of the lines are in built up urban areas and there is a decreased risk of impacts to fauna in these areas.			

Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/Importance*	Low	Medium	High	The sensitivity is considered low due to the disturbed and modified habitats that occur along the transmission line RoW.	
Impact Significance	Negligible	Minor	Moderate	Major	Considering the impact magnitude is medium and the sensitivity is low, the overall significance is considered to be of minor significance.

### Operation Phase

During operation, there is the potential for bird strikes to occur along the transmission lines. This is most likely for large bird species, migrating species and species which have a varied flight pattern (dipping and circling). During the operational phase there is the potential for impacts on avian populations as a result of direct strike with the transmission line and pylons (bird collision) and by electrocution. A number of species of large birds suffer losses resulting from electrocution. This would mainly affect birds associated with the site; and electrocutions on power supply structures by raptors and other medium sized birds on passage. Birds sitting on power poles and /or conductors could cause short circuits between energized wires or short to ground especially numerous medium and large sized birds using the power poles as perching, roosting and even nesting sites. Birds are able to cause electrical faults (short circuits on power lines through Bird pollution). The species of bird which are most likely to be impacted by collision with transmission lines are large species (such as raptors and waterfowl), birds that regularly migrate across the path of the transmission line (either daily or seasonal migration) and species whose flight patterns result in an increased time spent at transmission line height in the area of the development (predominantly display flight activities such as looping or circling repeatedly in the area). None of the species such as raptors and waterfowls are found within the proposed transmission route.

Collisions are a significant threat posed by overhead lines to birds. Collision with power lines is a lesser-known problem than electrocution and is harder to detect because it can occur at any point along the transmission line. Collision risk is influenced by the topography of surrounding terrain and the proximity of lines and pylons to nests and other areas used frequently by local species. Potential impact through collision could occur along EBA sites (Serengeti Plains and Kenyan Mountains). In most cases the impact of collision would lead to immediate death or fatal injuries.

Due to the the transmission route not traversing any of the IBAs the impact of bird strikes is expected to have a low sensitivity. The impact is directly negative, will be permanent as the lines will be in place throughout, the project life. The extent of the impact is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be low. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be of **Minor** significance pre-mitigation (Table 8-24).

**Table 8-24: Pre-Mitigation Impact Assessment**

Impact	Avifauna during Operations
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Impact Nature	Negative	Positive	Neutral		
	Increase in bid mortality due to bird strikes during operation				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the erection of the transmission lines and the bird species along the RoW				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered permanent throughout the project life.				
Impact Extent	Local	Regional	International		
	Impact is limited to the Project AoI				
Impact Scale	The impact is considered medium scale. Although the impact could occur across the whole length of each of the transmission line RoW's, large sections of the lines are in built up urban areas and there is a decreased risk of impacts to Avifauna in these areas.				
Frequency	The frequency is expected to be occasional				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is expected to be small due to bird mortality				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity is considered low, birds of conservational significance are not expected along the transmission line RoW.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the magnitude of the impact is small and the sensitivity is low the overall significance is considered to be of minor significance				

## Mitigation

In addition to the controls mentioned above, as well as those specified for mitigating impacts to flora and vegetation the following mitigation measures are recommended during **construction**:

The following mitigation measures are recommended during operations:

- In the event of receiving confirmation of regular bird strikes along the transmission line, high-visibility markers should be installed to make the lines more visible to birds, to reduce the risk of collision
- Where feasible and safe, provide artificial bird-safe perches and nesting platforms placed at a safe distance from the energised parts of transmission infrastructure
- Cross-arms, insulators and other parts of the power lines can be constructed such that there is no space for birds to perch where they can come into contact with energised wires
- Undertake regular (at least annual) monitoring of the transmission line for evidence of birds nesting on the pylons. In the event of nesting, anti-perch and nest devices will be installed to discourage birds from regularly visiting these structures. These will be replaced when necessary
- No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)
- Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.
- All terminal structures (transformers) should be constructed with sufficient insulation on jumper wires and surge arrestors

- Contractor should consider installing line marking to increase the visibility of the line. There are three general types of line marking devices: aerial marker spheres, spirals, and suspended devices

### Decommissioning Impacts on Avifauna

Avifauna within the surrounds of the activities may be disturbed by noise, vehicles, and human presence during decommissioning. The disturbance will be temporary and short-lived and the impact will be **negligible**.

### Residual Impact

The impact significance is **Negligible** after mitigation measures during construction and **Minor** post mitigation for operations (*Table 8-25*). There will be some habitat loss as a result of the construction, however the habitat is modified and not expected to have conservational value.

**Table 8-25: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Disturbance to avifauna species and degradation to environment during construction	Construction	Minor	Negligible
Increase in bird mortality due to bird strikes during operation	Operation	Minor	Minor

#### 8.2.2.1.8 Solid and Liquid Waste Impacts

Improper waste management procedures or lack of mitigation measures during construction, phase of the Project may result in adverse environmental and social impacts on: -

- Storm water quality and thus water quality in the water bodies in project areas
- Soil quality
- Surface water quality
- Ground water quality; and
- Ecological receptors or human health.

The different types of wastes and sources that are likely to be generated from the construction of the transmission line and sub-station are described below.

#### a) Recyclable and Reusable Waste

The types of recyclable and reusable wastes to be generated on site during the construction period include among others: -

**Box 8-1: Recyclable and reusable waste**

1. Waste metal
2. Waste plastic
3. Waste cables
4. Waste glass
5. Wastepaper (packaging material)

6. Clean containers, drums, bins etc.

#### b) Excavation Waste

The greatest volume of excavated material will arise from the construction activities of the Project during civil works associated with construction of the transmission lines. The excavated materials will be re-used immediately as back fill material.

#### c) Wastewater

Water will be required for the construction works, dust suppression, mixing of concrete and washing of construction equipment and in camp sites (if established by contractor) among others.

#### d) Hazardous Waste

The construction activities will generate hazardous wastes which may adversely impact on the local environment due to handling, storage, transport, and disposal. These include, oil, grease etc. During the construction period, waste oil will result from the maintenance of machines, equipment, and construction vehicles.

### Impact Assessment

Direct and indirect disposal of waste oils to the receiving environment is likely to adversely impact on the environment and human health. Without mitigation measures, it is anticipated that there will be potential major to moderate adverse impacts during construction and moderate adverse impacts during the maintenance and operations periods. Wastewater if discharged indiscriminately into the environment, will lead to risks and impacts on water bodies, soil, vegetation, fisheries, and human health.

**Table 8-26: Pre-Mitigation Impact Assessment**

Impact	Waste generation and hazards during Construction				
Impact Nature	Negative	Positive		Neutral	
	Disposal of waste to the receiving environment is likely to adversely impact on the environment and human health.				
Impact Type	Direct	Indirect		Induced	
	Waste generated from the used materials during construction and operation activities that could cause land and groundwater contamination if spilled or not handled, stored and disposed of correctly.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered to be temporary for the duration of the construction phase.				
Impact Extent	Local	Regional		International	
	Impact limited to the Study Area				
Impact Scale	The impact is considered as small scale since it is local to the construction area.				
Frequency	The frequency is considered to be occasional considering that the construction activities are localized.				
	Positive	Negligible	Small	Medium	Large
Impact	Waste generation and hazards during Operation				

Impact Magnitude	Based on the parameters above and considering the embedded measures, the magnitude is considered to be small.		
Resource/Receptor Sensitivity	Low	Medium	High
	The sensitivity of the of the potential receptors- land and ground water is High		
Impact Significance	Negligible	Minor	Moderate
	Considering the magnitude is small and sensitivity is high, the impact on the land and water resources during construction is considered to be of <b>moderate</b> significance.		

### Mitigation

The following mitigation measures should be employed to reduce any impacts on associated with waste generation.

- A Waste Management Plan must be prepared prior to commencement of construction by the contractor (s).

### Decommissioning Solid and Liquid Waste Impacts

Solid and liquid waste will be generated during this phase of the project and include plastic, cables, metal, transformers, capacitors, drywall, wood, glass, fasteners, wastewater etc. excavated materials will be re-used immediately as back fill material. Solid waste associated with transmission lines are largely re-used or recycled. To mitigate any residual impact, the waste management plan used during construction will be implemented.

### Residual Impact

The impact significance is **Negligible** after mitigation measures during construction and **Minor** post mitigation for operations (*Table 8-27*).

**Table 8-27: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Poor waste disposal	Construction	Minor	Negligible
Poor waste disposal	Operation	Minor	Minor

#### 8.2.2.1.9 Access to Infrastructure and Services

The Project will use the existing infrastructure for activities such as transportation and waste disposal. The transportation of construction material and equipment will take place by trucks and through the existing road network during construction. Stringing activities will also require short-term road closures and will disrupt transit routes. Although road improvement and construction of access roads may lead to disruption of traffic during the construction phase, these improvements are expected to benefit the local communities in the long run during the operation phase. The potential increase in the risk of road accidents is addressed under community and occupational health and safety impacts section.

During construction, the Project is not considered to give rise to any significant impact associated the increased pressure on health care infrastructure in the study areas as the number of workers will be low/negligible. Similarly, the potential pressure on local

sources of water has also been scoped out since the sources of water for construction and operating the campsite will be determined by the contractor and a water use plan will be required. No pressure on existing waste management infrastructure and services in the study area is expected either as the construction wastes associated with transmission lines are insignificant. However, wastes from the camp site could be significant and overburden the existing wastes disposal facilities in the area. The contractor will be required to develop a Waste Management Plan and ensure that the wastes generated during construction are disposed in accordance to the NEMA waste management regulations. There are dumpsites in all the 3 Counties that are designated by NEMA and capable of handling the wastes from the construction activities which will not be significant in terms of quantity.

### Baseline Conditions

Relevant baseline conditions that may influence the significance of potential impacts on infrastructures and services are summarized as follows:

- Road infrastructure and road safety are precarious along the Project line.
- Road conditions and lack of public transportation system are the main challenges as regards access to services such as health and education, as well as to job opportunities.
- Lack of infrastructure, poor maintenance, and long dry seasons are the main difficulties related to water access. A very small % of the settlements in the Study Area have in-house running water.
- Majority of households in the settlements of the Study Area do not have access to sanitation or sewage system, and most households use pit latrines/toilets.
- In the project area, most households burn or bury their waste. Only urban households have access to appropriate waste disposal.

### Impact Assessment

Disruption to road traffic and transportation during the upgrade of existing access roads, access to tower sites, transport of equipment and material supply and stringing activities could result in impacts to quality of life, and if unmanaged, in health impacts for local populations (e.g. worsening of the sanitary situation, inability to reach healthcare infrastructure during an emergency due to road upgrading or traffic, etc.). Therefore, if unmanaged, disruption to services might also result in community distrust and resentment towards the Project. This being said, the associated increased pressure and disruption of the existing road network and related traffic issues will be temporary and limited to the construction phase.

KETRACO commits to performing site reinstatement and rehabilitation including repairing any damage caused as part of the construction activities and reinstating existing access roads if needed. As described above, the impact magnitude is considered small and receptor sensitivity is high resulting in an impact of moderate significance.

**Table 8-28: Pre-Mitigation Impact Assessment**

Impact	Damage / Access to Local Infrastructure and Services during Construction		
	Negative	Positive	Neutral

Impact Nature	Damage road infrastructure can lead to disruptions and reduced quality of life of communities in the Study Area.				
Impact Type	Direct	Indirect		Induced	
	Increased pressure on road infrastructure is expected to occur as a result of direct utilization by the Project (road usage, transport of equipment, material, workers, water, waste, etc.).				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered to be of temporary duration as it is not expected that transportation and road upgrades will be continuous throughout the construction phase.				
Impact Extent	Local	Regional		International	
	Impact limited to the Study Area				
Impact Scale	The impact is considered as small scale since could result in temporary reductions in community well-being from loss of access to basic services before reinstatement.				
Frequency	The frequency is considered to be occasional considering that the traffic generated by the Project is expected to be low and localised and the building of new roads will be limited.				
	Positive	Negligible	Small	Medium	Large
Impact Magnitude	Based on the parameters above and considering the embedded measures in place to reinstate road networks, the magnitude is considered to be small.				
Resource/ Receptor Sensitivity	Low	Medium		High	
	The sensitivity of the local communities is considered to be high as they depend on the road network to access healthcare and other services.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the magnitude is small and sensitivity is high, the impact on community access to infrastructure during construction is considered to be of moderate significance.				

## Operations

Improvements to roads have the potential to positively impact on community access to education, employment, services, and road safety. Along the project route, communities in rural and remote areas are currently lacking in quality roads and infrastructure and they have the potential to be most positively impacted by infrastructure improvement. Communities benefiting from the upgrade and construction of new roads may also experience positive impacts such as enhanced access to markets for their local agricultural produce, and access to transportation and services (education, health, transport, etc.).

As the Project is expected to as much as possible use mainly existing roads, these will require upgrading during the construction phase and maintenance during operations which result in a long-term positive impact for local communities.

**Table 8-29: Pre-Mitigation Impact Assessment**

Impact	Damage / access to local infrastructure and services during operations			
Impact Nature	Negative	Positive	Neutral	
	Improvement of the local road network leading to improved access education, employment, healthcare and improved road safety for local communities in the Study Area.			
Impact Type	Direct	Indirect	Induced	
	The improvement in access to service and in livelihoods and employment is a direct result of Project road improvement, reinstatement and maintenance activities.			
	Temporary	Short Term	Long Term	Permanent

Impact Duration	The impact is considered to be of long-term duration throughout the 50- year operation phase.		
Impact Extent	Local	Regional	International
	Impact limited to the Study Area.		
Impact Scale	The impact is considered as medium scale considering the length of the Transmission Line route.		
Frequency	The frequency of the impact is continuous throughout the operation phase.		

### Mitigation Measures

The following mitigation measures should be employed to reduce any impacts on local infrastructure access and/or damage:

- Methods will be implemented to maintain open, clear, and transparent communication with the local communities regarding the use of local infrastructures by the Project throughout the different phases.
- Engagement with the relevant authorities is recommended in order to avoid damage to common property and minimize access disruption to education and healthcare facilities
- A **Community Grievance Mechanism Plan** will be implemented.
- A **Traffic Management Plan** shall be issued before earth movements and construction start in order to minimize traffic disruptions
- Where temporary closure of road is required, alternative access to property will be ensured and local solutions including diversions will be implemented to ensure uninterrupted mobility.

### Decommissioning Access to Infrastructure and Services

The transportation of decommissioned material and equipment will take place by trucks and through the existing road network. The exercise is not considered to give significant rise to pressure on existing infrastructure in the study area as the number of trucks will be low/negligible. The low number of workers are not also anticipated to strain the existing health infrastructure. The existing waste management infrastructure and services in the study area is not expected to suffer additional burden as decommissioning wastes associated with transmission lines are largely re-used or recycled. The impact is classified as **insignificant**

### Residual Impacts

Considering the mitigation measures in place, the significance of traffic and road network disruption may be reduced to minor, while the impact from road network improvements in the operation phase is positive.

**Table 8-30: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)	Impact (Post)
Disruption to traffic and transportation	Construction	Moderate	Minor	
Improvement of the local road networks	Operation	Positive	Positive	

#### 8.2.2.1.10 Air Navigation and Safety

For purposes of ensuring aircraft safety, the Kenya Civil Aviation Authority (KCAA) is mandated to evaluate and approve aerial masts and other structural heights. The installations, like the Power transmission towers, should not be erected in the vicinity of an aerodrome that may impact of aircraft operation being conducted safely. The impact to aircraft safety can be directly through collision, or indirectly through radar and radio interference. There are different heights and distance allowed depending on how far the building is from the runway and the approach path. A permit must be obtained from the KCAA for these kinds of installations. There are 3 aerodromes and airstrips around the site, these are Nyahururu airstrip (2.4Km from the RoW), Moi airstrip (17.4Km from the RoW) and also the Lanet airstrip which is a military installation (10.3Km from RoW). The tower heights of the stainless-steel pylons are approximately 40m above ground level and none is on the flight path of any of the airports.



Figure 8-1: Aerodromes and Airstrips along the RoW

Table 8-31: Impact Analysis Air Navigation and Safety

Impact	Air Navigation and Safety			
Impact Nature	Negative	Positive		Neutral
	Compromise on aircraft operation safety, directly through collision, or indirectly through radar and radio interference			
Impact Type	Direct	Indirect		Induced
	The height of the stainless-steel pylons can affect aircraft operation directly through collisions, from visual errors, or indirectly by radiations interfering with radar and radio			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The impact is considered to be of long-term duration throughout the 50- year operation phase.			
Impact Extent	Local	Regional		International
	Impact limited to the location of the specific tower			

Impact Scale	The impact is considered as medium scale considering the length of the Transmission Line route.
Frequency	The frequency of the impact is continuous throughout the operation phase.
Mitigation	The siting of the stainless-steel pylons, are not of adequate height, considering distances from the airports on its RoW to cause these impacts.
Residual Impact	None

#### 8.2.2.1.11 Landscape and Visual Amenity Risks and Impacts

Visual Impacts refers mainly to the changes to the visual character of landscape views resulting from: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the views of the visual receptors and intrusion of foreign elements into the view shed of landscape features. The construction activities for the transmission lines will have an impact on the visual character of the landscape due to:

- Clearance of vegetation along the transmission line corridor, construction yards and access roads
- Presence of construction vehicles and equipment
- Worker presence and activity; and
- Dust emissions resulting from construction activities and traffic.

**Table 8-32: Potential Impacts to Landscape and Visual Amenity**

Construction Phase	Operation Phase
Presence of construction vehicles and work force	Presence of transmission lines and towers/monopoles Permanent clearance of vegetation

#### Baseline Conditions

The local settings of the landscape are mainly characterized by the presence of open space plantations and cultivation areas with the line crossing small sections of Bahati Forest.

#### Impact Assessment

##### Construction Phase

As per the current settings of the project area, the proposed transmission line will cause minimal change to people's existing views. Despite the direct and negative impact of additional construction vehicles on site, it will be temporary and local. The small magnitude on visual amenity and the low sensitivity of the receptors means the significance of this impact is assessed as negligible. Based on the analysis provided above, the visual impact and change of landscape will be of minor significance.

**Table 8-33. Pre-Mitigation Impact Assessment**

Impact	Visual Amenity during Construction		
Impact Nature	Negative	Positive	Neutral
	Change in visual amenity		
Impact Type	Direct	Indirect	Induced
	Impact is a result as a direct interaction between project activities and local views		

Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration will be temporary				
Impact Extent	Local	Regional	International		
	The impact will be limited to the immediate surroundings of the construction yards and access roads.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low	Medium		High	
	The area has mainly modified environment with no relevant scenic views' locations				
Impact Significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is small and the sensitivity is low, the overall significance is considered to be Negligible.				

### Operation Phase

Along the proposed alignment, only the few communities in close proximity to the corridor will be able to perceive the presence of the project features, being more sensitive to the visual intrusion. Moreover, the expected pylons type (not solid but lattice) are limiting their evidence in the landscape as the viewer moves further away from them. The visual absorption capacity of the landscape is enhanced by the existing infrastructure as well as by the local vegetation patches and local gentle topography.

Based on the analysis provided above, the visual impact and change of landscape will be of *minor* significance.

**Table 8-34: Pre-Mitigation Impact Assessment**

Impact	Visual Amenity during Operations				
Impact Nature	Negative	Positive	Neutral		
	Change in visual character				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the project and surrounding residents and land users				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration will be permanent throughout the project life.				
Impact Extent	Local	Regional	International		
	The view shed experience is limited to few kilometres				
Impact Scale	The impact is considered as local scale. Visual impacts will not only impact people who live near the transmission line route, but also people who are travelling by the line daily.				
Frequency	Likely				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is expected to be medium				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The area has mainly modified environment with no relevant scenic views' locations				
	Negligible	Minor	Moderate	Major	

Impact Significance	Considering the magnitude is medium and the sensitivity is low the overall significance is considered to be minor
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### Mitigation

The nature of the development (i.e., tall structures and a linear formation) does not allow many opportunities for complete screening. The objective of mitigation is to minimize visual scarring of the landscape and to enhance absorption of the development's permanent equipment and structure into the surrounding environment. Specific recommended measures during operation as best practices include:

- Any excavated or cut and fill areas will be landscaped and revegetated
- No debris or waste materials will be left at the work sites, good housekeeping on site to avoid litter and minimise waste
- Towers and structures should have a non-reflective finish
- Night lighting of sites should be minimized within requirements of safety and efficiency
- Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor

It is suggested to evaluate locations in proximity of very close sensitive receptors to determine whether installation of screening items such as vegetated areas with indigenous species will reduce visual impacts and install if warranted.

### Residual Impact

Considering the nature of the construction activities, the foreseen mitigation measures are able to furtherly reduce the impacts avoiding an alteration of the view shed experience. For the operational phase, the nature of the project features is limiting the possibility to greatly reduce the potential impacts. There are, however, a number of sensitive visual receptors in proximity to the power line and the power line will intrude on their existing views. These visual receptors are mainly limited to residents with houses within 1 km of the route. Mitigation measures are unlikely to reduce the visual impact of the power lines on these visual receptors but for they will grant the local scale of the residual impacts.

**Table 8-35. Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Visual impact	Construction	Minor	Negligible

#### 8.2.2.1.12 Worker's Health and Safety and Workers Management

The construction of the transmission lines is likely to attract workers from within the project area and outside of the project area. The total number of work force cannot be estimated at this point and will be provided by the contractor. The total work force is going to be skilled and unskilled and sourced from project locality and outside of locality including internationally depending on the skill sets desired. The workers required by the contractor may include among others: -

- a) Engineers-Skilled Experts (civil, mechanical, electrical) etc.;

- b) Supervisors, Inspectors Foreman and Operators –Skilled Experts
- c) Technicians (inspectorate, welders, masons, steel fixers, drivers etc.)- –Skilled Experts; and
- d) Unskilled-flagmen, diggers, cleaning, security, mixing, watering, help team.

The construction activities will also entail engagement of contractors, sub-contractors and third-party entities which will form part of the supply chain. Workers' rights including occupational health and safety may be abused hence adverse impact and may include exposure to accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed by the proponent but also its contractors (including sub-contractors) and within the supply chain. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed by KETRACO but also its contractors (including sub-contractors) and within the supply chain. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice.

Table 8-36 presents the potentially significant impacts associated with occupational health and safety and worker management during the construction and operation phases. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

**Table 8-36: Potential Impacts on Occupational Health and Safety and Worker Management**

Construction Phase	Operation Phase
<p>Impacts on workers' health and safety, in particular from road accidents, slip, and trip and falls hazards during tower erection and stringing activities, exposure to chemicals and inconsistent use of PPEs.</p> <p>Impacts on workers' rights from violations of labour laws in particular with respect to enforcement of health and safety measures by the employer such as the use of appropriate PPEs during construction of the transmission lines.</p> <p>Workers are likely to be exposed to work related risks during the construction phase of the project especially when erecting the transmission towers and lines. Typical activities for the construction of the transmission lines include clearance of the RoW in vegetated areas, excavation work, erecting the towers, working at height and stringing the transmission lines. The above activities could expose workers to injuries and even fatalities when</p>	<p>Impacts on workers' health and safety in particular during maintenance of the transmission lines are from occupational hazards such as electrocution and EMF during line maintenance and the exposure to chemicals.</p> <p>Impacts on worker's rights from lack of enforcement of health and safety measures by the employer such as the use of appropriate PPEs during maintenance of the transmission lines.</p>

for instance those working at height fall, towers collapse, objects fall on workers, electrocution etc.	
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Similarly, the storage and disposal of hazardous waste and materials generated from the use of materials during the construction of transmission lines may also pose a hazard to the health of the workforce if not handled properly. Equipment and worker transport along the access roads to the pole positions may also result in road accidents in the absence of a proper traffic management plan or if traffic safety rules are not enforced. The often-poor conditions of the existing roads may also increase the risk of accidents.	
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Non-routine events such as risk of transmission line collapse and risks during stringing activities are assessed in Section **8.2.2.1.17** on Unplanned Events.

### **Baseline Conditions**

Relevant baseline conditions that may potentially influence impacts are summarized as follows:

1. There is adequate public health coverage in the 3 Counties and the majority of the population have access to County/GoK subsidized health services.
2. Settlement level key informants reported that the distance to health centres from these settlements varies between 0 and 2 km.
3. Road infrastructure and road safety are precarious along the Project transmission line route.
4. Enforcement of health and safety laws and standards in Kenya is expected to be limited, which contributes to high incidence of accidents on construction sites.

### **Impact Assessment**

#### **Construction**

##### **Worker's Health and Safety and Labour Rights**

Typical activities for the construction of the transmission lines include clearance of the RoW in vegetated areas, excavation work, erecting the towers, working at height and stringing the transmission lines. Considering that construction was identified as one of the sectors of employment (formal and informal) in Kenya (including in the peri-urban areas along the transmission line route), the locally hired workforce may have some experience in traditional/basic construction activities such as excavation works. However, work practices and consideration for health and safety may fall short of international standards and best practice, such as the use of personal protective equipment (PPE), which will increase the severity of hazards to which the workforce are exposed.

Similarly, the storage and disposal of hazardous waste and materials generated from the use of materials during the construction of transmission lines may also pose a hazard to the health of the workforce if not handled properly.

Equipment and worker transport along the access roads to the pole positions may also result in road accidents in the absence of a proper traffic management plan or if traffic safety

rules are not enforced. The often-poor conditions of the existing roads may also increase the risk of accidents.

During construction, the direct interaction between the Project and the workforce if not managed properly, will result in negative impacts on the workers' working conditions and potentially permanent impacts on their health and safety. The impact is considered short-term and continuous over the 12 months construction phase resulting in a medium impact magnitude. Since contractors are expected to operate according to international standards and considering the level of prior training of the workforce, receptor sensitivity is considered medium. Therefore, the impact is of *moderate* significance.

**Table 8-37: Pre-Mitigation Impact Assessment**

Impact	Workers Health and Safety and Rights during Construction				
Impact Nature	Negative	Positive		Neutral	
	Poor planning, non-compliance with health and safety best practice and labour rights can result in injuries or fatalities.				
Impact Type	Direct	Indirect		Induced	
	Resulting from a direct interaction between the Project (i.e. increased project traffic, working at height, stringing the transmission lines across the towers, open excavations, and demining) and the workforce.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Injuries and fatalities could have permanent impacts on workers and their families.				
Impact Extent	Local	Regional		International	
	The workforce will be primarily contracted from urban centres and potentially from peri-urban areas along the Transmission line.				
Impact Scale	As mentioned above the workers will be working on different sections of the line at different times. The impact scale is therefore medium.				
Frequency	The frequency is considered to be infrequent as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPEs and health and safety measures.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above and considering the embedded measures in place the magnitude is considered to be medium.				
Resource/ Receptor Sensitivity	Low		Medium		High
	The sensitivity of the receptors (workforce working along the transmission lines) is considered medium as some workers may not be aware of their rights.				
Impact Significance	Negligible		Minor	Moderate	Major
	Since the magnitude is considered medium and sensitivity is medium, the impact on workers' health and safety during construction activities is considered to be of moderate significance.				

## Operations

Similar to the construction phase, the operation phase may also lead to occupational health and safety issues in particular with respect to maintenance of the transmission lines (risk of electrocution and exposure to electric and magnetic fields).

With respect to exposure to EMF, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) considers that there are occupational circumstances where,

with appropriate advice and training, it is reasonable for workers voluntarily and knowingly to experience transient effects such as retinal phosphenes and possible minor changes in some brain functions. These symptoms are not believed to result in long term or pathological health effects.

### **Decommissioning Phase: Worker's Health and Safety and Labour Rights**

Typical activities for the decommissioning of the transmission lines include excavation work, dismantling of the towers, working at height and un-stringing the transmission lines. During these activities, the use of personal protective equipment (PPE), will greatly manage the severity of hazards to which the workforce are exposed. The traffic management plan will also be used to manage road accidents. The impact is considered short-term and medium over the decommissioning phase. Since contractors are expected to operate according to international standards and are in possession of prior EHS training, the impact is of **moderate** significance.

#### **8.2.2.1.13 Community Health and Safety Impacts**

The presence of the Project could affect the health, safety, and wellbeing of the communities along the transmission line route. Increased Project-related traffic, civil works for site preparation including site clearance and excavation work, change to the environment due to increased noise, decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities. Similarly, communities and stakeholder concerns around the safety of the transmission lines once they are operational including exposure to electric and magnetic fields (EMF), also have the potential to affect communities.

Construction activities are likely to expose the local communities to health and safety related risks. Local community members could be exposed to accidents which could lead to injuries or fatalities. Collapsing of the towers, falling objects, road accidents caused by construction vehicles, exposure to hazardous wastes from the construction sites among others are potential community health and safety impacts. Further as discussed external workers could bring with them communicable diseases including sexually transmitted diseases (STDs) that could be passed on to local communities. Table 8-38 presents the potentially significant community health, safety and security impacts that may occur during the construction and operation phases.

**Table 8-38. Potential Impacts on Community Health and Safety**

<b>Construction Phase</b>	<b>Operation Phase</b>
<p>Potential impacts on community safety, in particular road accidents, trespass on the sites, and demining activities potentially resulting in accidents leading to injuries or fatalities.</p> <p>Environmental health: changes to the environment due to increased noise and vibrations, decreased air quality and, inadequate management of waste.</p> <p>Impact from workers presence and potential interaction with local populations.</p>	<p>Community health over exposure to EMF.</p>

## Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarized as follows:

- Access to health services are limited throughout the transmission line route.
- The main health issues in the settlements of the Study Area are malaria, diarrhoea, respiratory problems, and urinary infections. HIV/AIDS prevalence in Kenya as of 2018 was approximately 4.7% among adults aged 15–49 years old. The prevalence in the county of Nakuru is 5.3%, in Nyandarua 3.8% and in Laikipia 3.7%.
- Road infrastructure and road safety are precarious along the Project transmission line route.
- Commercial activity such as the sale of agricultural products, wood and other small trades is often conducted on the side of the roads which increases the risk of accidents.

## Operations

### Potential Health Impact from Exposure to Electromagnetic Fields

Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device such as power lines and electrical equipment. Electric fields are created by differences in voltage; the higher the voltage, the stronger the resulting electric field. Concerns over EMF health and safety risks are related to chronic (long term) health effects and acute (short term) effects. The potential impacts on community health and safety resulting from potential chronic and acute health effects caused by the transmission lines' EMF are assessed below.

Chronic effects relate to long term exposure to low magnetic fields and the potential impacts on health. Specifically, epidemiological studies indicated that long term exposure to 50-60 Hz magnetic fields might be associated with an increased risk of childhood leukaemia. There are also some concerns about possible increased risk of cancer from exposure to electromagnetic radiation from overhead transmission line. However, according the IFC EHS guidelines for electric power distribution, there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. Nevertheless, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

Similarly, with respect to acute health effects from EMF, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines notes that there are a number of well-established acute effects of exposure to low frequency EMFs on the nervous systems; these being a result of direct stimulation of nerve and muscle tissue and the induction of retinal phosphenes. These health effects are not believed to result in long term or pathological health effects.

The development of the Project has been designed to comply with the *IFC EHS Guidelines for Electric Power Transmission and Distribution (April 30, 2007)* and the *ICNIRP Guidelines (2010)*. As such, rerouting of the transmission line has aimed to minimize exposure to the public in accordance with ICNIRP guidelines on public and occupational

exposure. Based on the analysis provided above, the potential impact from EMF from chronic and acute exposure is of *minor* significance.

**Table 8-39: Pre-Mitigation Impact Assessment**

Impact	EMF Chronic and Acute Health Effects				
Impact Nature	Negative		Positive	Neutral	
	Negative chronic and acute health effects as a result of EMF exposure.				
Impact Type	Direct		Indirect	Induced	
	The impact is a direct interaction between the transmission lines and surrounding residents and land users.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The duration is permanent as the project life cycle is expected to last throughout the project life.				
Impact Extent	Local		Regional	International	
	The impact is of local extent as it will be limited to the vicinity of the transmission line.				
Impact Scale	The impact scale is small considering the embedded measures in place to minimize exposure to the public in accordance with <i>ICNIRP guidelines on public and occupational exposure</i> and <i>IFC EHS Guidelines on Electric Power Transmission and Distribution</i> .				
Frequency	The occurrence of EMF is constant during the operation of the transmission lines; however, the risk of the chronic and acute health effects occurring is low.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is considered small considering the embedded measures in place.				
Resource/ Receptor Sensitivity	Low		Medium		High
	Receptor sensitivity is considered medium due to range of individuals in nearby settlements.				
Impact Significance	Negligible		Minor	Moderate	Major
	The overall potential chronic and acute effects are considered minor.				

### Residual Impacts

The significance of the residual impacts on community health and safety after the implementation of mitigation measures is presented in **Table 8-40** below.

**Table 8-40: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Community Safety (Road Accidents, Site Trespass)	Construction	Moderate	Minor
Environmental Health (Noise and Air)	Operation	Moderate	Minor
Interaction with Project Workforce	Operation	Moderate	Minor
EMF Health effects	Operation	Moderate	Minor

As stated previously, the Project during its lifetime will be subject to local labour laws and international standards with respect to the responsibility of the employer to safeguard the health and safety of its employees. The Project is therefore expected to abide by these regulations and develop and implement appropriate health and safety measures covering the operations phase including the use of PPE by the workforce. As stated for the construction phase, compliance with KETRACO's EHSS policy aimed at safeguarding the health and

safety of its employees and subcontractors will additionally help prevent potential labour abuses and reduce the risk of health and safety incidents. Finally, all contractor contracts include explicit reference to the need to abide by Kenyan law and KETRACO's standards and policies in relation to health and safety.

Any health and safety and labour rights related impact during the operations phase will be limited to a small number of workers and will be permanent over the operation phase. The magnitude is therefore considered small. Receptor sensitivity is considered low as most workers will be permanent skilled workers. Therefore, the impact is of *minor* significance.

**Table 8-41: Pre-Mitigation Impact Assessment**

Impact	Workers Health and Safety and Rights during Operations				
Impact Nature	Negative		Positive		Neutral
	Poor planning, non-compliance with health and safety best practice and labour rights can result in injuries or fatalities.				
Impact Type	Direct		Indirect		Induced
	Resulting from a direct interaction between the Project (i.e. increased project traffic, working at height, stringing the transmission lines across the towers, open excavations) and the workforce.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Injuries and fatalities could have permanent impacts on workers and their families.				
Impact Extent	Local		Regional		International
	The workforce will be primarily contracted from urban and rural centres within the 3 Counties and other Counties in Kenya as well as from other countries for some higher skilled jobs.				
Impact Scale	The impact scale is considered small during operations as the workforce size will be reduced and maintenance activities will be periodic.				
Frequency	The impact is considered to be infrequent since the operation activities will be limited to maintenance works. The workforce is expected to be trained and the employer is expected to enforce the use of PPEs and health and safety measures. Lessons learned from the construction phase are expected to enhance the safety conditions and thus reducing the frequency of safety incidents during the operation and maintenance phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, and the embedded measures in place, the magnitude is considered small.				
Resource/ Receptor Sensitivity/Value/Importance*	Low		Medium		High
	The sensitivity of the receptors is considered low as workers will be mostly skilled permanent employees.				
Impact Significance	Negligible		Minor	Moderate	
				Major	
	Considering the magnitude is medium and sensitivity is low, the impact on workers' health and safety during operations activities is considered to be of Moderate significance.				

## Mitigation Measures

The following mitigation measures will be implemented during the construction phase to reduce any impacts on workers' health and safety and labour rights. KETRACO will develop and implement a Workers Health and Safety Management System covering all contractors and subcontractors including the following measures:

- KETRACO will require contractors to develop Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc.

- KETRACO will require its contractors and subcontractors to put in place policies in line with national legislation and applicable international legislation and KETRACO Code of Conduct and Policies.
- KETRACO will establish contractual clauses to be embedded in the contracts of the EPC and all sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights and providing the contractor and KETRACO with the right of audit.
- KETRACO require that contractors prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment.
- Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting a pre-employment medical assessment include a safer working environment, reduction in workplace injuries, minimised downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.
- KETRACO will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities.
- KETRACO will implement regular health and safety checks and audits of Workers, contractors and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards.
- KETRACO will develop and implement a Workers Grievance Mechanism for the Project workforce including contractors and subcontractors.
- KETRACO will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks.
- KETRACO will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents.
- KETRACO will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE.
- Provision of condoms (male and female) for workers.
- Creating awareness on HIV/AIDS spread among workers and community.
- KETRACO will ensures that WB Group EHS guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed.
- KETRACO will ensure that adequate clean water, adequate food, and access to medical care is provided to all workers on the worksite and at accommodation.
- KETRACO will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver, and passenger behaviour, use of drugs and

alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.

- KETRACO will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
- Recruitment will be undertaken in collaboration with local authorities and local agencies. KETRACO will put in place measures to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation.

During the operation phase, KETRACO will implement the following measures:

1. The Workers' Health and Safety Management System will be extended to the operation phase and adapted to address relevant aspects, including the following measures:
2. Identification and provision of appropriate PPE, training and monitoring, as well as ongoing safety checks and safety audits.
3. Prohibiting the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment.
4. Ensuring that training on health and safety measures is provided to all operation workers prior to starting to work on the Project.
5. KETRACO will undertake compliance monitoring of labour rights. KPIs will be developed around worker rights, discrimination and management, workforce grievance mechanism and monitoring of outcomes.
6. Implementing a Workers Grievance Mechanism for the Project workforce.
7. Establishing a procedure for the recording and analysis of lessons learned and implementation of additional actions to avoid or minimize occupational health and safety risks.
8. KETRACO will develop a Waste Management Plan for the operation phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
9. KETRACO will put in place measures to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation.

### **Residual Impacts**

The implementation of mitigation measures will contribute to reducing occupational health and safety risks and the risk of labour rights abuses significantly. However, the risk of potential accidents still exists and may potentially lead to injuries or fatalities for the workforce during construction and operation. This risk will be short-term during the construction phase (18-24 months) and long-term during operations. With the implementation of mitigation measures the remaining impact significance is considered minor significance during construction and negligible during operation. In fact, during operations, knowledge and lessons learned in terms of health and safety and labour rights during the construction phase may extend to the operation phase and contribute to strengthening local knowledge and practices in Kenya.

**Table 8-42: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Worker health and safety and labour rights	Construction	Moderate	Minor
Worker health and safety and labour rights	Operation	Moderate	Minor

### **Impact on Community Safety related to Road Traffic, Site Trespass Activities**

During construction there will be an increase in traffic movements of heavy machinery and light vehicles in the road along the Transmission Line route and in access roads leading to the temporary tower site working areas during a period of 18-24 months. This will include water trucks, cement trucks, transport of construction material, excavation machinery, etc. which is expected to increase the risk of road traffic accidents and potential injuries or fatalities to other road users or pedestrians. The increase in movement of vehicles during the construction phase may result in greater disturbance and decreased wellbeing for those communities closest to the tower site working areas and along transportation routes and access roads.

It is assumed that the tower site working areas (40x50m each on average) will not be fenced during construction activities. The risk of trespass is highest when the tower sites are closest to settlements and agricultural areas with no electricity coverage, which increases the risk of accidental trespass at night. Trespassing on the temporary tower site working areas could result in accidents leading to injuries or even fatalities, especially due to the presence of large machinery, tower construction parts such as metal structures, and open excavations, which could at times be partly filled with water (e.g., open excavations for the erection of towers). Young people, elders and children are most at risk of being injured. The impact is a direct result of interaction with the increased traffic associated with construction activities. The impact is temporary in nature and limited to the settlements in the Study Area and the surrounding road network. Contractors will also be required to operate according to best international practice. However, considering the potential risk posed to communities, the magnitude is considered medium. Receptor sensitivity is also rated as medium, resulting in moderate impact significance.

**Table 8-43: Pre-Mitigation Impact Assessment**

Impact	Community Safety			
Impact Nature	Negative	Positive	Neutral	
	Increased traffic during the construction period may result in increased risk to road traffic accidents and the presence of unfenced tower site working areas near settlements may result in trespassing and potential injuries.			
Impact Type	Direct	Indirect	Induced	
	Impact that result from a direct interaction between the Project (i.e. increased traffic, unfenced tower work sites, risk posed by demining activities) and the local population along the transmission lines and road users.			
	Temporary	Short Term	Long Term	Permanent

Impact Duration	The increased traffic effect and risks to injuries is temporary, as construction activities will take place in a sequential manner during the length of the construction period. However, although construction activities at the tower sites working areas will be sequential, access to these sites will be prohibited throughout the 18-24 months of construction, as machinery and equipment will be left at the sites in between team shifts from site to site until completion of the works.				
Impact Extent	Local	Regional	International		
	Impact limited to the settlements in the Study Area				
Impact Scale	The impact is considered as medium scale since temporary tower sites will be under construction along the transmission line.				
Frequency	The frequency is considered to be occasional or one time at each temporary tower site over the duration of the construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be medium considering the potential consequence of accidents.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity of the receptors (local population along the transmission lines and road users including vehicle users, pedestrians and cyclists) is considered medium, as contractors will ensure that construction activities are undertaken in compliance with international standards. In addition, the transmission lines will be built in mostly rural areas and peri-urban areas where previous transmission lines have been built in recent years, and dense traffic in these areas may not be unusual for the populations, which may also contribute to improving the overall				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the magnitude and sensitivity are medium, the impact on the community safety during construction activities is considered to be of moderate significance.				

### Impact on Environmental Health for Communities

During the construction phase (approximately 18-24 months), activities will result in changes to the physical environment, with the potential to affect the health and welfare of communities. There will be temporary increases in dust during the duration of the construction phase, which will be mostly localised to the temporary tower site working areas and access roads. These are likely to result in increased disturbance and decreased wellbeing especially for residents closest to construction site and along unpaved access roads. There are no impacts on local air quality over the long term and therefore unlikely to result in a recordable increase in respiratory diseases in the population.

Similarly, the construction of the transmission lines is likely to result in temporary increased noise levels for residents close to the temporary tower site working areas. The increase in noise is likely to result in disturbance and decreased wellbeing for those closest to the construction activities. However, this will be limited to construction hours and sleep disturbance is unlikely assuming construction work will be undertaken during daytime hours.

Project construction will also entail some temporary, localized, ground works that will generate vibrations. Depending on the soil characteristics and on the distance to the nearest building, these activities could produce vibrations for houses in the vicinity. Impacts could range from the level of temporary nuisance and disturbance, up to actual damage to buildings. It should be noted that the minimum allowed distance from a physical structure to the tower position is 10m.

Waste production as a result of the construction activities is unlikely to impact on the health of communities along the route since most of the waste will be placed in the appropriate covered waste containers, and transported periodically to licensed dumpsites, and therefore opportunities for communities to come into contact with waste will be minimal.

KETRACO will reinstate and rehabilitate construction areas including repairing any damage caused as part of the construction activities.

The impacts on environmental health during construction are temporary in nature for the duration of the construction phase. Construction activities and associated vehicular traffic will take place in temporary tower working areas and dirt access roads along the transmission line and close to local settlements. Considering the temporary nature of the works and the sequential approach, the magnitude is considered medium.

Receptor sensitivity is also considered medium as receptors will include children, old people and others that may be susceptible to changes to environmental quality. However, it is noted that the transmission line crosses areas where previous transmission lines have been built in recent years, and related environmental changes might not be unusual for the populations, which may reduce the overall sensitivity of the populations. The impact significance is therefore considered moderate.

**Table 8-44: Pre-Mitigation Impact Assessment**

Impact	Environmental Health				
Impact Nature	Negative	Positive		Neutral	
	Construction activities have the potential to impact on environmental health which may translate into decreased localized air quality and increase in noise emission and associated disturbance.				
Impact Type	Direct	Indirect		Induced	
	Impacts that result from a direct interaction between the Project (i.e. air and noise emissions, vibrations, changes into visual environment and generation of waste) and the population along the transmission lines.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered temporary since it is expected to be limited to the duration of construction activities at each of the temporary tower sites. Note however that the time between each stop may vary, and that machinery and equipment will be left at the sites in between team shifts. Access to these sites will therefore be prohibited during the 18-24 months of construction.				
Impact Extent	Local	Regional		International	
	Impact limited to the Study Area and surrounding access roads connecting to settlements located further away (500m area from the line)				
Impact Scale	The impact is considered medium. Although construction will take place in a phased manner at the different sites, there is the potential for air and noise emissions to extend beyond the immediate tower sites working areas and associated access roads.				
Frequency	The frequency is considered to be occasional or one time at each tower site and associated access roads throughout the 18-24 months construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be medium.				
	Low	Medium		High	

Resource/ Sensitivity	Receptor	Receptor sensitivity is considered medium as receptors may experience disturbance and decreased well-being. Also, although structures inside the 30m footprint corridor will be displaced to maintain security distances to the line, houses located further away may still experience some impacts related to noise and air quality. However, since the transmission line crosses areas where previous transmission lines have been built in recent years, related environmental changes might not be unusual for the populations, which may contribute to reducing the sensitivity of the local people.		
Impact Significance		Negligible	Minor	Moderate
		Considering both the magnitude and receptor sensitivity are medium, the impact on the community health due to environmental changes during construction activities is considered of moderate significance.		

### Potential Interactions with Project Workforce

Indirectly, results of the development activities might affect population growth. It is predicted that the following demographic processes will take place:

1. **In-migration:** People from other areas will move to the area in search of new opportunities. The opportunities may not be directly in the project; they could be in-coming to conduct business as a result of the project.
2. **Presence of temporary workers:** It is not expected that the area will experience substantial labor influx.

Without mitigation, the primary impact of in-migration will be an increase in population, physical expansion of project affected areas and informal development.

1. The potential for unplanned and uncontrolled growth could lead to issues surrounding safety, sanitation and service delivery.
2. Where in-migrants compete directly against local people, especially for unskilled jobs, it may result in tension, and possible aggression, between job seekers within the affected areas, and the country more widely.
3. In-migration can also lead to negative social change and an erosion of cultural values, as migrants bring in different cultural norms and values and attitudes to traditional leadership systems.
4. An influx of in-migrants is likely to lead to an increase in communicable diseases such as TB, HIV/AIDS and other sexually transmitted diseases, exacerbated by increased pressure on health care facilities and the possible introduction of new diseases.
5. Influx of in-migrants is likely to lead to the risk of GBV (SEA and SH).

The Project workforce may be housed in open or closed accommodation camps. Interaction with nearby communities is therefore very likely and could potentially lead to an increased transmission of communicable diseases and sexually transmitted diseases within these communities. This is a particular risk in relation to communities located close to worker camps where the potential for interaction is highest. The exact locations of the workers camps are not confirmed at this stage but are expected to be located near the town centres.

The profile of these diseases will be influenced by the existing diseases profile of communities along the route and the diseases profile of the countries workers are sourced from (in case of international workers). In addition, if opportunistic workers arrive in the area hoping to benefit from employment spin offs this could also impact on the transmission

of communicable diseases. Considering that 85% of the workers will be sourced from urban and peri-urban centres and areas near the transmission line route, communicable diseases of concern are likely to include diarrhoea, respiratory infections, and typhoid fever. Children will be at particular risk of diarrhoeal diseases due to their sanitary behaviours, while the elderly will be at risk of more severe health outcomes as a result of their frailty.

In addition, considering that HIV/AIDS prevalence in Kenya as of 2018 was approximately 4.7% among adults aged 15–49 years old, transmission of HIV may also occur. Since workers may live in open camps, prostitution may also be an issue considering the low levels of employment opportunities, and it is possible that some women in settlements close to the construction camps may resort to prostitution for short term economic gain. There is also a risk of increased pregnancies of young girls that could result in increased school dropouts in the settlements of the Study Area.

Based on the above, interaction between Project workforce and local communities in the Study Area is considered very likely during the construction phase. Receptor sensitivity is considered high as the low levels of employment opportunities might encourage prostitution and transmission of STDs and communicable diseases. This results in a moderate impact significance.

**Table 8-45: Pre-Mitigation Impact Assessment**

Impact	Interaction with Project Workforce					
Impact Nature	Negative	Positive		Neutral		
	The presence of Project Workforce will lead to interaction with the local communities which will potentially result in increased transmission of communicable diseases and sexually transmitted diseases.					
Impact Type	Direct	Indirect		Induced		
	Impacts that result from a direct interaction between the Project workforce and the population along the transmission lines.					
Impact Duration	Temporary	Short Term	Long Term	Permanent		
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).					
Impact Extent	Local	Regional		International		
	Impact limited to the Study Area and nearby urban centres.					
Impact Scale	Camps are open, workers will be free to access surrounding villages and settlements, and interaction is therefore very likely.					
Frequency	The frequency is considered to be continuous throughout the construction phase.					
Impact Magnitude	Positive	Negligible	Small	Medium	Large	
	Based on the parameters above, the magnitude is considered small since work forces is					
Resource/ Sensitivity	Low	Medium		High		
	Receptor sensitivity is considered high. The low levels of employment opportunities might encourage prostitution and transmission of STDs, and children and the elderly are considered particularly vulnerable to the transmission of communicable diseases.					
	Negligible	Minor		Moderate		Major

Impact Significance	Since impact magnitude is considered small and receptor sensitivity is high, the impact on community health due to interactions with the Project Workforce during construction activities is considered of moderate significance.
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### **Mitigation Measures**

The following mitigation measures will be implemented during the construction phase to reduce any impacts on community health and safety.

- KETRACO will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures:
  - Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health and safety impacts.
  - Ensure all workers including contractors and subcontractors undergo pre-employment physical screening and regular health screening.
  - Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements.
  - Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STDs.
  - Undertake awareness creation among the communities on HIV/AIDS and other STDs.
  - Provide access to health care for those injured by its activities.
  - Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a community or house, employ security guards from the local community to prevent trespass.
  - Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.

KETRACO will develop Emergency Preparedness and Response Plans (EPRPs) in cooperation with local emergency authorities and hospitals.

- KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- KETRACO will provide primary health care and first aid at construction camp sites to avoid pressure on local healthcare infrastructures.
- KETRACO will implement a Community Grievance Mechanism.
- KETRACO will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver, and passenger behaviour, use of drugs and

alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations

### **Decommissioning Phase: Community Health and Safety Impacts**

Increased Project-related traffic for site decommissioning will cause change to the environment due to increased noise, decreased air quality, waste handling or disposal, accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities. The Community engagement plans, mechanisms and associated measures used during construction and operation will also be used in this phase.

#### **8.2.2.1.14 Gender-Based Violence**

An influx of in-migrants may also lead to Gender-Based Violence (GBV) (Sexual Exploitation and Abuse (SEA) and Workplace Sexual Harrassment (SEA) in the workplace, although the project is not expected to have a large influx of workers, the in-migration may increase the demand for sex work or the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex. The risk of incidents of sex between laborers and minors, even when it is not transactional, can also increase. The Project may create changes in the project affected communities and can cause shifts in power dynamics between the community members and within households. Male jealousy, a key driver of GBV, can be triggered by labor influx on a project when workers are believed to be interacting with community women. Hence, abusive behavior can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project. Potential resettlement for civil works may equally render women vulnerable to GBV.

### **Mitigation Measures**

The following mitigation measures will be implemented during the pre-construction, construction, operation, and decommissioning phases to mitigate the risk of GBV-SEA/SH.

- KETRACO will extend the Worker Code of Conduct to include guidelines on worker-community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- Community sensitization including disseminating information on GBV (SEA and SH) risks and management protocols.
- Implementing a GBV-SEA/SH management plan to mitigate and respond to GBV cases, including a GRM that is sensitive and confidential.

#### **8.2.2.1.15 Violence Against Children**

The recruitment of children under the age of 18 during the construction of the transmission line and sub- station is a potential risk and considered VAC. Based on current conditions in the sector it is assessed that the risk of child or forced labor is negligible, and already managed through national legislation and the proponent's corporate requirement.

### **Mitigation Measures**

The following mitigation measures will be implemented during the construction phase to reduce any impacts on VAC.

- KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- Preparing and implementing a child protection plan
- Employing persons aged 18+ years (in accordance with the labour laws of Kenya).

#### **8.2.2.1.16 Archaeology and Cultural Heritage Impacts**

Baseline assessments have not identified cultural heritage sites along the proposed transmission line corridor and thus no valuable tangible cultural heritage structures and resources are likely to be impacted by the project. There were no cultural heritage and archaeological sites identified in the area. Further, there are no graves or cemeteries identified during the ESIA study along the transmission line and this is further confirmed by the asset inventory study undertaken during the RAP preparation. During the construction activities there will be the need to improve access to some of the areas for vehicle. The removal of vegetation and opening of road accesses might uncover cultural sites which can only be removed by the appropriate governmental structures and consultation with the traditional authorities. The potential impacts are likely to be temporary and short term and most of these can be avoided during the vegetation removal process. Based on the baseline data it is not expected that the planned activities will result in negative impacts over the existent cultural and archaeological sites. In terms of embedded controls, during the construction phase of the proposed transmission line project the contractor will apply the chance finds procedures as recommended by WB O.P. 4.11.

### **Baseline Conditions**

There are no cultural heritage and archaeological sites identified in the three Counties crossed by the project. The identified archeological and cultural heritage sites are located further away from the proposed transmission line route and thus are unlikely to be affected by the proposed project. There are also no graves along the proposed transmission line.

### **Impact Assessment**

#### **Pre-Construction Phase**

This phase includes design related activities, compensation, and relocation of Project Affected Households due to loss of land, structure, and other assets. The design activities and loss of land and other assets will not lead to any archeological or cultural heritage impacts.

#### **Construction Phase**

During the construction activities there will be the need to improve access to some of the presently remote areas for vehicles and establishment of camps as well as in some inhabited areas. The removal of vegetation and opening of road accesses might uncover illegal grave

sites which can only be removed by the appropriate governmental structures and consultation with the traditional authorities. The potential impacts are likely to be temporary and short term and most of these can be avoided during the vegetation removal process.

Based on the baseline data it is not expected that the planned activities will result in negative impacts over the existent cultural and archaeological sites. In terms of embedded controls, during the construction phase of the proposed transmission line project the contractor will apply the chance finding procedures as recommended by OP 4.09).

This direct impact is temporary, since the impacts will be evident during the vegetation removal and installation of the infrastructure. As there are no grave sites identified within the transmission line RoW the likelihood of these impacts is low. The potential impact, in case illegal grave sites are identified during the vegetation removal process, is direct and negative. The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be negligible.

Based on the analysis provided above, the impact of the project on cultural sites, will be a low negative impact pre-mitigation (Table 8-46).

**Table 8-46: Pre-Mitigation Impact Assessment**

Impact	Cultural Heritage during Construction				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to grave sites during vegetation removal and construction activities				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and potential cultural sites (e.g. grave sites) along the transmission line				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered temporary as grave sites would be identified during the vegetation removal activities				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered to be of negligible scale.				
Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	The receptors can be identified in the early stages of the process (e.g. vegetation removal and opening accesses). The sensitivity is considered low.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is negligible and the sensitivity is low, the overall significance is considered to be of negligible significance.				

## Operation Phase

During the operational phase there are not expected potential impacts on the cultural heritage as a result of the existence of the transmission line. Table 8-47 reflects the non-

applicability of the significance of impacts on cultural heritage during the operation of the transmission line.

**Table 8-47. Pre-Mitigation Impact Assessment**

Impact	Cultural Heritage during Operations				
Impact Nature	Negative	Positive	Neutral		
	There are no expected impacts during operation				
Impact Type	Direct	Indirect	Induced		
	N/A				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	N/A				
Impact Extent	Local	Regional	International		
	N/A				
Impact Scale	The impact is considered to be of negligible scale.				
Frequency	N/A				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	N/A				
Impact Significance	Negligible	Minor	Moderate	Major	
	N/A				

## Mitigation

The following standard mitigation measures will be employed:

- Consult community leaders when any community issue arises in order to engage traditional forms of community leadership.
- Work with local community representatives to develop cultural awareness materials (that will cover key issues including the location and importance of all local cultural sites and other cultural sensitivities (graves).
- Should construction activity be required in proximity to existing graves, develop and implement working protocols in consultation with local traditional leaders.
- Do not remove any cultural heritage including graves without prior consultation to the communities and fulfilling the legal requirements. Any removal of cultural heritage should be conducted by the best available techniques.
- Establish a grievance procedure to ensure community concerns are addressed.
- Develop a chance find procedure which will detail the appropriate course of action that must be followed for any relevant cultural heritage discoveries.

## Residual Impact

The impact significance is negligible after mitigation measures during construction and no impacts are expected during operations (Table 8-48). With the proposed mitigation measures, particularly the development of chance finding procedures the residual negative impacts on cultural resources are assessed to be of a low magnitude.

**Table 8-48: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Damage of grave sites considered important by the local communities	Construction	Negligible	Negligible

#### 8.2.2.1.17 Unplanned Events

The following section presents the assessment of impacts resulting from unplanned or non-routine events and those which are a result of accidents. These are different to impacts that would reasonably be predicted to occur in the normal course of activities (including the application of in-built control measures) during construction and operations. Unplanned and accidental events have the potential to occur during Project activities and therefore the evaluation of impacts for unplanned and accidental event takes into account the likelihood of the event occurring into the impact magnitude. Likelihood is determined as unlikely, possible, or likely based in professional judgement and quantitative information (statistical frequency) where available. Given the nature of Project activities, unplanned and accidental events relate to potential accidental spills of equipment fuel and oils and vehicle traffic accidents. If unplanned and accidental events did occur, there would be effects on the biophysical and social environment. The risks of unplanned and accidental events are described in this section.

#### Potential Impacts to Soil and Surface Water from Spill Events

During construction there is the potential for spills of fuels and oils during construction activities, fuelling, maintenance of machinery and vehicles. Spills could occur in a number of locations along the transmission line RoW footprints. Spills have the potential to affect terrestrial environments and could lead to the deterioration of soil, water and sediment quality. This could lead to knock on effects for flora and fauna and local community users.

#### Impact Assessment

If hazardous materials such as fuel were to be released to the soil and surface water resources, this would be limited to the local extent, depending on the volume spilt and rate of spillage. Within the Project AoI there are surface water resources such as streams which could be impacted if the spill were to occur within proximity of the resource.

#### Likelihood

Incidental spills of fuels are infrequent but do occur; most frequently due to malfunction of handling systems, poor practice of workers and force majeure. Spills are most likely to occur during refilling and transportation of substances. Large releases of hazardous materials are rare and it is considered unlikely that a spill would occur of emergency scale.

#### Significance of Impacts

For impacts to soils, the spatial scale is considered to be local. The impact could be long term and is a direct negative impact. The overall magnitude is considered to be medium. There are areas along the transmission RoW which are used for cultivation and therefore the sensitivity is considered of medium sensitivity. This results in a potential negative impact of Moderate significance (Table 8-49 below).

**Table 8-49: Potential Impacts from Spillages**

Construction Phase	Operation Phase
Soil and surface water degradation due to fuel spills during construction activities (refuelling, maintenance machinery)	Soil and surface water degradation as a result fuel spills due to maintenance activities of the transmission lines.

For surface water, the impact of the spill would be short to medium term as the release of fuel or oil is likely to be a discrete (i.e.: non-continuous) event and the effects on water quality naturally mitigated through dilution and natural attenuation. The magnitude of the impact is considered medium and the potential impact is therefore of Moderate significance (Table 8-50).

**Table 8-50: Pre-Mitigation Impact Assessment**

Impact	Accidental Fuel Spills on Soils				
Impact Nature	Negative		Positive	Neutral	
	Reduction in local soil quality as a result of spillage during maintenance of machinery, improper storage of hazardous materials, spillage during transfers of fuel and general construction activities.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities soil resources along the RoW areas				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is long term due to time for remediation or natural attenuation expected for contaminated soils				
Impact Extent	Local	Regional		International	
	The impact will be limited to the AoI				
Impact Scale	The impact is considered as medium scale. If a spill occurs, it will be locally– usually at a construction site – and not along the whole of the transmission line.				
Frequency	Not Applicable				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered medium				
Resource/	Low		Medium		High
Receptor Sensitivity	While some areas along the RoW are in urban areas other sections include cultivated areas and therefore the significance is medium.				
Impact Significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is medium and the sensitivity is medium the overall significance is considered to be moderate.				

## Mitigations

The following management measures will be implemented in the Project's ESMP:

- The Project will develop a detailed Oil Spill Response Plan (OSRP) which includes community notifications of any significant spills that have the potential to affect communities. The Project will maintain spill clean-up and response capability adequate for addressing spills during all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated, and post remediation verification will be carried out (involving sampling of water and/or soil).

- Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, treated by incineration or removed by an authorised local contractor. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hardstanding surface.
- Hazardous material storage will be on hard standing and impermeable surface and the bulk storage facility will be bunded. The Project will restrict storage and handling of hazardous materials and fuels to bunded areas of sufficient capacity to contain a release.
- Hydrocarbon spill clean-up kits shall be available at all locations where refuelling or maintenance of vehicles and equipment is done, and responsible people shall be trained in the use thereof.

### Residual Impact

The impacts on soils are considered Minor post mitigation, largely because parts of the transmission line occur in cultivated areas and spills of hazardous substances here are likely to have a greater impact than spills in unutilized areas. Based on the surface water context, impacts on surface water will be of Minor significance post mitigation.

**Table 8-51: Residual Impact Significance**

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Reduction in local soil quality	Construction and Operation	Moderate	Minor
Reduction in surface water quality	Construction and Operation	Moderate	Minor

### Potential Impacts to Community Health and Safety

During the transmission line construction and operation phases, unplanned events with the potential to negatively affect human population could occur. Table 7.48 presents the potentially significant unplanned events that may occur during the construction and operation phases.

### Impact Assessment

Stringing activity around the wires and other electrical units can be a potential hazard if proper planning is not followed. The assumption that local workers at times are not accustomed to using personal protective equipment (PPE) should be taken in consideration, i.e. their attitude to avoid PPE may result in accident/hazard. During operation, there is a possibility of lines or towers/parts of the tower failing and causing injuries and/or fatalities. Additionally, during the operation phase, contact with the transmission line can result in electrocution.

### Embedded Controls

The following embedded controls are considered as part of the assessment:

- Contractor team will follow the method statement for overhead stringing; the activities will be managed by experienced Supervisors.
- Implementation of design standards (built in safety), the line hardware used on the overhead transmission lines is rated or designed higher than the conductor ultimate tensile strength and the conductor is only pulled to 20% of its ultimate tensile strength.

The potential impacts are all considered unlikely in that they are not likely to occur during the lifetime of the Project. The significance of the impact associated with stringing activities is summarised in Table 8-52. This is considered a negative event that could lead to permanent impacts if there are injuries and fatalities. The overall impact is considered of Moderate significance.

**Table 8-52: Potential Impacts on Community Health and Safety**

Construction Phase	Operation Phase
Risks during stringing activities.	Dielectric oil release that have the potential to ignite, create fire or explosion and could lead to fatalities. Potential disaster resulting in a transmission line snapping, transmission tower/pylon collapse.

In terms of the impact related to UXO exposure to the communities, it is considered a negative event that could lead to permanent impacts if there are injuries and fatalities. The overall impact is considered of Major significance if unmitigated (Table 8-53).

**Table 8-53: Pre-Mitigation Impact Assessment**

Impact	Risks during Stringing Activities				
Impact Nature	Negative	Positive			Neutral
	Inadequate planning of stringing activities has the potential to impact occupational and community health.				
Impact Type	Direct	Indirect		Induced	
	The community health and welfare of workers and population around the stringing activities could be directly impacted.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Potential impacts are considered to be permanent as they could lead in injuries and fatalities.				
Impact Extent	Local	Regional		International	
	The impact will have a localised extent limited to the transmission lines footprint.				
Impact Scale	The impact is considered as medium scale covering the length of the transmission lines.				
Likelihood	Unlikely because it is not likely to occur during the lifetime of the project.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above, the event is considered to have a Medium magnitude.				
Resource/ Receptor Sensitivity	Low	Medium		High	
	Sensitivity of receptor considered as Medium.				
Impact	Negligible		Minor	Moderate	Major

Significance	Considering the magnitude is medium as well as the sensitivity, the impact on the community health and welfare is considered to be of moderate significance.
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Table 8-54 summarizes the potential impact associated with transmission line snapping or pylon collapse. The negative impact is a direct impact, which while regional in its extent, could lead to permanent impacts and therefore has a large magnitude. The risk is influenced by poor foundation quality, tower member theft, material corrosion due to poor coating and poor quality or damaged fittings exposing the system to failure. The receptor sensitivity is considered high as there are households (residential structures with no business structures) within the transmission line RoWs in the areas close to urban and peri-urban area. This is therefore considered as a Major significant impact, which is unlikely to occur during the lifetime of the Project. In the rural areas, due to the fact that the transmission line routing was mostly designed far from the existing communities the receptor sensitivity is considered low but with medium significance.

**Table 8-54: Pre-Mitigation Impact Assessment**

Impact	Risks during Stringing Activities				
Impact Nature	Negative	Positive	Neutral		
	Injuries or fatalities to community members or workforce.				
Impact Type	Direct	Indirect	Induced		
	The community health and welfare of workers and population around the construction areas could be directly impacted.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Potential impacts are considered to be permanent as they could lead in injuries and fatalities.				
Impact Extent	Local	Regional	International		
	The impact will have a localised extent limited to the transmission lines footprint.				
Impact Scale	The impact is considered as medium scale covering the length of the transmission lines.				
Likelihood	Possible given the high incident of UXOs in the region.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the potential for fatalities, the event is considered to have a Large magnitude.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	Sensitivity of receptor considered as Medium.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the risk of fatalities. the impact on the community health and welfare (and workforce) is considered to be of Major significance if unmitigated.				

## Mitigations

The following mitigation measures will be employed to reduce any impacts resulting from a potential unplanned event:

- Stringing activities near wires and other electrical utilities will be done after proper shutdown of the line/utilities with prior information and permission.
- Making sure that temporary soil stockpiles are safely stored, with controlled access.

- An Emergency Prevention and Response Plan (EPRP) will be developed according to international industry standards and best practices.
- The EPRP will be developed in consultation with the competent authorities, emergency service and administrations along the transmission routes.
- Based on consultations with relevant stakeholders, KETRACO will investigate the capacity of statutory local emergency response providers to participate in emergency response activities.
- Personnel will be trained on how to respond to unplanned events.
- Periodic audits will be performed in order to ensure the safeguards are in place.
- Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower.
- Once the stringing work is complete, notices and permanent anti-climbing devices will be installed on the tower (in particular in lattice towers). The operational start date for electricity transmission and safety implications will be publicized locally in advance.
- In addition, the risk of the transmission line spanning, or pylon collapse can be mitigated through complying with design specifications, installing anti-theft devices, conducting material quality inspection and compliance, and following KETRACO's installation procedures.

**Table 8-55: Pre-Mitigation Impact Assessment**

Impact	Potential Disaster Resulting in Transmission Line Snapping and/or Transmission Tower/Pylon Collapse				
	Negative	Positive		Neutral	
Impact Nature	An unplanned event leading to the snapping of the transmission lines or collapse of transmission towers or parts of it has the potential to impact on community health and welfare.				
	Construction and operation	Moderate		Minor	
Impact Type	Direct	Indirect		Induced	
	The community health and welfare of population around the transmission lines could be directly impacted.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts on community health and wellbeing are considered to be permanent as they could lead in injuries and fatalities.				
Impact Extent	Local	Regional		International	
	The impact will have a localized extent limited to the areas surrounding the transmission lines – more acute close to urban and peri/urban areas				
Impact Scale	The impact is considered as medium scale.				
	Unlikely because the event is not likely to occur during the lifetime of the project.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above, the event is considered to have a Large magnitude.				
Resource/ Receptor Sensitivity	Low	Medium		High	
	Sensitivity of receptor considered as High, considering that significant portions of the transmission lines routes cross dense residential areas.				
	Negligible	Minor		Moderate	Major

Impact Significance	Considering the magnitude is large and the sensitivity high, the impact on the community health and welfare in case of transmission line snapping or transmission tower/pylon collapse is considered to be of major significance in the urban areas with crowded settlements and moderate significance in the rural areas. It should be noted that although this event is unlikely to occur it has a great consequence since the majority of the transmission line crosses urban areas.
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## Seismic Hazards

The location of the proposed transmission line project generally exhibits low seismic hazards as shown in the Figure 5-4. The measure of seismic risk is defined by Probabilistic Ground Acceleration (PGA) which is the maximum acceleration of the ground shaking during an earthquake. The PGA for an earthquake along the transmission line route is in the range of 0.2 – 0.8m/s.

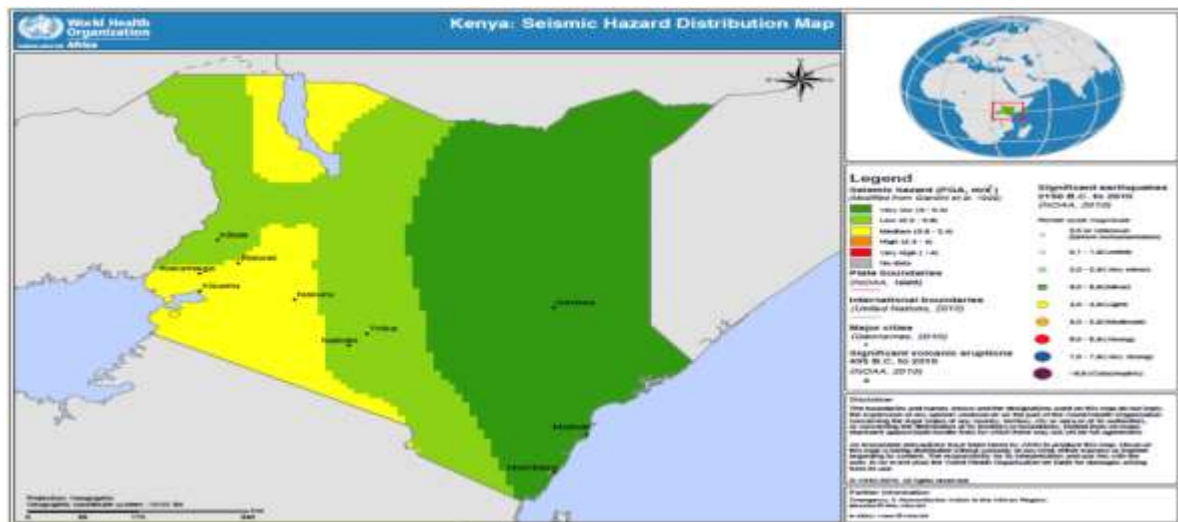


Figure 8-6: Seismic Hazard Distribution Map

### 8.2.3 Cumulative Impacts

Effects of an action, project, or activity (collectively referred to in this document as “developments”) when added to other existing, planned, and/or reasonably anticipated future ones (IFC, 2013). The potential for cumulative impacts within the Project AoI is considered low as no significant urban developments are expected to occur as a direct cause of the project - the future transmission line will boost energy provision to the three counties of Nakuru, Nyandarua and Laikipia. Consequently, is not likely to result in increased traffic activity in the AoI, increased pressure on waste management facilities and accidental events such as spillages or uncontrolled releases. Cumulative impacts are considered to be Project impacts that act with impacts from other projects such that:

- Sum of the impacts is greater than the parts; or
- Sum of the impacts reaches a threshold level such that the impact becomes significant.

The overall approach is summarized in Figure 8-7 below, as outlined in the IFC Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (Source: [www.ifc.org](http://www.ifc.org) 18/06/2020).

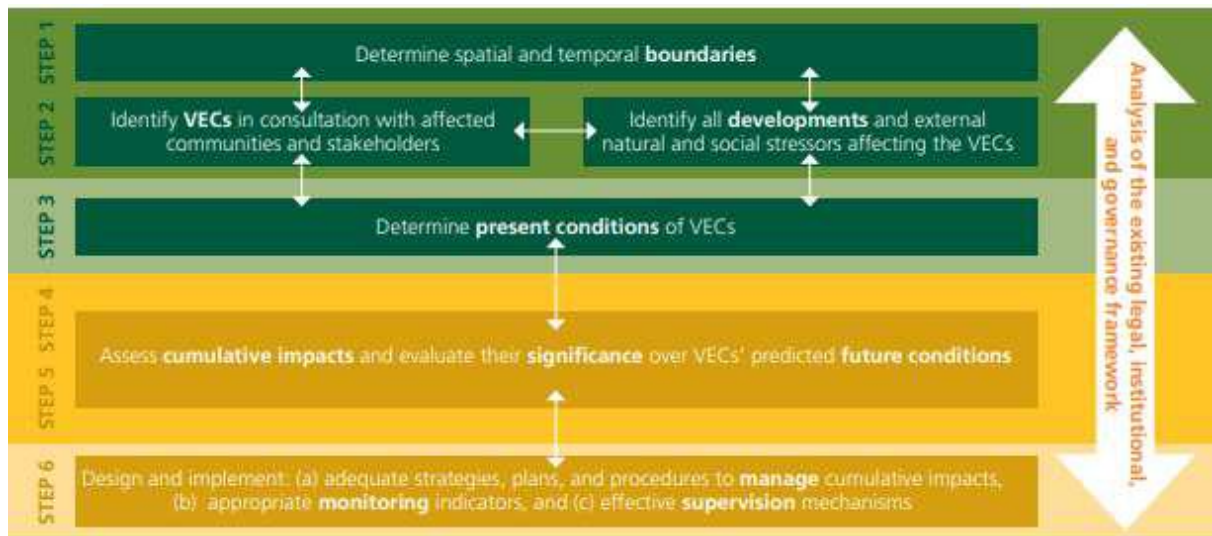


Figure 8-7: Cumulative Impact Approach

Due to the inherent uncertainties in the nature of cumulative impacts, the CIA has by necessity been performed in a qualitative manner, but still provides useful context for determining the significance of the Project's contribution to the overall impacts. Because all of Project predicted residual adverse impacts are of **Minor** or **Negligible** significance, only a high-level CIA has been carried out, on the basis that the potential significant cumulative effects is low. Upon assessment of the project impacts, the cumulative impact assessment will focus impacts on Atmospheric Air quality, Noise Levels, Water quality and use.

#### 8.2.3.1 Air Quality

It is expected that air quality will be impacted due to cumulative impacts of additional machines and vehicles along the project RoW. The only source for air pollution from the Transmission Line construction shall be the excavation which shall be carried out during benching and foundation work. However, with only about 9mx9m area to be excavated, the amount of dust generated will be minimal. The other sources of air contaminants will be from the additional worker camps where wood and kerosene may be the main fuel for cooking and heating, especially since these camps will be located away from access roads and LPG or electricity will not be readily available. The net impact of the Project on Air Quality is **small** and **transient**, because air pollution will be generated at the sporadically spread worker camps and along the highway and will be limited to the pre-construction and construction period.

#### 8.2.3.2 Noise Impacts

It is expected that the noise levels will be impacted due to cumulative impacts of additional construction machines, vehicles and general construction activities along the RoW given the noise levels of the machines used. The net impact of the Project on Noise Levels is **small** and **transient**, because noise will be generated at the construction sites of the stainless-steel pylons and along the highway and will be limited to the pre-construction and construction period.

#### **8.2.3.3 Water Resources Demand**

Depending on the number of workers deployed at the construction locations of the Transmission Line and in line with the World Health Organization (WHO) requirement that 50 to 100 liters of water per person per day is needed to ensure that most basic needs are met and few health concerns arise. About 300 litres/day of water shall also be used in concrete works, concreting shall be done only for laying foundation for the stainless-steel pylon tower. About 50 liters of water will be also required for sprinkling on to the area of excavation to suppress dust. This shall only be required during the excavation at pylon foundation. The net impacts of the Project activities on water resources is **small** and **transient** because the only use of water for construction of the TL is to serve for domestic purposes. Water use has been calculated for the peak construction period and could be considerably lower than the estimated quantity depending on number of workers at each site.

#### **8.2.3.4 Socioeconomic Parameters**

With regard to socioeconomic parameters, if a project activity causes a negative impact in one parameter that can be compensated by an overall positive development impact, then the impact can usually be considered to be acceptable. The major socio-economic impact is the land acquisition along the RoW, this is mitigated by compensation and livelihood restoration for all persons affected by the project.

## 9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project and possible mitigation measures. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected. In accordance with best practice, the analysis includes issues relating to the project's environmental and social sustainability.

### 9.1 Mitigation Measures

#### Mitigation Hierarchy for the Planned Project Activities

**Avoid at source: Reduce at source**

Avoiding or reducing at source is essentially “designing” the project so that a feature causing an impact is designed out (e.g., a Transmission line re-routed) or altered (e.g., reduced working width). Often this is called minimization.

**Abate on site**

This involves adding something to the basic design to abate the impact for example, pollution controls fall in this category. This is often called end-of-pipe.

**Abate at receptor**

If an impact cannot be abated on-site, then measures can be implemented off-site an example of this would be to install double-glazed windows to minimize the impact of noise at a nearby residence.

**Repair or Remedy**

Some impacts involve unacceptable damage to a resource, e.g., agricultural land during transmission line construction. Repair essentially involves restoration and re-instatement type measures.

### 9.2 Pre-Construction

The majority of mitigation measures and in particular mitigations to protect and enhance the physical environment are most effectively incorporated during the design phase. There are five key elements:

- Development of sustainable designs with the lowest possible environmental impact within the constraints of the project funding and the socio-economic setting.
- Incorporate the recommendations and requirements of the ESMP to be an integral part of the Bidding and Contract Documents thereby building in enforceable measures to protect the environmental and social matters throughout the construction phase.
- Development of stakeholder engagement plan or procedures
- Provide adequate grievance redress procedures to address the concerns of local people and stakeholders to ensure satisfactory resolution of any grievance arising from the project.

- Ensure adequate and fair compensation for involuntary resettlement for any party suffering inconvenience, financial or loss of livelihood due to being moved to accommodate the works, principally the construction of the transmission line.

For each of the identified impacts, mitigation measures have been suggested in accordance with a general rule defining mitigation criteria as:

1. Avoidance of major impacts: major impacts are generally considered unacceptable, ones that would endure in the long-term or extend over a large area;
2. Reduction of major and moderate impacts to as low as reasonably practicable (ALARP) by planning, designing and controlling mitigation measures. This implies that mitigation measures will be applied until the limitations of cost effectiveness and practical application have been reached. The limitations are established by international practice;
3. Implementation of good practices for impacts rated as minor, in order to ensure that impacts are managed within good reason.

There will only be localized short-term impacts during construction due to the implementation of the civil works. Impacts have been addressed at the design stage by choosing engineering solutions that, as far as is possible, minimize the impacts during construction and operational phase. The impacts which could not be eliminated by the design, mostly impacts during construction, will be reduced or eliminated by mitigation and monitoring measures specified in the ESMP. These construction related impacts can be mitigated by (i) the contractors' work practices, especially those related to maintenance of access, methods of trench excavation, the storage of construction materials and cleanliness of the work sites; (ii) cooperation by the local authorities with the contractor in terms of traffic management and use of public space and utilities; (iii) project management's strict enforcement of the correct construction practices and standards; (iv) the incorporation of the mitigation measures identified in the ESIA into the bid documents and specifications; (v) public awareness including liaison at ward level shortly in advance of work in each work location; and (vi) close monitoring of the contractor's implementation of the required mitigation measures. Environmental impacts and proposed mitigation measures during project pre-construction, construction, operation, and decommissioning phases are described in the following sections.

### 9.3 Environmental and Social Management Plan

The ESIA includes an ESMP which details the mitigation measures, environmental monitoring activities, institutional responsibilities, and environmental management capacity building. The relevant ESMP provisions are included in bid documents for contractors. During construction, the project management team will closely monitor the works contractors' environmental performance and overall ESMP implementation.

**Table 9-1. Environmental and Social Management Plan**

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>Pre-Construction Phase</b>				
<b>Land Acquisition and Involuntary Displacement</b>	<p>-Permanent and temporary loss of assets (land, structures, and crops), livelihoods and household income as a result of temporary land take.</p> <p>-Displacement of physical structures and physical resettlement. Acquisition of land for contractor facilities and workers camps.</p>	<p>Preparation and implementation of the RAP, including any livelihoods restoration measures, as applicable.</p> <ul style="list-style-type: none"> <li>▪ Avoiding or minimizing the number of towers sites working areas in agricultural areas or areas of community resources.</li> <li>▪ Minimizing clearance of maintenance road as in some cases clearance may not be necessary since other access roads are available.</li> <li>▪ Minimizing as far as possible tree cut-off and tree trimming in the temporary tower sites working areas.</li> </ul> <p>KETRACO and contractors will ensure that land for contractor facilities, and workers camps is acquired in line with the provisions of the RPF. In addition, contractors will ensure that all agreements regarding land acquisition for their facilities and restoration after use are entered with the respective communities and adhered to by the contractor.</p> <p>Undertake specific ESIAS for sub-station sites, contractor facilities, and workers camps once the exact locations have been ascertained.</p> <p>Both men and women are equally engaged throughout the RAP implementation process.</p>	<p>552,307,790.08</p> <p>Excluding the cost for acquiring land for contractor facilities, workers camps.</p>	<p>KETRACO</p> <p><b>CONTRACTOR</b></p>
Gender-based violence (SEA and SH) and other forms of GBV at the community/family level.	<p>Sexual exploitation and abuse of community members by project workers (SEA) and sexual harassment amongst workers (SH).</p> <p>Other forms of Gender-based violence e.g.,</p> <ul style="list-style-type: none"> <li>-Forced Early Marriages</li> <li>-Transactional sex.</li> <li>-Domestic violence.</li> </ul>	<p>KETRACO will</p> <p>Implement a SEA/SH Action Plan.</p> <p>Extend the Worker Code of Conduct to include guidelines on worker – community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. The workers code of conduct will be signed by all with physical presence on site and in the project area.</p> <p>Where other forms of GBV are reported to the project, establish a link between KETRACO activities or operations with, GBV cases at the community/family level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively.</p>	1,000,000	Ketraco Contractor

Table 9-2. Environmental and Social Management Plan

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>Construction Phase</b>				
<b>A1. Construction Air Impacts</b>	Impact on sensitive receptors	<b>A1-1:</b> Develop a Dust Management Plan; <b>A1-2:</b> Record all dust and air quality complaints, identify cause(s), take appropriate measures <b>A1-3:</b> Liaise with local communities to forewarn of potentially dusty activities; <b>A1-4:</b> Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring <b>A1-5:</b> Undertake inspections to ensure compliance with the Dust Management Plan; <b>A1-6:</b> Plan potentially dusty activities so that these are located as far from receptors as feasible <b>A1-7:</b> Erect solid screens if feasible around stockpiles and concrete batching; <b>A1-8:</b> Avoid run off of mud and water and maintain drains in a clean state; <b>A1-9:</b> Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; <b>A1-10:</b> Impose speed limits on haul routes and in construction compounds to reduce dust generation; <b>A1-11:</b> Minimise drop heights when loading stockpiles or transferring materials; and <b>A1-12:</b> Avoid waste or vegetation burning.	Contractors' Cost	Contractor
	Impact on workers' health and safety			
	Impact on community health and safety			
	Impact on flora and fauna			
		For traffic on unpaved roads: <b>A1-13:</b> Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and <b>A1-14:</b> On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.	Contractors' Cost	Contractor
		<b>For earthworks:</b> <b>A1-15:</b> Revegetate exposed areas as soon as feasible <b>A1-16:</b> Revegetate or cover stockpiles if feasible; <b>A1-17:</b> Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<p><b>For track out:</b>  <b>A1-18:</b> Where track out is onto paved roads, use wet road cleaning methods to remove dirt and mud build up;  <b>A1-19:</b> Avoid dry sweeping of large areas; and  <b>A1-20:</b> Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.</p>	Contractors' Cost	Contractor
<b>A2. Noise and Vibration Impacts</b>	Impact on sensitive receptors	<b>A2-1:</b> Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (e.g. site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable;	Contractors' Cost	Contractor
	Impact on workers' health and safety	<b>A2-2:</b> Where practicable noisy equipment will be orientated to face away from the nearest NSRs;		
	Impact on community health and safety	<b>A2-3:</b> Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only;		
	Impact on fauna	<b>A2-4:</b> Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;	Contractors' Cost	Contractor
		<b>A2-5:</b> Where practicable, stationary equipment will be located in an acoustically treated enclosure	Contractors' Cost	Contractor
		<b>A2-6:</b> For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals;	Contractors' Cost	Contractor
		<b>A2-7:</b> Throttle settings will be reduced, and equipment and plant turned off, when not being used; <b>A2-8:</b> Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and <b>A2-9:</b> Fitting of mufflers or silencers of the type recommended by manufacturers	Contractors' Cost	Contractor
<b>A3. Soil erosion and contamination impacts</b>	Impacts on water quality (sediment run-off/contamination)	<b>A3-1:</b> Vegetation clearing, and topsoil disturbance will be minimized. <b>A3-2:</b> Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion;	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	<p>leading to deterioration of quality.</p> <p>Deteriorated water quality will impact on fauna if consumed.</p> <p>Deteriorated water quality will impact on community health if consumed.</p>	<p><b>A3-3:</b> Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means.</p> <p><b>A3-4:</b> Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season.</p> <p><b>A3-5:</b> Topsoil shall be evenly spread across the cleared areas when reinstated.</p> <p><b>A3-6:</b> Accelerated erosion from storm events during construction shall be minimised through managing storm water runoff (e.g. velocity control measures).</p> <p><b>A3-7:</b> Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. Material (e.g. fuel or chemicals).</p> <p><b>A3-8:</b> Spread mulch generated from indigenous cleared vegetation across exposed soils after construction.</p>		
<b>A4. Surface Water Quality Impacts</b>	<p>Impacts on water quality (sediment run-off/contamination) leading to deterioration of quality.</p> <p>Deteriorated water quality will impact on fauna if consumed.</p> <p>Deteriorated water quality will impact on community health if consumed.</p>	<b>A4-1:</b> Activities shall be conducted >100m away from water bodies, except where crossings are required.	Contractors' Cost	Contractor
		<b>A4-2:</b> All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment;	Contractors' Cost	Contractor
		<b>A4-3:</b> Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan. Park vehicles preferably on paved platforms	Contractors' Cost	Contractor
<b>A5. Impact on Flora and Vegetation</b>	<p>Loss of biodiversity.</p> <p>Fragmentation of habitat.</p>	<b>A5-1:</b> Avoidance of impacts should be prioritized. , it is strongly recommended to closely/re-route follow the main road along these transmission-line segments. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary.	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>A5-2:</b> Rivers, watercourses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing;	Contractors' Cost	Contractor
		<b>A5-3:</b> Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary;	Contractors' Cost	Contractor
		<b>A5-4:</b> There should be no deviation from the access road position without prior discussions with the authorities;	Contractors' Cost	Contractor
		<b>A5-5:</b> Firewood collection by the project's employees should be strictly forbidden.		
		<b>A5-6:</b> Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants – construction of new camps is unlikely to happen;	Contractors' Cost	Contractor
		<b>A5-7:</b> Materials (e.g. pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and	Contractors' Cost	Contractor
		<b>A5-8:</b> Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible	Contractors' Cost	Contractor
<b>A6. Impact on Fauna</b>	-Disturbance due to noise, vibrations and vehicle presence.	<b>A6-1:</b> All areas disturbed by construction activities shall be landscaped and rehabilitated;	Contractors' Cost	Contractor
		<b>A6-2:</b> Vegetation that does not grow high enough to cause interference with the overhead power lines, or cause a fire hazards, should not be trimmed or cut unless it is growing in the road access area <b>A6-3:</b> Speed of project vehicles should be controlled at a maximum limit of 40 km/h to minimise roadkill <b>A6-4:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<p><b>A6-5:</b> Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.</p> <p><b>A6-6:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)</p>	Contractors' Cost	Contractor
<b>A7. Impact on Avifauna</b>	-Disturbance due to noise, vibrations and vehicle presence.	<b>A7-1:</b> In the event of receiving confirmation of regular bird strikes along the transmission line, high-visibility markers should be installed to make the lines more visible to birds, to reduce the risk of collision;	Contractors' Cost	Contractor
		<b>A7-2:</b> Where feasible and safe, provide artificial bird-safe perches and nesting platforms placed at a safe distance from the energized parts of transmission infrastructure	Contractors' Cost	Contractor
		<b>A7-3:</b> Cross-arms, insulators and other parts of the power lines can be constructed such that there is no space for birds to perch where they can come into contact with energized wires	Contractors' Cost	Contractor
		<b>A7-4:</b> Undertake regular (at least annual) monitoring of the transmission line for evidence of birds nesting on the pylons. In the event of nesting, anti-perch and nest devices will be installed to discourage birds from regularly visiting these structures. These will be replaced when necessary;	Contractors' Cost	Contractor
		<b>A7-5:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	Contractors' Cost	Contractor
		<b>A7-6:</b> All animal dens in close proximity to the work areas must be marked as no go areas.	Contractors' Cost	Contractor
		<b>A7-7:</b> Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.		Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>A8: Solid and Liquid Waste Impacts</b>	<ul style="list-style-type: none"> <li>-Impact on storm water quality and thus water quality in the water bodies in project areas</li> <li>-Impact on soil quality</li> <li>-Impact on surface water quality;</li> <li>-Impact on ground water quality; and</li> <li>-Impact on ecological receptors or human health</li> </ul>	<b>A8-1:</b> The Contractor should prepare a Solid Waste Management Plan.	Contractors' Cost	Contractor
<b>A9. Access to Infrastructure and Services</b>	<ul style="list-style-type: none"> <li>-Disruption of transit routes</li> <li>-Disruption of normal traffic operations</li> <li>-Wastes from the camp site could be significant and overburden the existing wastes disposal facilities in the area</li> </ul>	<p><b>A9-1:</b> Methods will be implemented to maintain open, clear and transparent communication with the local communities regarding the use of local infrastructures by the Project throughout the different phases.</p> <p><b>A9-2:</b> Engagement with the relevant authorities is recommended in order to avoid damage to common property and minimize access disruption to education and healthcare facilities</p> <p><b>A9-3:</b> Community Grievance Mechanism will be implemented.</p> <p><b>A9-4:</b> A Traffic Management Plan shall be issued before earth movements and construction start in order to minimize traffic disruptions</p> <p><b>A9-5:</b> Where temporary closure of road is required, alternative access to property will be ensured and local solutions including diversions will be implemented to ensure uninterrupted mobility.</p>	Contractors' Cost	Contractor
<b>A10: Landscape &amp; Visual amenities risks</b>	<ul style="list-style-type: none"> <li>-Impacts on aesthetics of the surroundings with the possibility to affect the neighbouring residents.</li> </ul>	<p><b>A10-1:</b> Any excavated or cut and fill areas will be landscaped and revegetated;</p> <p><b>A10-2:</b> No debris or waste materials will be left at the work sites, good housekeeping on site to avoid litter and minimise waste</p> <p><b>A10-3:</b> Towers and structures should have a non-reflective finish;</p> <p><b>A10-4:</b> Night lighting of sites should be minimized within requirements of safety and efficiency;</p>		Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>A10-5:</b> Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor;		
<b>A11: Worker's Health and Safety and Workers Management</b>	-Workers are likely to be exposed to work related risks during the construction phase of the project.	<b>A11-1:</b> KETRACO will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc.	Contractors' Cost	Contractor
		<b>A11-2:</b> KETRACO will require its contractors and subcontractors to put in place policies in line with national legislation and applicable international legislation and KETRACO Code of Conduct and Policies.	Contractors' Cost	Contractor
		<b>A11-3:</b> KETRACO will establish contractual clauses to be embedded in the contracts of the EPC and all sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights and providing the contractor and KETRACO with the right of audit.	Contractors' Cost	Contractor
		<b>A11-4:</b> Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting a pre-employment medical assessment include a safer working environment, reduction in workplace injuries, minimised downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.		Contractor
		<b>A11-5:</b> KETRACO will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities.		
		<b>A11-6:</b> KETRACO will implement regular health and safety checks and audits of Workers, contractors and subcontractors and implementing sanctions in case of breaches of nationals		
		<b>A11-7:</b> KETRACO will develop and implement a Workers Grievance Mechanism for the Project workforce including contractors and subcontractor's standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards.		
		<b>A11-8:</b> KETRACO will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks.		

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<p><b>A11-9</b> KETRACO will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents.</p> <p><b>A11-10:</b> KETRACO will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE.</p> <p><b>A11-11:</b> KETRACO will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation.</p> <p><b>A11-12:</b> KETRACO will provide condoms (male and female to workers</p>		
<b>A12: Community Health and Safety Impacts</b>	<p>-Increased noise decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, debris and movement of heavy equipment may pose a safety risk to the public.</p> <p>-Potential impacts on community safety, in particular road accidents, trespass on the sites, and demining activities potentially resulting in accidents leading to injuries or fatalities.</p> <p>~ Environmental health: changes to the environment due to increased noise and vibrations, decreased air</p>	<p><b>A12-1:</b> KETRACO will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures:</p> <ul style="list-style-type: none"> <li>• Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health and safety impacts.</li> <li>• Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements.</li> <li>• Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STDs.</li> <li>• Undertake community awareness on HIV/AIDS and other STDs</li> <li>• Ensure that COVID-19 protocols and guidelines by GoK's Ministry of Health are adhered to during the construction activities including social distancing, provision of face masks to all workers, provision of sanitizers, establishment of hand washing areas and provision of water and soap, conducting temperature checks for all workers, creating awareness on signs and symptoms of COVID-19, encouraging staff to take COVID-19 tests if symptoms associated with the same are exhibited, liaising with GoK to offer vaccination for workers.</li> <li>• Provide access to health care for those injured by its activities.</li> <li>• Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a</li> </ul>	Contractors' Cost	Contractor
				Contractor
				Contractor
				Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	<p>quality and, inadequate management of waste.</p> <p>~ Impact from workers presence and potential interaction with local populations</p>	<p>community or house, employ security guards from the local community to prevent trespass.</p> <ul style="list-style-type: none"> <li>Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.</li> </ul>		
		<p><b>A12-2:</b> KETRACO will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals.</p> <ul style="list-style-type: none"> <li>KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.</li> <li>KETRACO will provide primary health care and first aid at construction camp sites to avoid pressure on local healthcare infrastructures.</li> <li>KETRACO will implement a Community Grievance Mechanism.</li> <li>KETRACO will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations</li> </ul>	Contractors' Cost	
<b>A13: Gender-based violence (SEA and SH) and other forms of GBV at the community/family level.</b>	<p>Sexual exploitation and abuse of community members by project workers (SEA) and sexual harassment amongst workers (SH).</p> <p>Other forms of Gender-based violence e.g.,</p> <ul style="list-style-type: none"> <li>-Forced Early Marriages</li> <li>-Transactional sex.</li> <li>-Domestic violence.</li> </ul>	<p><b>A13-1:</b> Implement a SEA/SH Action Plan.</p> <p>Extend the Worker Code of Conduct to include guidelines on worker – community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. The workers code of conduct will be signed by all with physical presence on site and in the project area.</p> <p>Where other forms of GBV are reported to the project, establish a link between KETRACO activities or operations with, GBV cases at the community/family level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively.</p>	Contractors' Cost	Contractor KETRACO

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>A14: Violation of children rights by contractor and labour force on site</b>	-Violation of children rights by contractor and labour force on site (e.g., child labour, sexual relations with minors etc.)	<b>A14-1:</b> KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. <b>A 14-2:</b> Prepare and implement a child protection strategy <b>A14-3:</b> Prepare and implement a child protection plan and monitoring the employment register, <b>A14-4:</b> Employing persons aged 18+ years	Contractor's cost	Contractor
<b>A15: Archaeology and Cultural Heritage Impacts</b>	-Restriction to access cultural sites.  -Destruction of cultural sites during construction or operations	<b>Avoid damage to, relocation of or restricting access to physical, cultural resources.</b> <b>A15-1:</b> Consult community when any community issue arises to engage traditional forms of community leadership. Develop stakeholder engagement procedures to guide consultations. <b>A15-2:</b> Work with local community representatives to develop cultural awareness materials (that will cover key issues including the location and importance of all local cultural sites and other cultural sensitivities (graves). Develop stakeholder engagement procedures to guide consultations. <b>A15-3:</b> Should construction activity be required in proximity to existing graves, develop and implement working protocols in consultation with local traditional leaders. Develop stakeholder engagement procedures to guide consultations. <b>A15-4:</b> Do not remove any cultural heritage including graves without prior consultation to the communities and fulfilling the legal requirements. Any removal of cultural heritage should be conducted by the best available techniques. <b>A15-5:</b> Establish a grievance procedure to ensure community concerns are addressed. <b>A15-6:</b> Develop a chance find procedure which will detail the appropriate course of action that must be followed for any relevant cultural heritage discoveries.	Contractors' Cost	Contractor
<b>A16: Vulnerable individuals and households e.g., the elderly, female-headed households,</b>	Exclusion from accessing project benefits and opportunities, and non-participation in	<b>A16-1:</b> The project will provide targeted interventions to vulnerable individuals and households to enable them to participate in the project effectively and access project benefits and opportunities.	3,000,000	Contractor/ Ketraco

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
the poor, single women, PWD etc.	stakeholder engagement sessions.			
<b>A17: Unplanned Events</b>	-Impacts to soil and surface water from spill events	<p><b>A17-1:</b> Develop a detailed Oil Spill Response Plan (OSRP) which includes community notifications of any significant spills that have the potential to affect communities.</p> <p><b>A17-2:</b> Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground.</p> <p><b>A17-3:</b> Hazardous material storage will be on hard standing and impermeable surface and the bulk storage facility will be bunded.</p> <p><b>A17-4:</b> Hydrocarbon spill clean-up kits shall be available at all locations where refuelling or maintenance of vehicles and equipment is done, and responsible people shall be trained in the use thereof.</p>	Contractors' Cost	Contractor

Table 9-3. Environmental and Social Management Plan

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>Operations and Maintenance Phase</b>				
<b>B1. Air pollution Impacts</b>		<p><b>B1-1:</b> Develop a Dust Management Plan;</p> <p><b>B1-2:</b> Record all dust and air quality complaints, identify cause(s), take appropriate measures</p> <p><b>B1-3:</b> Liaise with local communities to forewarn of potentially dusty activities;</p> <p><b>B1-4:</b> Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring</p> <p><b>B1-5:</b> Undertake inspections to ensure compliance with the Dust Management Plan;</p> <p><b>B1-6:</b> Plan potentially dusty activities so that these are located as far from receptors as feasible</p> <p><b>B1-7:</b> Erect solid screens if feasible around stockpiles and concrete batching;</p> <p><b>B1-8:</b> Avoid run off of mud and water and maintain drains in a clean state;</p> <p><b>B1-9:</b> Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible;</p> <p><b>B1-10:</b> Impose speed limits on haul routes and in construction compounds to reduce dust generation;</p> <p><b>B1-11:</b> Minimise drop heights when loading stockpiles or transferring materials; and</p>	1,500,000	KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>B1-12:</b> Avoid waste or vegetation burning.		
		For traffic on unpaved roads: <b>B1-13:</b> Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and <b>B1-14:</b> On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.	3,000,000	KETRACO
		For earthworks: <b>B1-15:</b> Revegetate exposed areas as soon as feasible <b>B1-16:</b> Revegetate or cover stockpiles if feasible; <b>B1-17:</b> Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow	1,000,000	KETRACO
		For track out: <b>B1-18:</b> Where track out is onto paved roads, use wet road cleaning methods to remove dirt and mud build up; <b>B1-19:</b> Avoid dry sweeping of large areas; and <b>B1-20:</b> Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.	2,000,000	KETRACO
<b>B2. Noise Emissions and Vibration Impacts</b>	Intermittent noise from high voltage overhead power transmission lines can generate noise by a phenomenon known as 'corona discharge'	<b>B2-1:</b> Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (e.g. site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; <b>B2-2:</b> Where practicable noisy equipment will be orientated to face away from the nearest NSRs; <b>B2-3:</b> Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only;	2,000,000	KETRACO
		<b>B2-4:</b> Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;	N/A	KETRACO
		<b>B2-5:</b> Where practicable, stationary equipment will be located in an acoustically treated enclosure	N/A	KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>B2-6:</b> For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals;	N/A	KETRACO
		<b>B2-7:</b> Throttle settings will be reduced, and equipment and plant turned off, when not being used; <b>B2-8:</b> Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and <b>B2-9:</b> Fitting of mufflers or silencers of the type recommended by manufacturers	Part of costs above	KETRACO
<b>B3. Soil erosion and contamination impacts</b>	~ Minimal or no soil erosion	<b>B3-1:</b> Vegetation clearing, and topsoil disturbance will be minimized. <b>B3-2:</b> Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion; <b>B3-3:</b> Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means. <b>B3-4:</b> Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season.	2,500,000	KETRACO
		<b>B3-5:</b> Topsoil shall be evenly spread across the cleared areas when reinstated. <b>B3-6:</b> Accelerated erosion from storm events during construction shall be minimised through managing storm water runoff (e.g. velocity control measures).	Part of costs above	KETRACO
		<b>B3-7:</b> Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. Material (e.g. fuel or chemicals).	Part of above cost	KETRACO
		<b>B3-8:</b> Spread mulch generated from indigenous cleared vegetation across exposed soils after construction.	Part of above cost	KETRACO
<b>B4. Surface Water Quality Impacts</b>	-Minimal or no water pollution	<b>B4-1:</b> Activities shall be conducted >100m away from water bodies, except where crossings are required.	500,000	KETRACO
		<b>B4-2:</b> All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment;	Part of above cost	KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>B4-3:</b> Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan. Park vehicles preferably on paved platforms	Part of above cost	KETRACO
<b>B5. Impact on Flora and Vegetation</b>	~No Large impact on existing flora and vegetation.	<b>B5-1:</b> Avoidance of impacts should be prioritized. It is strongly recommended to closely/re-route follow the main road along these transmission-line segments. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary.	500,000	KETRACO
		<b>B5-2:</b> Rivers, watercourses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing;	Part of above cost	KETRACO
		<b>B5-3:</b> Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary;	Part of above cost	KETRACO
		<b>B5-4:</b> There should be no deviation from the access road position without prior discussions with the authorities; <b>B5-5:</b> Firewood collection by the project's employees should be strictly forbidden.	Part of above cost	KETRACO
		<b>B5-6:</b> Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants – construction of new camps is unlikely to happen;	Part of above cost	KETRACO
		<b>B5-7:</b> Materials (e.g., pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and	Part of above cost	KETRACO
		<b>B5-8:</b> Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible	Part of above cost	KETRACO
<b>B6. Impact on Fauna</b>	~ Disturbance due to noise, vibrations and vehicle presence. ~ Direct strike with the transmission line and pylons (bird collision) and by electrocution	<b>B6-1:</b> All areas disturbed by maintenance activities shall be landscaped and rehabilitated; <b>B6-2:</b> Vegetation that does not grow high enough to cause interference with the overhead power lines, or cause a fire hazard, should not be trimmed or cut unless it is growing in the road access area <b>B6-3:</b> Speed of project vehicles should be controlled at a maximum limit of 40 km/h to minimise roadkill <b>B6-4:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	500,000	KETRACO
			Part of above cost	KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	~ Change of avian flight patterns for some species.	<b>B6-5:</b> Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.	Part of above cost	KETRACO
<b>B7: Impact on Avifauna</b>	~ Direct strike with the transmission line and pylons (bird collision) and by electrocution  ~ Change of avian flight patterns for some species	<b>B7-1:</b> In the event of receiving confirmation of regular bird strikes along the transmission line, high-visibility markers should be installed to make the lines more visible to birds, to reduce the risk of collision;	Contactor to install as part of construction	KETRACO
		<b>B7-2:</b> Where feasible and safe, provide artificial bird-safe perches and nesting platforms placed at a safe distance from the energised parts of transmission infrastructure	Contactor to install as part of construction	KETRACO
		<b>B7-3:</b> Cross-arms, insulators and other parts of the power lines can be constructed such that there is no space for birds to perch where they can come into contact with energised wires	Contactor to install as part of construction	KETRACO
		<b>B7-4:</b> Undertake regular (at least annual) monitoring of the transmission line for evidence of birds nesting on the pylons. In the event of nesting, anti-perch and nest devices will be installed to discourage birds from regularly visiting these structures. These will be replaced when necessary;	500,000	KETRACO
		<b>B7-5:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	No cost	KETRACO
<b>B8: Solid and Liquid Waste Impacts</b>	Minimal or no solid or liquid waste	<b>B8-1:</b> Implement Solid Waste Management Plan, as described in this report.	200,000	KETRACO
<b>B9: Landscape &amp; visual amenities risks</b>	Impacts on aesthetics of the surroundings with the possibility to affect the neighbouring residents.	<b>B9-1:</b> Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor;	200,000	KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>B11: Worker's Health and Safety and Workers Management</b>	Potential impacts to workers health and safety -respect for labour rights during construction	Develop and implement a Worker's Health and Safety Management System covering all contractors and subcontractors including the following measures: <ul style="list-style-type: none"> <li>HR Policy in line with Local labour laws and ILO standards <ul style="list-style-type: none"> <li>Training on H&amp;S Risks</li> <li>H&amp;S Audits for workers</li> <li>Workers Grievance Mechanism</li> <li>Incident and Accident Reporting</li> </ul> </li> <li>Code of conduct to regulate behaviour</li> <li>Ensure that COVID-19 protocols and guidelines by GoK's Ministry of Health are adhered to during O&amp;M activities including social distancing, provision of face masks to all workers, provision of sanitizers, establishment of hand washing areas and provision of water and soap, conducting temperature checks for all workers, creating awareness on signs and symptoms of COVID-19, encouraging staff to take COVID-19 tests if symptoms associated with the same are exhibited, liaising with GoK to offer vaccination for workers.</li> </ul>	1,800,000	KETRACO
		<ul style="list-style-type: none"> <li>Access to clean water</li> </ul>	Part of above cost	KETRACO
		<ul style="list-style-type: none"> <li>Traffic Management Plan <ul style="list-style-type: none"> <li>Vehicle Safety</li> <li>Drug and alcohol use</li> <li>Rest periods</li> <li>Traffic safety</li> <li>Accident Reporting</li> </ul> </li> </ul>	Part of above cost	KETRACO
		<ul style="list-style-type: none"> <li>Non-Discrimination on basis of gender, marital status Age, Religion or sexual orientation</li> </ul>	Part of above cost	KETRACO
<b>B12: Community Health and Safety Impacts</b>	-Exposure to Electromagnetic Fields	<b>B12-1:</b> KETRACO will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures: <ul style="list-style-type: none"> <li>Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.</li> </ul>	3,000,000	KETRACO
				KETRACO
				KETRACO
				KETRACO

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>B12-2:</b> KETRACO will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals.	Part of above cost	
<b>B13: Gender-based violence (SEA/SH) and other forms of GBV at the community/family level</b>	<ul style="list-style-type: none"> <li>- Sexual exploitation and abuse of community members by project workers (SEA) and sexual harassment amongst workers (SH).</li> <li>- Other forms of Gender-based violence e.g., <ul style="list-style-type: none"> <li>- Forced Early Marriages</li> <li>- Transactional sex.</li> <li>- Domestic violence</li> </ul> </li> </ul>	<p><b>A13-1:</b> KETRACO will extend the Worker Code of Conduct to include guidelines on worker–community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.</p> <p><b>Implement the SEA/SH Action Plan.</b> Extend the Worker Code of Conduct to include guidelines on worker–community interactions and will provide training on the worker code of conduct to all employees including contractors and sub-contractors as part of the induction process. The employees code of conduct will be signed by all those with physical presence on site and in the project area.</p> <p>Where other forms of GBV are reported to the project, establish a link between KETRACO activities or operations with, GBV cases at the community level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively.</p>	1,500,000	KETRACO

Table 9-4. Environmental and Social Management Plan

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>Decommissioning Phase</b>				
<b>C1. Demolition Air Impacts</b>	<ul style="list-style-type: none"> <li>Impact on sensitive receptors</li> <li>Impact on workers' health and safety</li> <li>Impact on community health and safety</li> </ul>	<p><b>C1-1:</b> Develop a Dust Management Plan;</p> <p><b>C1-2:</b> Record all dust and air quality complaints, identify cause(s), take appropriate measures</p> <p><b>C1-3:</b> Liaise with local communities to forewarn of potentially dusty activities;</p> <p><b>C1-4:</b> Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring</p> <p><b>C1-5:</b> Undertake inspections to ensure compliance with the Dust Management Plan;</p>	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	Impact on flora and fauna	<b>C1-6:</b> Plan potentially dusty activities so that these are located as far from receptors as feasible <b>C1-7:</b> Erect solid screens if feasible around stockpiles; <b>C1-8:</b> Avoid run off of mud and water and maintain drains in a clean state; <b>C1-9:</b> Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; <b>C1-10:</b> Impose speed limits on haul routes and in compounds to reduce dust generation; <b>C1-11:</b> Minimise drop heights when loading stockpiles or transferring materials; and <b>C1-12:</b> Avoid waste or vegetation burning.		
		For traffic on unpaved roads: <b>C1-13:</b> Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and <b>C1-14:</b> On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.	Contractors' Cost	Contractor
		<u><b>For earthworks:</b></u> <b>C1-15:</b> Revegetate exposed areas as soon as feasible <b>C1-16:</b> Revegetate or cover stockpiles if feasible; <b>C1-17:</b> Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow	Contractors' Cost	Contractor
		<u><b>For track out:</b></u> <b>C1-18:</b> Where track out is onto paved roads, use wet road cleaning methods to remove dirt and mud build up; <b>C1-19:</b> Avoid dry sweeping of large areas; and <b>C1-20:</b> Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.	Contractors' Cost	Contractor
<b>C2. Demolition Noise and Vibration Impacts</b>	Impact on sensitive receptors  Impact on workers' health and safety	<b>C2-1:</b> Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of decommissioning noise at receptors wherever practicable; <b>C2-2:</b> Where practicable noisy equipment will be orientated to face away from the nearest NSRs;	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	Impact on community health and safety	<b>C2-3:</b> Working hours for significant noise generating decommissioning work (including works required to upgrade existing access roads or create new ones), will be daytime only;		
	Impact on fauna	<b>C2-4:</b> Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;	Contractors' Cost	Contractor
		<b>C2-5:</b> Where practicable, stationary equipment will be located in an acoustically treated enclosure	Contractors' Cost	Contractor
		<b>C2-6:</b> For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals;	Contractors' Cost	Contractor
		<b>C2-7:</b> Throttle settings will be reduced, and equipment and plant turned off, when not being used; <b>C2-8:</b> Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and <b>C2-9:</b> Fitting of mufflers or silencers of the type recommended by manufacturers	Contractors' Cost	Contractor
<b>C3. Soil erosion and contamination impacts</b>	Impacts on water quality (sediment run-off/contamination) leading to deterioration of quality.	<b>C3-1:</b> Vegetation clearing, and topsoil disturbance will be minimized. <b>C3-2:</b> Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion; <b>C3-3:</b> Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means. <b>C3-4:</b> Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible decommissioning work will take place during the dry season.	Contractors' Cost	Contractor
	Deteriorated water quality will impact on fauna if consumed.			
	Deteriorated water quality will impact on community health if consumed.	<b>C3-5:</b> Topsoil shall be evenly spread across the cleared areas when reinstated. <b>C3-6:</b> Accelerated erosion from storm events during decommissioning shall be minimised through managing storm water runoff (e.g., velocity control measures). <b>C3-7:</b> Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. Material (e.g., fuel or chemicals).	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>C3-8:</b> Spread mulch generated from indigenous cleared vegetation across exposed soils after decommissioning.	Contractors' Cost	Contractor
<b>C4. Surface Water Quality Impacts</b>	Impacts on water quality (sediment run-off/contamination) leading to deterioration of quality.  Deteriorated water quality will impact on fauna if consumed.  Deteriorated water quality will impact on community health if consumed.	<b>C4-1:</b> Activities shall be conducted >100m away from water bodies, except where crossings are required.	Contractors' Cost	Contractor
		<b>C4-2:</b> All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment;	Contractors' Cost	Contractor
		<b>C4-3:</b> Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan. Park vehicles preferably on paved platforms	Contractors' Cost	Contractor
<b>C5. Impact on Flora and Vegetation</b>	Loss of biodiversity.  Fragmentation of habitat.	<b>C5-1:</b> Avoidance of impacts should be prioritized, it is strongly recommended to closely/re-route follow the main road along these transmission-line segments. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary.	Contractors' Cost	Contractor
		<b>C5-2:</b> Rivers, watercourses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing;	Contractors' Cost	Contractor
		<b>C5-3:</b> Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary;	Contractors' Cost	Contractor
		<b>C5-4:</b> There should be no deviation from the access road position without prior discussions with the authorities; <b>C5-5:</b> Firewood collection by the project's employees should be strictly forbidden.	Contractors' Cost	Contractor
		<b>C5-6:</b> Rehabilitation of temporary decommissioning. sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants – construction of new camps is unlikely to happen;	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		<b>C5-8:</b> Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible	Contractors' Cost	Contractor
		<b>C5-8:</b> Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible	Contractors' Cost	Contractor
<b>C6. Impact on Fauna</b>	-Disturbance due to noise, vibrations and vehicle presence.	<b>C6-1:</b> All areas disturbed by decommissioning activities shall be landscaped and rehabilitated;	Contractors' Cost	Contractor
		<b>C6-2:</b> Vegetation that does not grow high enough to cause interference with the overhead power lines, or cause a fire hazards, should not be trimmed or cut unless it is growing in the road access area	Contractors' Cost	Contractor
		<b>C6-3:</b> Speed of project vehicles should be controlled at a maximum limit of 40 km/h to minimise roadkill	Contractors' Cost	Contractor
		<b>C6-4:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	Contractors' Cost	Contractor
		<b>C6-5:</b> Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.	Contractors' Cost	Contractor
		<b>C6-6:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	Contractors' Cost	Contractor
<b>C7. Impact on Avifauna</b>	-Disturbance due to noise, vibrations and vehicle presence.	<b>C7-1:</b> No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)	Contractors' Cost	Contractor
		<b>C7-2:</b> All animal dens in close proximity to the work areas must be marked as no go areas.	Contractors' Cost	Contractor
		<b>C7-3:</b> Guidance shall be given to all staff that they are not allowed to harm any animals during decommissioning.	Contractors' Cost	Contractor
<b>C8: Solid and Liquid Waste Impacts</b>	-Impact on storm water quality and thus water quality in the water bodies in project areas -Impact on soil quality -Impact on surface water quality;	<b>C8-1:</b> The Contractor should prepare a Solid Waste Management Plan.	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	-Impact on ground water quality; and -Impact on ecological receptors or human health			
<b>C9. Access to Infrastructure and Services</b>	-Disruption of transit routes -Disruption of normal traffic operations -Wastes from the camp site could be significant and overburden the existing wastes disposal facilities in the area	<b>C9-1:</b> Methods will be implemented to maintain open, clear and transparent communication with the local communities regarding the use of local infrastructures by the Project throughout the different phases. <b>C9-2:</b> Engagement with the relevant authorities is recommended in order to avoid damage to common property and minimize access disruption to education and healthcare facilities <b>C9-3:</b> Community Grievance Mechanism will be implemented. <b>C9-4:</b> A Traffic Management Plan shall be issued before decommissioning start in order to minimize traffic disruptions <b>C9-5:</b> Where temporary closure of road is required, alternative access to property will be ensured and local solutions including diversions will be implemented to ensure uninterrupted mobility.	Contractors' Cost	Contractor
<b>C10: Landscape &amp; Visual amenities risks</b>	-Impacts on aesthetics of the surroundings with the possibility to affect the neighbouring residents.	<b>C10-1:</b> Any excavated or cut and fill areas will be landscaped and revegetated; <b>C10-2:</b> No debris or waste materials will be left at the work sites, good housekeeping on site to avoid litter and minimise waste <b>C10-3:</b> Night lighting of sites should be minimized within requirements of safety and efficiency; <b>C10-5:</b> Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor;		Contractor
<b>C11: Worker's Health and Safety and Workers Management</b>	-Workers are likely to be exposed to work related risks during the decommissioning phase of the project.	<b>C11-1:</b> KETRACO will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc.	Contractors' Cost	Contractor
		<b>C11-2:</b> KETRACO will require its contractors and subcontractors to put in place policies in line with national legislation and applicable international legislation and KETRACO Code of Conduct and Policies.	Contractors' Cost	Contractor
		<b>C11-3:</b> KETRACO will establish contractual clauses to be embedded in the contracts of the EPC and all sub-contractors that require adherence to Kenyan	Contractors' Cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		law and international standards to be upheld related to worker rights and providing the contractor and KETRACO with the right of audit.		
		<p><b>C11-4:</b> Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting a pre-employment medical assessment include a safer working environment, reduction in workplace injuries, minimised downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.</p> <p><b>C11-5:</b> KETRACO will ensure that training on health and safety measures is provided to all workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities.</p> <p><b>C11-6:</b> KETRACO will implement regular health and safety checks and audits of Workers, contractors and subcontractors and implementing sanctions in case of breaches of national standards.</p> <p><b>C11-7:</b> KETRACO will develop and implement a Workers Grievance Mechanism for the Project workforce including contractors and subcontractor's standards and the Project's specific standards. Such audits to include workplace H&amp;S; worker contracts, working hours, pay and conditions; housing and food standards.</p> <p><b>C11-8:</b> KETRACO will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks.</p> <p><b>C11-9:</b> KETRACO will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents.</p> <p><b>C11-10:</b> KETRACO will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE.</p> <p><b>C11-11:</b> KETRACO will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation.</p> <p><b>C-11-12:</b> Ensure that COVID-19 protocols and guidelines by GoK's Ministry of Health are adhered to during the decommissioning activities including social distancing, provision of face masks to all workers, provision of sanitizers,</p>		Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
		establishment of hand washing areas and provision of water and soap, conducting temperature checks for all workers, creating awareness on signs and symptoms of COVID-19, encouraging staff to take COVID-19 tests if symptoms associated with the same are exhibited, liaising with GoK to offer vaccination for workers.		
<b>C12: Community Health and Safety Impacts</b>	<p>-Increased noise decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, debris and movement of heavy equipment may pose a safety risk to the general public.</p> <p>-Potential impacts on community safety, in particular road accidents, trespass on the sites, and demining activities potentially resulting in accidents leading to injuries or fatalities.</p> <p>~ Environmental health: changes to the environment due to increased noise and vibrations, decreased air quality and, inadequate management of waste.</p> <p>~ Impact from workers presence and potential</p>	<b>C12-1:</b> KETRACO will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures: <ul style="list-style-type: none"> <li>• Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health and safety impacts.</li> <li>• Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements.</li> <li>• Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STDs.</li> <li>• Undertake awareness creation on STDs and specifically HIV/AIDS targeting the local communities</li> <li>• Provide access to health care for those injured by its activities.</li> <li>• Ensure that work sites are fenced and that signs are put up around work fronts and decommissioning. sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a community or house, employ security guards from the local community to prevent trespass.</li> <li>• Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.</li> </ul>	Contractors' Cost	Contractor
				Contractor
				Contractor
				Contractor
		<b>C12-2:</b> KETRACO will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals.	Contractors' Cost	

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
	interaction with local populations	<ul style="list-style-type: none"> <li>KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.</li> <li>KETRACO will provide primary health care and first aid at decommissioning. camp sites to avoid pressure on local healthcare infrastructures.</li> <li>KETRACO will implement a Community Grievance Mechanism.</li> <li>KETRACO will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations</li> </ul>		
<b>C13: Gender-based violence (SEA/SH) and other forms of GBV at the community/family level</b>	-Sexual exploitation and abuse of community members by project workers (SEA) and sexual harassment amongst workers (SH). Other forms of Gender-based violence e.g., -Forced Early Marriages -Transactional sex. -Domestic violence	<b>C13-1:</b> Implement the SEA/SH Action Plan Extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. The workers code of conduct will be signed by all those with physical presence on site or in project areas.  Where other forms of GBV are reported to the project, establish a link between KETRACO activities or operations with, GBV cases at the community level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively.	Contractors' Cost	Contractor KETRACO
<b>C14: Violation of children rights by contractor and labour force on site</b>	-Violation of children rights by contractor and labour force on site (e.g., child labour, sexual relations with minors etc.)	<b>C14-1:</b> •KETRACO will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. <b>C 14-2:</b> Prepare and implement child protection strategy <b>C14-3:</b> Prepare and implement a child protection plan and monitoring the employment register, <b>C14-4:</b> Employing persons aged 18+ years	Contractor's cost	Contractor

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST	RESPONSIBILITY
<b>C15: Archaeology and Cultural Heritage Impacts</b>	<ul style="list-style-type: none"> <li>-Restriction to access cultural sites.</li> <li>-Destruction of cultural sites during decommissioning.</li> </ul>	<p><b>C15-1:</b> Consult community when any community issue arises in order to engage traditional forms of community leadership. Develop stakeholder engagement procedures to guide consultations.</p> <p><b>C15-2:</b> Work with local community representatives to develop cultural awareness materials (that will cover key issues including the location and importance of all local cultural sites and other cultural sensitivities (graves). Develop stakeholder engagement procedures to guide consultations.</p> <p><b>C15-3:</b> Should decommissioning activity be required in proximity to existing graves, develop and implement working protocols in consultation with local traditional leaders. Develop stakeholder engagement procedures to guide consultations.</p> <p><b>C15-4:</b> Do not remove any cultural heritage including graves without prior consultation to the communities and fulfilling the legal requirements. Any removal of cultural heritage should be conducted by the best available techniques.</p> <p><b>C15-5:</b> Establish a grievance procedure to ensure community concerns are addressed.</p> <p><b>C15-6:</b> Develop a chance find procedure which will detail the appropriate course of action that must be followed for any relevant cultural heritage discoveries.</p>	Contractors' Cost	Contractor
<b>C16: Unplanned Events</b>	<ul style="list-style-type: none"> <li>-Impacts to soil and surface water from spill events</li> </ul>	<p><b>C16-1:</b> Develop a detailed Oil Spill Response Plan (OSRP) which includes community notifications of any significant spills that have the potential to affect communities.</p> <p><b>C16-2:</b> Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground.</p> <p><b>C16-3:</b> Hazardous material storage will be on hard standing and impermeable surface and the bulk storage facility will be bunded.</p> <p><b>C16-4:</b> Hydrocarbon spill clean-up kits shall be available at all locations where refuelling or maintenance of vehicles and equipment is done, and responsible people shall be trained in the use thereof.</p>	Contractors' Cost	Contractor

Table 9-5.Environment and Social Monitoring Indicators

Project Activity/Aspect	Impact/Effect	Monitoring Indicator	Institutional Responsibility	
			Monitoring Responsibility	Frequency
A. General	A-1 Planning	<ul style="list-style-type: none"> <li>Workforce briefed about the relevant environmental issues, including pollution control and site management</li> </ul>	KETRACO	
	A-2 Implementation Oversight Capacity	<ul style="list-style-type: none"> <li>EHS Manager</li> <li>Environmental Officers</li> <li>Social Officers</li> <li>Health and Safety Officer</li> </ul>	KETRACO	
	A-3 Site Implementation Capacity	<ul style="list-style-type: none"> <li>Site EHS Officer</li> </ul>	Contractor	
B. Land Acquisition	<b>B-1</b> Land will be used for permanent facilities like foundation, pylons, contractor facilities and workers camps etc.  <i>(Loss of land and Livelihoods. To be compensated. The rates for land are agreed on a negotiated basis)</i>	<ul style="list-style-type: none"> <li>Development/Disclosure of RAP</li> <li>Implementation of RAP</li> <li>Development/Implementation of Stakeholder Engagement Plan</li> <li>Development/Implementation of GRM               <ul style="list-style-type: none"> <li>Number of complaints on land registred</li> <li>Number of complaints on land (registration, succession) etc, resolved</li> </ul> </li> <li>Development/Implementation of LRP               <ul style="list-style-type: none"> <li>Landowners informed about compensation package</li> <li>Number of PAPs receiving compensation</li> <li>Number of restored livelihoods</li> <li>Number of PAPs completing Livelihood restoration training courses</li> <li>Number of Grievances received/resolved</li> <li>Number of stakeholder consultations undertaken</li> </ul> </li> </ul>	KETRACO/NLC	As per RAP Schedule
	<b>B-2</b> Crop/Plant loss during temporary loss of land	<ul style="list-style-type: none"> <li>Number of crops/plants losses</li> </ul>		<ul style="list-style-type: none"> <li>Prior to land acquisition</li> </ul>
	<b>B-3</b> Communication and compensation	<ul style="list-style-type: none"> <li>Number of PAHs compensated</li> <li>Number of communication consultations held with PAHs</li> </ul>		

Project Activity/Aspect	Impact/Effect	Monitoring Indicator	Institutional Responsibility	
			Monitoring Responsibility	Frequency
	<i>(to be communicated during negotiation)</i>			
	<b>B-4</b> Damage to community and private/individual property during construction activities	<ul style="list-style-type: none"> <li>• Availability of grievance redress system</li> <li>• Number of grievances reported</li> <li>• Number of grievances resolved in a timely manner</li> </ul>		
<b>C.</b> Labour Influx and related impacts	<b>C-1</b> sexually transmitted diseases in the local population. <b>C-2</b> (GBV-SEA/SH) and other forms of GBV	Development/Implementation <ul style="list-style-type: none"> <li>• HR Policy</li> <li>• Labour Influx Management Plan</li> <li>• GBV (SEA and SH) Management Plan</li> </ul> Indicators <ul style="list-style-type: none"> <li>• HR records on the percentage of local versus non-local employment.</li> <li>• Number/attendance records of Sensitization meetings held on GBV, SEA, HIV/AIDS and other STIs etc.</li> <li>• Review of training attendance records of capacity enhancement and transfer of knowledge that local personnel have received.</li> <li>• Workers Code of conduct included in employee contracts.</li> <li>•</li> </ul>	HSE Manager Human Resource Manager Contractor/KETRACO	<ul style="list-style-type: none"> <li>• Prior to construction commencing for Local Content and Procurement Plan.</li> <li>• Continuous during construction and decommissioning phase for employment and procurement-related measures.</li> <li>• Quarterly for training-related measures.</li> </ul>
<b>D.</b> Air Quality/Atmospheric Conditions	<b>D-1</b> Dust Emissions associated with construction activities	Dust deposition in adjoining areas to be physically monitored using NEMA accredited labs to ensure compliance	Contractor/HSE	<ul style="list-style-type: none"> <li>• At least once during excavation and casting</li> </ul>
<b>E.</b> Noise	<b>E-1</b> Noise from construction activities <i>(to be managed by equipment choice and arrangement of</i>	<ul style="list-style-type: none"> <li>• Part of the subcontractors' contract</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Each schedule of construction activities</li> </ul>

Project Activity/Aspect	Impact/Effect	Monitoring Indicator	Institutional Responsibility	
			Monitoring Responsibility	Frequency
	<i>construction activities)</i>			
<b>F. Soils</b>	<b>F-1</b> Dumping of construction material outside the project construction footprint <b>F-2</b> Erosion and compaction <b>F-3</b> Contamination due to spill of civil construction material	<ul style="list-style-type: none"> <li>Visual checks at construction site</li> <li>Visual inspection during casting</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>At least once per construction site</li> </ul>
<b>G. Ecology</b>	<b>G-1</b> Disruption to existing flora and fauna <b>G-2</b> Loss of Vegetation <b>G-3</b> Disturbance to fauna due to movement in forest areas	<ul style="list-style-type: none"> <li>Sensitization trainings to worker on local ecology and extent of care</li> <li>Signs and warnings against hunting</li> <li>Number of revegetated areas.</li> <li>% area of site cleared vs. remaining un-cleared land.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Continuous</li> </ul>
<b>H. Waste</b>	<b>H-1</b> accumulation of waste on site causing nuisances such as odor, pest control problems and general litter.	<ul style="list-style-type: none"> <li>Construction Waste Management Plan</li> <li>Routine weekly checks of waste management arrangements should be undertaken.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Continuous</li> </ul>
<b>I. Traffic and Transport</b>	Increase in traffic	<ul style="list-style-type: none"> <li>Development/implementation of traffic management plan</li> </ul>		<ul style="list-style-type: none"> <li>Continuous</li> </ul>
<b>J. Landscape and Visual Amenity</b>	<b>K-1</b> Visual scarring of the landscape	Inspection on a daily basis	Contractor	Continuous throughout the construction phase

Project Activity/Aspect	Impact/Effect	Monitoring Indicator	Institutional Responsibility	
			Monitoring Responsibility	Frequency
<b>K.</b> Workers Health, Safety and Labour Rights	Worker's health and safety Respect for labour rights	<ul style="list-style-type: none"> <li>• Worker Health and Safety Management System</li> <li>• Human Resources Policy.</li> <li>• Traffic Management Plan</li> <li>• Verify contractual clauses of Contractor and all sub-contractors requiring adherence to Kenya law and international standards.</li> <li>• Records of incidents and accidents.</li> <li>• Record on training sessions and attendance on health and safety measures</li> <li>• Record of lessons learned to minimize occupational health and safety.</li> <li>• Code of Conduct document</li> <li>• Presence of COVID-19 prevention measures (hand washing points, sanitizers, masks provided to workers, observable awareness creation materials/signs, # of workers vaccinated, # of workers detected with COVID-19, observable social distancing.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Continuous</li> </ul>
<b>L.</b> Labour Influx and related impacts such as GBV-SEA/SH, <i>STDs, HIV/AIDS etc.</i>		Development/Implementation <ul style="list-style-type: none"> <li>• GBV (SEA and SH) Management Plan</li> <li>• Number/attendance records (communities and workers) of sensitization meetings held on GBV (SEA and SH), HIV/AIDS and other STDs etc.</li> <li>• Review of training attendance records of capacity enhancement and transfer of knowledge that local personnel have received.</li> <li>• Code of conduct included in employee contracts.</li> </ul>	Contractor KETRACO	Continuous throughout the construction and decommissioning phases
<b>M</b> Community expectation for local benefits such as employment.		Development/Implementation <ul style="list-style-type: none"> <li>• Labour influx Management Plan.</li> <li>• Local Recruitment Plan.</li> </ul>	Contractor	Continuous throughout the construction and decommissioning phases

Project Activity/Aspect	Impact/Effect	Monitoring Indicator	Institutional Responsibility	
			Monitoring Responsibility	Frequency
N Violence against Children		<ul style="list-style-type: none"> <li>• Policies against VAC in place</li> <li>• HR Policy</li> <li>• Updated records of employees with National ID card indicated.</li> </ul>	Contractor	Continuous throughout the construction and decommissioning phases
O. Cultural Heritage	O-1 Cultural and religious sensitivities maybe impacted by project	<ul style="list-style-type: none"> <li>• Chance Find Procedures</li> <li>• Records of training on chance find procedures</li> </ul>	Contractor	Continuous throughout the construction phase
P. Local amenities and infrastructure	P-1 Pressure to local infrastructure from use of local resources	<ul style="list-style-type: none"> <li>• Availability of grievance redress process</li> <li>• Number of grievances reported</li> <li>• Number of grievances resolved in a timely manner</li> <li>• Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.</li> </ul>	KETRACO Liaison Officer Contractor Local representative/Admin	Continuous throughout the construction phase
Q. Meaningful stakeholder consultations	Q-1 Lack of access to project benefits and opportunities by PAPs Exclusion of some stakeholders in the consultation process	<ul style="list-style-type: none"> <li>• Availability of and implementation of the Stakeholder Engagement Plan</li> <li>• # of stakeholder consultations held</li> <li>• Record of stakeholder consultations held (minutes of meetings and list of participants)</li> <li>• Issues raised and actions taken</li> </ul>	KETRACO Community Liaison Officer Contractor Local representative administration	Continuous throughout the pre-construction, construction, operations, and decommissioning phases
R. Grievances Redress Mechanisms	R-1 Inadequate handling and untimely resolution of grievances leading to conflicts and escalation of complaints	<ul style="list-style-type: none"> <li>• Availability of grievance redress process</li> <li>• Updated GRM Log</li> <li>• Number of grievances reported</li> <li>• Number of grievances resolved in a timely manner</li> <li>• Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.</li> </ul>	KETRACO Community Liaison Officer Contractor Local representative administration	Continuous throughout the pre-construction, construction, operations, and decommissioning phases

### **9.3.1 Construction Environment and Social Management Plan**

For an effective integration of environmental and social safeguards into the project implementation the Contractor will need to adopt this ESMP and prepare a comprehensive Construction Environment and Social Management Plan (C-ESMP) that will provide the key reference point for compliance. The environmental supervision will also adopt the C-ESMP. Construction Environment and Social Management Plan (C-ESMP) is an upgraded ESMP illustrating realities of the project works to be prepared by the Contractor. The Contractor is expected to finalize the Work Plan and upon approval, list the works items and for each item present practical actions that will be undertaken to realize achievement of the ESMP. The actions on works items should address environmental and social aspects associated with the works and in line with guidelines from the ESMP. Based on these ESMP outline, the Contractor will be instructed to develop a Construction Environment and Social Management Plan (C-ESMP) for each component of the project and submit these plans to the KETRACO.

### **9.3.2 KETRACO Project Management Team**

The Project will be implemented by KETRACO which has a long experience of implementing World Bank financed projects under the safeguards policies. KETRACO has experienced environmental and social safeguards specialist including CLO in the KESIP Project Implementation Unit (PIU). However, KETRACO may require a qualified Social Safeguards Specialist to focus specifically on GBV (SEA/SH) impacts likely to occur because of the project and to support the Contractor Social Safeguards Specialist to develop and implement the GBV Management Plan. The project implementation arrangements have been established and the proponent has appointed the KETRACO project implementation team including;

- Project manager
- Environmentalist
- Socio-Economist /Social Specialist
- Land Surveyor
- Land Economist
- Civil Engineer
- Electrical Engineer
- Community Liaison Officer

The core functions of the team will be to coordinate and facilitate oversight for technical, environmental, and social safeguards, health and safety and social risks supervision.

### **9.3.3 Project Supervision Engineer**

The Project Supervision Engineer will be required to recruit a qualified Environmental and Social Expert who will be charged with the responsibilities of supervision, review of site reports, preparation of monthly progress reports, prepare and issue appropriate instructions to the Contractor and monitor ESMP implementation.

### **9.3.4 Contractor**

The Contractor will ensure that the established mitigation measures are integrated and implemented throughout the project works as per the C-ESMP. The Contractor will

internalize the ESMP/C-ESMP, prepare monthly progress reports and implement instructions issued by the Supervision Consultant. The Contractor, therefore, will engage qualified Environmentalist (ensure compliance to ESMP and C-ESMPs) and Social Specialist (ensure compliance to social aspects of the ESMP and C-ESMPs) and Community Liason Officer (link between community and contractor) on full time basis to interpret the C-ESMP and advice on the implementation of the same, as well to the counterpart personnel for the supervision expert.

### **9.3.5 National Environment Management Authority**

The National Environment Management Authority (NEMA) is responsible for ensuring environmental compliance in the country and has offices in Nakuru, Nyandarua and Laikipia Counties with staffing who will further ensure that the ESMP is implemented as part of their mandate, functions, and responsibilities. NEMA will undertake surveillance on the project implementation and review compliance performance based on the supervision monitoring reports.

### **9.3.6 Grievance Redress**

WBG operational policies require Grievance Mechanisms to provide a structured way of receiving and resolving grievances. Complaints should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities and is at no cost and without retribution. The mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both the company and stakeholders. The mechanism must not impede access to other judicial or administrative remedies, such as law courts (costs to be borne by the aggrieved) and the World Bank Grievances Redress Service and the World Bank Inspection Panel (at no cost to the aggrieved).

The project GRM will be vital in addressing grievances raised by PAPs and other stakeholders regarding project activities and operations. The Workers GRM will be utilized by workers on site to raise grievances related to project activities and operations.

The GRMs (worker and project) will be culturally appropriate, accessible, and understandable to all stakeholders and applicable to the entire project life. The GRM will be communicated to all stakeholders including contractors.

There will also be a separate GRM established by the contractor to address grievances between the workers and the contractor (internal). The GRM will be accessible and understandable for all stakeholders in the project and for the entire project life. The GRM will be communicated to all relevant stakeholders and will also be applicable for any contractor that will occupy and/or use land during the construction and operations phase.

There will be a separate mechanism within the GRM that will be aimed at ensuring safely and confidentially while receiving complaints related to SEA and to GBV at the community level through a focal point system (KETRACO) as well as anonymous complaints mechanism managed by the CLO. A clear link will be established by KETRACO (which has full responsibility to manage the SEA and SH), between construction and operations/decommissioning activities and community level GBV cases such as domestic violence.

This is to ensure that all GBV cases reported at the community level and resulting from or exacerbated by project operations are managed effectively.

### 9.3.7 Management and Monitoring

#### 9.3.7.1 Management Plans

The ESMP has identified some additional plans that will be prepared by the procured contractor prior to construction commencing on all transmission line and sub-station:

- Traffic and Transportation Management Plan;
- Construction Environmental and Social Management Plan;
- Waste Management Plan;
- Emergency Preparedness and Response Plan;
- Chance Find Procedure;
- Labour Management Plan
- Stakeholder Engagement Plan
- Local Recruitment Plan
- Community Health and Safety and Security Plan;
- Occupational Health and Safety Plan;
- Grievance Redress Mechanism
- Gender Based Violence (SEA/SH) Management Plan
- Child Protection Strategy
- HIV/AIDS Prevention Plan/Strategy
- CSR plan (to be informed by KETRACO's CSR Policy)

The specific management plans are listed in Table 9.4 along with links to how these relate to the activities and impacts described within the ESIA as well as the identified responsible party for each. Together with this ESMP, these specific plans will form the overall Environmental and Social Management Plans for the Project.

**Table 9-6.Management Plans**

Plan Name	Includes	Plan Owner
<b>Specific Management Plans</b>		
<b>Traffic &amp; Transportation Management Plan</b>	Controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. Will also include specification for community awareness and safety programs.	Contractor
<b>Construction Management Plan</b>	Plan for the management of the establishment process, including logistics and site management	Contractor
<b>Waste Management Plan</b>	Project-related waste handling procedures for hazardous and non-hazardous wastes.	Contractor
<b>Emergency Preparedness and Response Plan</b>	Administration (policy, purpose, distribution, definitions, etc.), organisation of emergency areas (command centres, medical stations, etc.), roles and responsibilities, communication systems, emergency response procedures, emergency resources, training	Contractor

	and updating, checklists (role and action list and equipment checklist) and business continuity and contingency. The plan will also include specifications for emergency communications as well as on-going public and community communication and disclosure.	
<b>Change Find Procedure</b>	Procedural guideline to be followed in the event that previously unknown heritage resources or and burial grounds and graves are exposed or found during the life of the project.	Contractor
<b>Stakeholder Engagement Plan (SEP)</b>	SEP will build on engagement undertaken to date and specify interactions with community and other stakeholders, as well as finalizing the grievance procedure to be used throughout the Project. Community and Employee awareness training and code of conduct procedures.	Contractor
<b>Gender Based Violence (SEA/SH) Management Plan</b>	Plan for mitigating Gender Based Violence (SEA and SH).	Contractor
<b>Employment and Workforce Management Plan</b>	Plan for local training and procurement for operations. Also specifies requirements for contractors during construction. The local recruitment plan will include policies and procedures for hiring of local labour, unskilled, semi- skilled and skilled labour as much as possible and ensure fair and transparent recruitment considering gender, age, disability, and other vulnerabilities present in the project area.	Contractor
<b>Community Health and Safety and Security Plan</b>	The purpose of the CHSSP is to provide a clear set of actions and responsibilities for the control of impacts affecting the health and safety of the communities within the Project's area of influence. The plan includes measures to respond to exposure to diseases due to worker interaction, environmental change, and safety (traffic, unplanned events, etc.)	Contractor
<b>Occupational Health and Safety Plan</b>	Procedures on chemical hazards, fire and explosions, confined spaces and on site-traffic hazards. Communication and training programs. Safety analysis and industrial hygiene surveys procedures. Monitoring, record-keeping and audit procedures.	Contractor
<b>Grievances Redress Mechanism</b>	Procedures for complaints and grievance handling	Contractor

KETRACO will delegate certain responsibility but retain oversight and supervision role to construction contractors and supervising engineers as specified in this ESIA/ESMP section that highlights the roles of the contractors. During this phase KETRACO will manage its contractors to ensure that this ESMP is implemented and monitored effectively through contractual mechanisms regular direct oversight. As a contractual requirement, the contractors will be required to demonstrate compliance of their activities against the ESMP. This includes providing resources to ensure compliance of next tier contractors and a process for emergency stop-work orders in response to monitoring triggers. Contractors will be responsible for performing all work:

- In compliance with relevant national and international EHS legislation and regulations, and with other requirements to which the Project subscribes

- In conformance with the Project ESMP, and related management plans for specific aspects; and
- In accordance with contractual technical and quality specifications.

The Project's ESMP and related documentation will be the main contractual documentation to which the contractor(s) will be bound. Contractors will be required to develop their own management plans which show how they will comply with these environmental and social requirements.

In this way, the ESMP will be implemented and controlled using both KETRACO and the contractor management systems. The contractor management systems will therefore:

- Provide the framework that regulates their activities;
- Define responsibilities and reporting relationships for expediting, mitigation and monitoring actions detailed in the ESMP; and
- Specify the mechanisms for inspecting and auditing to ensure that the agreed actions are implemented.

Contractors will be required to self-monitor against their plan and compliance with the plan will be routinely monitored by KETRACO directly or by third parties. Contractors will be required to submit regular reports of monitoring activities and the Project will review these on a regular basis. KETRACO is ultimately responsible for the management and supervision of all Project activities and will have principal responsibility for implementing this ESMP and the mitigation measures.

#### **9.3.7.2 Training and Awareness**

KETRACO will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment or social conditions. KETRACO recognises that it is important that employees at each relevant function and level are aware of the Project's environmental and social policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures. Training and awareness-raising therefore forms a key element of both EHS and the expediting of this ESMP.

Key staff will, therefore, be appropriately trained in key areas of EHS management and operational control with core skills and competencies being validated on an on-going basis. The identification of training and awareness requirements and expediting of the identified training/awareness events will be the responsibility of the HSE Manager.

Training and awareness are not a requisite solely of contractor's personnel (and subcontractors). It would be important to include an assessment of the need for training and capacity building of KETRACO staff (before and during the construction phase) and at the conclusion of the construction phase and handover of the ESMP, SEP and grievance mechanism. This will be achieved through a formal training process. Employee training will include awareness and competency with respect to:

- environmental and social impacts that could potentially arise from their activities (including, biodiversity and noise);

- legal requirements in relation to environmental and social performance;
- necessity of conforming to the requirements of the ESIA and ESMP, in order to avoid or reduce those impacts;
- activity-specific training on waste management practices, documentation systems and community interactions; and
- roles and responsibilities to achieve that conformity, including those in respect of change management and emergency response.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be coordinated by the HSE Manager prior to commissioning of the facilities. Upon completion of training and once deemed competent by management, staff will be ready to train other people. Similarly, the Project will require that each of the contractors' institute training programs for its personnel. Each contractor is responsible for site EHS awareness training for personnel working on the job sites. The contractors are also responsible for identification of any additional training requirements to maintain required competency levels. The contractor training program will be subject to approval by KETRACO and it will be audited to ensure that:

- Training programs are adequate;
- All personnel requiring training have been trained; and
- Competency is being verified.

#### **9.3.7.3 Communication**

KETRACO will maintain a formal procedure for communications with the regulatory authorities and communities. Dealings will be transparent, and stakeholders will have access to personnel and information to address concerns raised. The Project will implement a grievance mechanism whereby community members can raise any issues of concern. Grievances may be verbal or written and are usually either specific claims for damages/injury or complaints or suggestions about the way that the Project is being implemented. When a grievance has been brought to the attention of the Project team it will be logged and evaluated. The person or group with the grievance is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made. Where a complaint or claim is considered to be valid, then steps are required to be undertaken to rectify the issue or agree compensation for the loss. In all cases the decision made and the reason for the decision will be communicated to the relevant stakeholders and recorded. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (e.g., government official). Local community stakeholders will be informed on how to implement the grievance procedures.

#### **9.3.7.4 Documentation**

KETRACO will control EHS documentation, including management plans; associated procedures; and checklists, forms, and reports, through a formal procedure. All records will be kept on site and will be backed up at several offsite locations (including secure cloud storage facilities). Records will be kept in both hard copy and soft copy formats. And all records will be archived for the life of the project.

Furthermore, the document control procedure will describe the processes that the Project will employ for official communication of both hardcopy and electronic (through the internet) document deliverables. In addition, it will describe the requirement for electronic filing and posting and for assignment of document tracking and control numbers (including revision codes). The EHS Manager is responsible for maintaining a master list of applicable EHS documents and making sure that this list is communicated to the appropriate parties. The EHS Manager is responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately. The contractors will be required to develop a system for maintaining and controlling its own EHS documentation and describe these systems in their respective EHS plans.

#### **9.3.7.5 Operational Control Procedures**

Each activity for which a potentially significant environmental or socioeconomic risk or impact is expected will have an operational control associated with it that specifies appropriate procedures, work instructions, best management practices, roles, responsibilities, authorities, monitoring, measurement, and record keeping for avoiding or reducing impacts. Operational controls are monitored for compliance and effectiveness on a regular basis through a monitoring and auditing procedure described in the ESMP. Operational control procedures will be reviewed and, where appropriate, amended to include instructions for planning and minimising impacts, or to at least reference relevant documents that address impact avoidance and mitigation.

#### **9.3.7.6 Managing Changes to Project Activities**

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during the course of the project life cycle. The Project will implement a formal procedure to manage changes in the Project that will apply to all project activities. The objective of the procedure is to ensure that the impact of changes on the health and safety of personnel, the environment, plant and equipment are identified and assessed prior to changes being implemented. The management of change procedure will ensure that:

- Proposed changes have a sound technical, safety, environmental, and commercial justification
- Changes are reviewed by competent personnel and the impact of changes is reflected in documentation, including operating procedures and drawings
- Hazards resulting from changes that alter the conditions assessed in the ESIA have been identified and assessed and the impact(s) of changes do not adversely affect the management of health, safety, or the environment
- Changes are communicated to personnel who are provided with the necessary skills, via training, to effectively implement changes; and
- The appropriate KETRACO person accepts the responsibility for the change.

As information regarding the uncertainties becomes available, the Project ESMP will be updated to include that information in subsequent revisions. Environmental and social, as well as engineering feasibility and cost, considerations will be taken into account when choosing between possible alternatives.

## 10 GRIEVANCE MANAGEMENT

Grievance redressal is a critical component of effective ESMP implementation. The purpose of GRM is to provide a forum to the internal and external stakeholders to voice their concerns, queries, and issues with the project. Such a mechanism would provide the stakeholders with one project personnel or one channel through which their queries will be channeled and will ensure timely responses to each query. This will allow for trust to be built amongst the stakeholders and prevent the culmination of small issues into major community unrest. The GRM will be accessible and understandable for all stakeholders in the project and for the entire project life. The GRM will be communicated to all relevant stakeholders and will also be applicable for any contractor that will occupy and/or use land during the construction and operations phase.

WBG standards require Grievance Mechanisms to provide a structured way of receiving and resolving grievances. Complaints should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities and is at no cost (except legal redress through courts) and without retribution. The mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both the company and stakeholders. WBG standards require that PAPs and other stakeholders be informed of the rights that they have to know and access at no cost, other administrative redress mechanisms such as the World Bank Grievances Redress Service and the World Bank Inspection Panel.

The mechanism must not impede access to other judicial or administrative remedies. This section contains the following:

- Grievance definition and categories and GRM principles; and
- The process of receiving, documenting, addressing, and closing grievances.

### 10.1 Grievance Definition/Categories

As stated earlier, a grievance is a concern or complaint raised by an individual or a group within communities affected by company operations. Both concerns and complaints can result from either real or perceived impacts of a company's operations and may be filed in the same manner and handled with the same procedure. Grievances may take the form of specific complaints for actual damages or injury, general concerns about project activities, incidents and impacts or perceived impacts. Based on the understanding of the project area and the stakeholders, an indicative list of the types of grievances have been identified for the project, as can be seen below: -

**Internal Grievances:** Grievances from employees (including both direct and indirect employees, including local workers and migrant workers through contractors):

- Complaints pertaining to amount of wage, salary, other remuneration or benefits as per Company's Human Resource policy
- Gender discrimination
- Workplace Sexual harassment.
- Violence against children (e.g., child labour)

- Issues related to workers organization
- Labour Accommodation
- Health and Safety issues; and
- Extended working hours.

**External Grievances:** Grievances from community members:

- Issues related to sexual exploitation and abuse by project workers against community members
- Issues related to gender-based violence at the community-level, e.g. domestic violence;
- Issues related to child labour and protection
- Issues related to transportation and traffic
- Increase in environment pollution
- Impact on community health
- Disturbances to locals due to influx of migrant workers in the area
- Issues arising out of sharing of employment and business opportunity; and
- Concerns over the impact on local cultures and customs.

The list of grievances will be regularly updated as and when the new one arises.

#### **10.1.1 Internal Grievance Mechanism**

During consultations, it was revealed that the client will hire a Community Liaison Officer (CLO) who will serve to meet all community liaison responsibilities. The CLO will assist the contractor social specialist in grievances management, (the bidding documents will reflect these requirements). The grievance mechanism will be advertised and announced to affected stakeholders so that they are aware of their rights to submit comments and how to go about it. The grievance mechanism will be founded on the following principles:

- Responsibilities will be adequately assigned: A responsible person or team will be constituted and mandated to organise the resolution of grievances. This will enable the system run without undue impediments.
- The process will be accorded due importance: It is important for affected communities and other stakeholder groups seeking to have their complaints resolved, to perceive the grievance management process as transparent and fair. The KETRACO grievance management process will enhance outcomes and give people satisfaction that their complaints have been heard, even if the outcome is less than optimal.
- The grievance procedures will be readily understandable, accessible, and culturally appropriated by the local population. From the outset, clarification will be made on who is expected to use this procedure. The people will be assured that there will be neither costs nor retribution associated with lodging a grievance. The entire process (from how a complaint is received and reviewed, through to how decisions are made and what possibilities may exist for appeal) will be made as transparent as possible through good communication.
- The Mechanism will be scaled as needed for the Project: The KETRACO grievance mechanisms will be designed to fit the context and needs of the project. As much as

possible, it will have relatively simple means of addressing complaints, such as through community meetings, community liaison personnel and suggestion boxes allowing for anonymity. It may also need a more formalized process and mechanism, and a higher level of dedicated resources for receiving, recording, tracking, and resolving complaints. The grievance mechanisms will not be taken as a substitute for community engagement process or vice-versa. The two are complementary and will be made mutually reinforcing. Not all grievances shall be handled in the same way. KETRACO will consider creating different levels of redress within the grievance mechanism that correspond to the scale and seriousness of the complaint.

- The process will be documented and publicized: The process will be put in writing and publicized. KETRACO recognizes that the GRM cannot be effective if nobody knows about it. Thus, the grievance procedures will be put into writing, publicized, and explained to relevant stakeholder groups. The people will be informed on where to go and whom to talk to if they have a complaint and understand what the process will be for handling it. As with all information, it will be provided in a format and language readily understandable to the local population and/or communicated orally where it's established that literacy levels are low. It will not be overly complicated to use nor will it require legal counsel to complete.
- The process will be made accessible: Projects that make it easy for people to raise concerns and feel confident that these will be heard and acted upon can reap the benefits of both a good reputation and better community relations. One of the best ways to achieve this is to localize your points of contact. Hire people with the right skills, training, and disposition for community liaison work and get them into the field as quickly as possible. Maintaining a regular presence in the local communities greatly helps to personalize the relationship with the company and engender trust. Talking with a familiar face who comes to the village regularly, or lives nearby, creates an informal atmosphere in which grievances can be aired and sorted out, or referred up the chain of command. This is usually more convenient and less intimidating to people than having to travel distances to the company offices during business hours to file a formal complaint.
- Response time will be defined, and transparency upheld: KETRACO will publicly commit to a certain time frame in which all recorded complaints will be responded to and ensure this response time is enforced. This will help allay frustration by letting people know when they can expect to be contacted by KETRACO personnel and/or receive a response to their complaint. Combining this with a transparent process by which stakeholders can understand how decisions are reached will inspire confidence in the KETRACO system. During critical times such as construction, there will be immediate responses to time-sensitive complaints. A related issue is making sure that the community liaison officer has the authority to resolve basic complaints herself, as well as a direct reporting line to senior managers if the issue is more serious or costly to address.
- Good record-keeping and feedback: a grievance logbook will be kept where necessary, and a sophisticated database will be maintained where required. Written records of all complaints will be kept as this is critical for effective grievance management. The record shall contain the name of the individual or organization; the date and nature of the complaint; any follow-up actions taken; the result; and how and when this decision

- was communicated to the complainant. Overly personal data such as national identity and phone numbers will be optional and kept confidential unless required to disclose to authorities. In addition to informing the complainant of the outcome (in writing where appropriate), as part of the broader community engagement process KETRACO will report back periodically to communities and other stakeholder groups as to how the company has been responding to the grievances it has received.
- There will be a separate reporting and documentation mechanisms for GBV (SEA and SH) cases that are discrete and anonymous. The KETRACO Community Liaison Officer (CLO) will be the focal point and will establish the system to handle these complaints that will include reference to confidentiality, safety, and survivor- centred approach. All registration of the data will be confidential and anonymized. KETRACO will recruit a CLO with experience in community engagement and liaison as well as GBV-SEA/SH management. The CLO will assist KETRACO's social specialist in GBV-SEA/SH management. Access to legal remedies will not be impeded: If the project is unable to resolve a complaint, it may be appropriate to enable complainants to have recourse to external experts. These may include public defenders, legal advisors, or NGOs. The client may find that it can work in collaboration with these third parties and affected communities to find successful resolution of the issues. However, this is not always possible, and situations may arise where complainants will choose to pursue legal recourse. In this case, KETRACO will not impede access to these mechanisms.

**Table 10-1. Sample Grievance Recording Form**

<b>GRIEVANCE REGISTRATION</b>	
<b>CASE No.</b>	<b>DATE</b>
Name	
Department/Contractor Name	
Phone Number	
Details of Grievance	
Name of Person Recording Grievance	
Designation of Person Recording Grievance	
Proposed Date of Response to Grievance	
Signature of Recording Person	Signature of Complainant
<b>GRIEVANCE REDRESS RESPONSE</b>	
<b>Date of Redress</b>	
<b>Decision of CLO (Give full details)</b>	

### **10.1.2 Maintaining a Grievance Register**

Each grievance thus received, shall be recorded in a grievance register. The format for the grievance register shall be as follows.

**Table 10-2. Sample Grievance Recording Form**

Date	GR #	Name of Grievant	Ward/Village	Grievance Details	Concerned Department	Name of Recording Person	Present Status	Remarks

This grievance register shall be updated at each stage of the grievance redressal. Once the grievance is recorded in the register, a preliminary analysis shall be undertaken by the Community Liaison Officer to ensure that the grievance is within the scope of the GRM.

## **10.2 External Grievance Mechanism**

The process to be followed for the redressal of the external stakeholder grievances is summarized below.

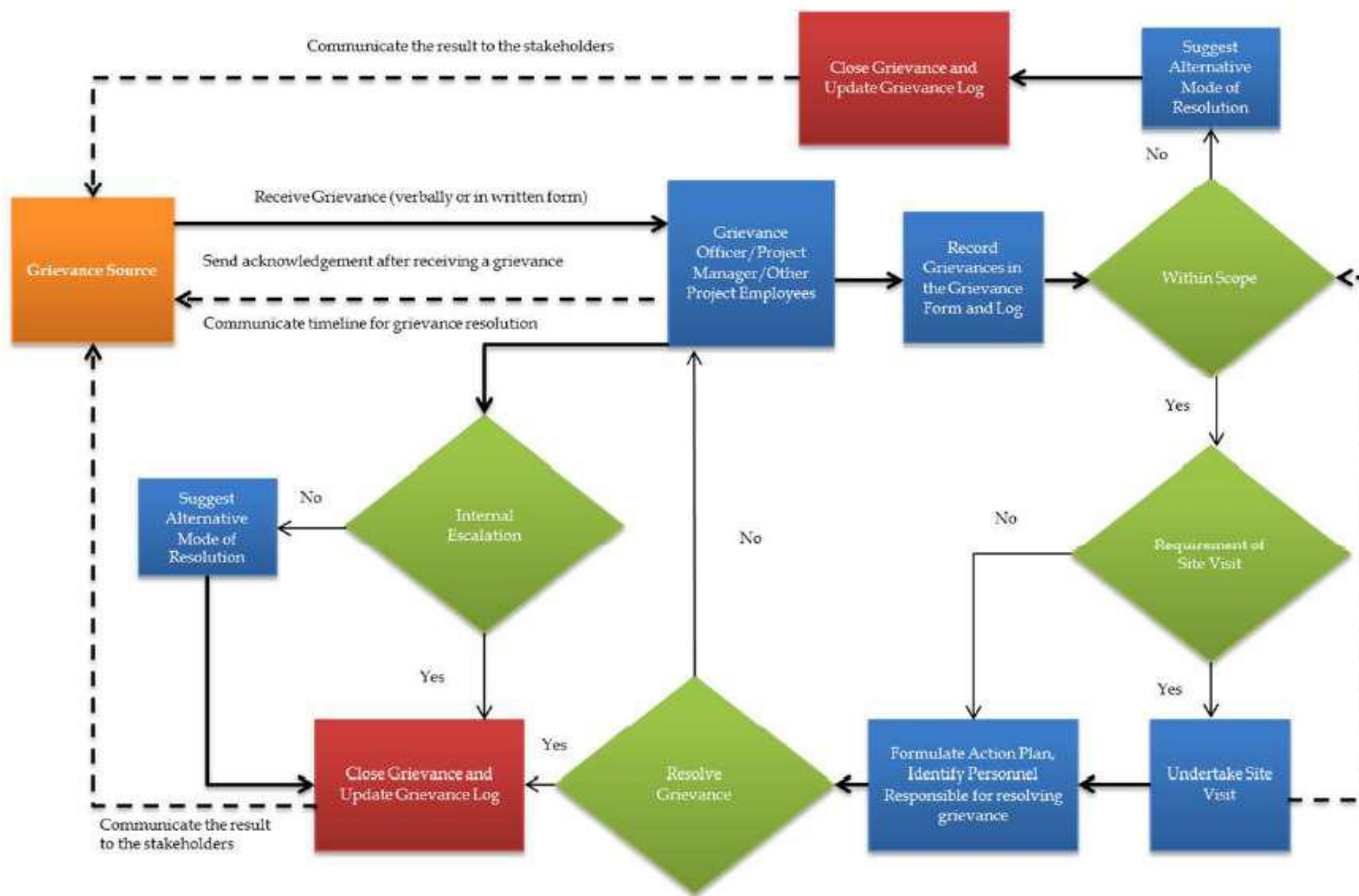


Figure 10-1. GRM Steps

### 10.2.1 Publicizing and Disclosure of the GRM

The GRM and other project-specific management plans will be disclosed to PAPs in culturally appropriate languages, formats, and techniques (e.g., FGDs, public barazas etc.) and considering any disability, mobility and literacy challenges in a timeframe that ensures meaningful consultations.

### 10.2.2 Receiving and Recording Grievances

As part of the GRM, the grievances from the stakeholder or their representatives may be communicated verbally (in person or over a telephonic conversation) or in written form (in the format given below) to the project representatives or to the CLO directly. If the grievance is received directly by the CLO or other project representatives, it will be recorded directly into the Grievance Form as soon as the personnel return to site. A sample grievance form is as follows.

**Table 10-3. Sample Grievance Recording Form**

<b>GRIEVANCE REGISTRATION</b>	
<b>CASE No.</b>	<b>DATE</b>
Name	
Department/Contractor Name	
Phone Number	
Details of Grievance	
Name of Person Recording Grievance	
Designation of Person Recording Grievance	
Proposed Date of Response to Grievance	
Signature of Recording Person	Signature of Complainant
<b>GRIEVANCE REDRESSAL RESPONSE</b>	
<b>Date of Redress</b>	
<b>Decision of CLO (Give full details)</b>	

All project staff and community members will be informed that they must pass all grievances, communications to the CLOs on site as soon as possible after they are received. Details of the person lodging the grievance shall be noted and passed along with the grievance. The CLO in turn will communicate all grievances to the Environmental and Social Officers for the contractor or KETRACO. For assisting the communication of grievances, a register will be maintained at the project office at which any individual/group can come have their complaint registered. Village leaders and government departments will also be advised to pass any complaints they receive to the site level community liaison officer.

### 10.2.3 Maintaining a Grievance Register

Each grievance thus received, shall be recorded in a grievance register. The format for the grievance register shall be as follows.

This grievance register shall be updated at each stage of the grievance redressal. Once the grievance is recorded in the register, a preliminary analysis shall be undertaken by the social officer to ensure that the grievance is within the scope of the GRM.

### 10.2.4 Acknowledgment of Grievance

Upon the completion of the recording of the grievance, the stakeholder will be provided with an acknowledgment of the receipt, along with a summary of the grievance.

#### Box 10.1 Sample Acknowledgement Receipt for Claimant

This	receipt	is	acknowledgement	of	grievance	registration	by
			_____resident	of	_____	_____	village
			_____	on	date	_____	His case number is
			_____	and the date for response is _____			
Full name & signature of recording person _____							

In case the grievance is assessed to be out of the scope of the GRM, a communication towards the same shall be made to the grievant, and an alternative mode of redressal shall be suggested.

### 10.2.5 Site Inspection and Resolution

For the purpose of verifying and resolving the grievances received, site inspection may not be required in all the cases. Depending upon the sensitivity of the issue, requirement of a site inspection will be identified.

A site inspection will be undertaken by the site level community liaison officers or the project member assigned by the contractor's Environment and Social officer. The purpose of the site inspection will be to check the validity and severity of the grievance.

For this purpose, the personnel may also undertake discussions with the concerned external stakeholder. The inspection will be undertaken within ten days of receiving the grievance. The assigned individual will then work with other relevant members of the Project team to investigate the problem and identify measures to resolve the grievance as appropriate. The personnel to be involved in the grievance resolution shall be dependent upon the nature of the grievance.

### 10.2.6 Resolution, Escalation, and Closure

Based on the understanding thus developed, the CLO, in consultation with the concerned departments, shall identify a suitable resolution to the issue. This could involve provision of information to clarify the situation, undertaking measures to remedy actual problems or compensate for any damage that has been caused either by financial compensation or compensation in-kind, and introduction of mitigation measures to prevent recurrence of the

problem in the future. This resolution shall be accordingly communicated to the grievant within 10 working days of completing the site investigation.

#### **10.2.7 Update of Records**

The records of the grievance register shall be updated every working week with the present status of the grievance. Once the grievance is resolved, and the same has been communicated to the grievant, the grievance shall be closed in the grievance register. The grievance register should also provide an understanding of the manner in which the grievance was resolved. These instances shall then serve as references for any future grievances of similar nature.

#### **10.2.8 GBV (SEA/SH) GRM**

There will be a separate reporting and documentation mechanisms for GBV (SEA and SH) cases that are discrete from the standard GRM, that will be utilized by survivors or their representatives, to ensure all GBV cases are reported and handled confidentially. PAPs and all workers/staff will be made aware of these mechanisms through awareness sessions and staff inductions respectively. KETRACO's Social Expert supported by the Social Expert from the contractor's end will be the focal point and will establish the system to handle these complaints that will include reference to confidentiality, safety and survivor-centered approach. All registration of the data will be confidential and anonymized.

#### **10.2.9 GRM Monitoring and Implementation**

It is important to monitor GRM to ensure that the grievances are addressed and resolved. The monitoring of the GRM implementation will be undertaken on a monthly basis by the KETRACO team. Monitoring will include:

- Auditing the implementation of the GRM
- Monitoring the formal and informal consultation activities conducted with the stakeholder groups with respect to GRM
- Tracking feedback received from engagement activities
- Recording and tracking commitments made to communities; and
- Assessing the efficacy of the engagement activities in terms of the desired outcomes and the participation of the stakeholder groups.

#### **10.2.10 GRM Reporting**

The performance of the GRM will be reviewed on a quarterly basis during the implementation period. For the purpose of review, the quarterly reports will be considered for analysis and discussion. On the basis of these reports, a Grievance Redressal Report will be prepared.

### **10.3 World Bank Grievances Redress Mechanism**

The World Bank has established 2 grievance redress mechanisms that provide avenues for individuals and communities to submit complaints directly if there is belief that they have been, or are likely to be, adversely affected by a World Bank-funded project. In this project PAPs and other stakeholders have the right to know and access at no cost these GRMs as described.

### **10.3.1 World Bank Grievances Redress Service**

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:

Those aggrieved or their representatives can report their complaints through the following mediums; (i) Online by accessing the online form; (ii) Sending an Email to [grievance@worldbank.org](mailto:grievance@worldbank.org); or (iii) Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.

### **10.3.2 World Bank Inspection Panel**

The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IP are listed below. Tel: +1 202 458 5200; Email: [ipanel@worldbank.org](mailto:ipanel@worldbank.org)

## **10.4 Other Administrative Grievance Redress Mechanism**

Kenya has its place institutions a justice system that provide grievance redress on environmental and land issues (including bio-physical and socio-economic) for which PAPs and stakeholders have a right to access at their own costs and at any time even without going through the internal, external GRM described in section 10.1.1 and 10.2 including World Bank GRM as described in 10.3.1 and 10.3.2. These include: -

### **10.4.1 Environment and Land Court**

A superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land.

### **10.4.2 Land Acquisition Tribunal (The Tribunal)**

A court of law that hears disputes related to the compulsory land acquisition process and in determining such disputes, confirm, vary, or quash the decision of the NLC. Tribunal has first instance jurisdiction to hear such disputes with the Environment and Land Court (ELC) exercising appellate jurisdiction.

#### **10.4.3 Commission on Administrative Justice.**

The Commission on Administrative Justice (Ombudsman Office) is the formal feedback and complaints handling mechanism in Kenya. Its mandate is to receive and address complaints against public officers and public institutions to improve service delivery.

#### **10.4.4 National Environmental Tribunal**

The National Environmental Tribunal is a quasi-judicial tribunal established pursuant to the provisions of the Environmental Management and Co-ordination Act, 1999 (EMCA). Its mandate generally is to hear any disputes regarding the exercise of power by the National Environmental Management Authority (NEMA).

#### **10.4.5 National Environmental Complaints Committee**

The National Environmental Complaints Committee (NECC) was established under Section 31 of the Environmental Management and Co-ordination Act, 1999. It was formerly known as the Public Complaints Committee (PCC) but its name changed in the EMCA (Amendment) No. 5 of 2015). It is an important institution in the assessment of the condition of the environment in Kenya. It plays an important role in the facilitation of alternative dispute resolution mechanisms relating to environmental matters.

## II CONCLUSIONS

This report presents a comprehensive environmental and social impact assessment for the proposed 132 kV double circuit transmission line and proposed measures for mitigating the adverse impacts while enhancing the positive ones during the phases of pre-construction, construction, operation, and maintenance and decommissioning. An evaluation of the possible alternatives for the project activities was also performed.

The following conclusions have been arrived at regarding the proposed 132 kV double circuit Transmission line. The anticipated benefits of the construction and operation and maintenance of the Project are immense. The project will provide a clean/green reliable supply of electricity to the region and the national grid, which comes along with many benefits. For the project components, which are suggested to be maintained and those where alternatives were provided, an evaluation of the positive and negative impacts was performed, and an Environmental and Social Monitoring Plan (ESMP) drawn. All negative impacts can be mitigated following the ESMP.

The negative impacts identified in this ESIA during the planning, construction, operation and decommissioning phase of the project, including waste generation, air pollution, noise pollution, occupational health and safety impacts, community health and safety impacts, traffic, labour influx and gender impacts will be limited to the transmission line ROW/wayleaves and can be mitigated using the measures proposed in the ESMP as well as the preparation and implementation of C-ESMPs including but not limited to:-

- ✓ *Health, Hygiene and Safety Plan*
- ✓ *Labour Management Plan*
- ✓ *Local Recruitment Plan*
- ✓ *Child Protection Strategy*
- ✓ *Grievances Management Mechanism*
- ✓ *Waste Management Plan*
- ✓ *Contractors Code of Conduct, specific provisions for VAC, SEA and SH*
- ✓ *HIV/AIDS Prevention Strategy*
- ✓ *GBV (SEA/SH) Management Plan*
- ✓ *Stakeholder Engagement Plan*
- ✓ *CSR Plan ( to be informed by KETRACO's CSR Policy)*

Other plans to aid the implementation of the safe project implementation will be included as the project continues. The adverse impacts on the physical and natural environment will be “in sum total,” not significant, and can be handled through the provided mitigation measures. There are incremental costs required to achieve these. The contractor will be legally bound to implement this ESMP and any subsequent C-ESMP that will be developed during the construction process. This obligation will be explicitly stated in the ToR, bidding documents and the final executed contract. Based on the immense project benefits of the clean energy generation/harvesting and transmission, which have been stated above, and the identified negative impacts which can be mitigated in the proposed ESMP, we strongly contend that NEMA will find this ESIA study satisfactory and the project environmentally and socially viable to be permitted to take off.

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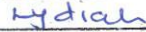





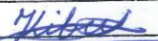







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## I4ANNEXES

## **14.1 ANNEX A. LIST OF PARTICIPANTS CONSULTED**

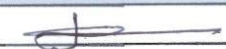






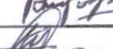

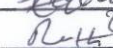
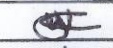
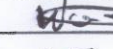
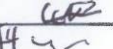
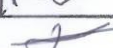
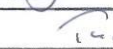



**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 05/06/2019 VENUE BAHATI CHIEFS CAMP

NAME	PHONE NUMBER	SIGNATURE
Lucy M. Kamau	0720717619	
RUTH WANJERU	0716910522	
JANE MUTHONI	0712718377	
Lydia Wambui	0717087134	
NANCY WAMBUI	0700811115	
MARGARET MUMBI	0711997884	
VIRGINIA WAMAIHA	0710289784	
MARY WANJIRU	0724060906	
Ether Wanjiru	0728147952	
Hazamire Wacake	0710634489	
JOHN KIBUI MURAGE	0728971797	
JOHN MAINA MACHARIA	0725600963	
REBECCA WANGARI		
ROBERT MONGA	0728432546	
JOHN MDEGWA	0727314231	
JONATHAN CHEGE	0724619294	
JOHN KIMANI GITAU	0721435204	

05/06/2019

**PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINZALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES**

NO	NAME	DESIGNATION	SIGNATURE
	WILSON KARIUKI GICHAGA	RESIDENT	
	SIMON KARATI MUTHATOA	RESIDENT	
	GEORGE KIMATHI WACHARA	"	
	WILSON MANGA HDUNGU	"	
	GEORGE WAMBE KINYUA	"	
	JOE KAMAU WANDERI	"	
	SAMUEL KIBI KARIUKI	"	
	PETER WAMBE GATURUKU	"	
	PAUL MAINA WAMBOGI	"	
	WATGAI WACHARA	"	
	ELIJAH KURIA GUCHU	"	
	SAMSON HDEGUA HAMBURU	"	
	RUTH NYAMBURA KARATI	"	
	JULIA WANGARI KATHAKA	"	
	MARY WANGUI KANYORA	"	
	LUCIA WANGUI KITHONGE	"	
	HANNAH WATHARA CHEGE	"	
	RAEL SEMAYO TUET	"	

**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 05/06/2019 VENUE BAHATI CHIEFS CAMP















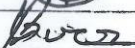



NAME	PHONE NUMBER	SIGNATURE
Francisca Mwikali John	0726141067	<i>[Signature]</i>
DANIEL MACHARIA MAINIA	0720242197	<i>[Signature]</i>
HALIMA NYAMBURA KIARII	0702553069	H.N.
NAOMI WATHIRA MWANGI	0701565521	<i>[Signature]</i>
MARY MWANGI	0727722848	<i>[Signature]</i>
MARGRET. WANTIRU MWANGI	0723094766	<i>[Signature]</i>
MARGRET MUKONI KURIA		<i>[Signature]</i>
WANGI WANJA KIRGORI	0711219223	<i>[Signature]</i>
Chelomse Gakeni Wambugu	0790788816	<i>[Signature]</i>
MERIC MUNIH KANYARI	0725569025	<i>[Signature]</i>
JOHN WAMAI		<i>[Signature]</i>
ESTHER KICHUKI	0719369218	<i>[Signature]</i>
Grace Wambura	0706088635	<i>[Signature]</i>
SUSAN WANGIRU MWANGI	0792445587	<i>[Signature]</i>
MARION WANGACHI	0741803267	<i>[Signature]</i>
LADLINE K MBATHA	0710309891	<i>[Signature]</i>
Susan Ngokabi Wangombe	0714583457	<i>[Signature]</i>

09/08/19









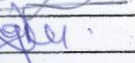
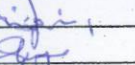
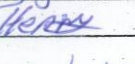
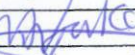



## GATIMU CHIEFS CAMP

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
1	DAVID KARIUKI NDERITU	MUNGETHO	
2	CHARLES KARIUKI NDEGWA	RESIDENT KARAGOINI	
3	David Makeno Mung'etho	KAHEMBE	
4	Duncan Gathembu Wacira	Mung'etho	
5	Heron Kariuki Muthoni	Mung'etho	
6	LEWIS NDUATI GICHARU	Karagoini	
7	DAVID GITONGA WAMITHI	KARA GOINI	
8	BONFACE KABIRU	KARAGOINI	
9	Rev DEACON EZEKIEL M. MUTHINA	KAHEMBE/MUTANGA	
10	Peterson Kariuki Thirango	Mung'etho	
11	JOHN WAMBUU MUMBUI	MUNG'ETHO / MUTANGA	
12	STANISLAW Kung'u Kariuki	Mung'etho	
13	RAFFISIA Ndungu Gituku	Mung'etho	
14	JAMES NDIRANGU WANJOHI	MUNG'ETHO	
15	James Ruda	KAHEMBE	
16	JOHN KARIUKI WANENE	KARA GOINI (KAHEMBE)	
17	PAUL KINGORI MUIRU	KARAGOINI	
18	CHARLES GADHANTA RUGIRI	KARAGOINI (KAHEMBE)	













**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 09/08/19 VENUE Gatimu Chiefs Camp.

NAME	PHONE NUMBER	SIGNATURE
EUNICE N. KJUGUNA	0726138108	
FELISHINA KAMAU	0724732356	
GRACE W. KAMAU	072629368	
Joseph K. Gachoya	0722684497	
PETER N. WAINAWA	0724021257	
Collin M. Mwangi	0227341185	
Manne Mwangi	0708054684	
George Mwangi	0711690403	
Linet Mbova	0733838091	
Paul Apichu	0720719977	
Ephraim Wachira	0722921187	
PETER N. NG'AMU	0712264482	
David Nkuge Kimani	0723805521	
SIMON M. MBURU	0225201207	
PETER GAKAHU	0715348235	
Henry Gichinga Githii	0728922186	
MOSES NJICA GACHUGA	0721987823	

**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 09/08/2019 VENUE GAJIMU CHIEFS CAMP

NAME	PHONE NUMBER	SIGNATURE
JANE WANTIY KAHURA	0724239929	
STEPHEN NJUGI NJUSUNIA	0721292800	
WILSON WATHOME MUTA	0712776946	
MARY MUTETI	0713213927	
Rebecca Luthini	0715759037	
BENEDICT CHERONO	0716537403	
KENIENDY Juma	0798542234	
HANNAH WANJIKU KOIMBU	0722725295	
PHILIPINA WAKONYO	0728127003	
DAVID NDUGU MAINA	0726364802	
SUSAN WANDIKU	0712494672	
JOHN NDUGIRE ASS CHIEF	0725204406	



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08/08/19

GATUMU CHIEFS CAMP

NO	NAME	DESIGNATION	SIGNATURE
66	Esther Wanjiku Kuria		
67	Mary Nyoki Gathumui		
68	Miriam Wangari Wangui		
69	Mary Muthoni Githungo		
70	Virginia Wathereza Karoki		
71	Daniel Wainaina Kimani		
72	Patrick Ndegwa Kamau		
73	Alice Ngũgĩ Mahunda		
74	Lucy Nduta Kamau		
75	Stephen Ndutu Ndutu		
76	Wilson Kimani Mwikia		
77	Joseph Waweru Njeru		
78	Joseph Njeru		
79	Paul Maitia Kariuki		
80	PETER KIMANI WAWERU		
81	STEPHEN KAMERIC KAMANI		
82	Hannah Wanjiku		
83	Daniel Njuguna Simon		










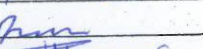

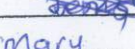
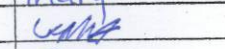
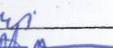




DATE 08/08/19 VENUE GATUMU CHIEFS CAMP

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












**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

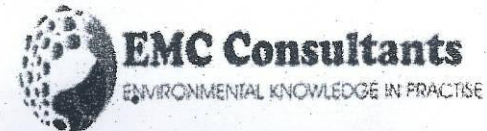
DATE 8/8/2019 VENUE GAUMBIRO CHIEFS CAMP

NAME	PHONE NUMBER	SIGNATURE
CONSOLATA KAMBUI NAMUGO	0722973325	
GIBSON GICHURE NDUNGU	0713-034-655	
DAVID LUKOMO MUCHIRI	0725 635 1141	
Marcy Muthoni Mwangi		
DANIEL MACHARIA NDUNGU	0712890114	
GLADYS NJAKI MUGO	0727 87 2175	
JANE WANJIRU MWANGI	07	
JOSEPH KINYUA KAROKI	0720 678282	
DAVID KARIRI	0726 890273	
PETERSON MUKATHI	0727563279	
GODFREY M. MWANGI	0714 823 524	
GRISHON GICHU	0743282169	
MARY MUTHONI	0725315781	
SABAS HIRINGA	0711881388	
JOSEPH NGUMU	0727479031	
ISAACK KIGITHU MWANGI	0710217227	
	<del>0710217227</del>	

**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 08/8/2019 VENUE GATUMBIRI CHIEFS CAMP

NAME	PHONE NUMBER	SIGNATURE
BETH ALAWA	0729690036	
PAULINE WANJIRO	0722039429	
KENNETH CHIRURI	0717412897	
Benson Ndung'u	0718439528	
William MBERA	0716171658	
ONUGRI THOMAS	070743088	
Cecilia Kamau	0700451340	
Ester Mjaki	0714938340	
Grands Wambui	0701244045	
Josephine Wambui	0726765718	
Margaret W. Wangombe	0725839515	
Winfred W. Wanyonyi	0720595701	
Alice Wairimu Kahuga	0718405241	
EMERY NJOKI KAMUKU	0701836185	
Moses Mwangi Muchiri	0701804846	
Simon Ndung'u Ndegwa	0745915483	
Joyce Wambui	0797205368	




















**LIST OF ATTENDANCE –PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 8/8/2019 VENUE GATUMBIRD CHIEFS CAMP

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**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**




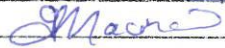






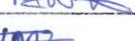



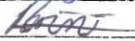
DATE 08/8/2019 VENUE GATUMBIRI CHIEFS CAMP

NAME	PHONE NUMBER	SIGNATURE
BETH ALAWRA	0729690036	
PAULINE WANJIRU	0722 039 429	
KENNETH CHIRURI	0717 412 897	
Benson Ndung'u	0718 43 95 28	
William MBERET	0716171658	
ONUGI TOMO	070043088	
Cecilia Kamau	0700451340	
Ester Mjaki	0714938340	
Grands Wambui	0701244045	
Josphene Wambui	0726765715	
Margaret W. Wangombe	0725839515	
Winfred W. Wanyombe	0720590700	
Alice Wairimu Kahugu	0718405241	
EMERY NJOKI KAMUKU	0701836185	
Moses Mwangi Muchuri	0701804846	
Simon Ndung'u Ndegwa	0745915483	
Joyce Wambui	0797205368	

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**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 08/08/19 VENUE GATUMBIRD CHIEFS CAMP.

NAME	PHONE NUMBER	SIGNATURE
Phyllis WANGARI KARIURI	0723 274565	
RUTH ATERI MUNGAI	0710 943 381	
Phyllis Kathanga Ndlovu	0700 753 104	
Virginia Wangari Macharia	07240 3131	
ROSEWATI JIKU MBUGUA	0718860 233	
DEMARI Nyawira Macharia	0717611 759	
Joshua Ndungu Kamau	0721382 605	
WILSON MUAUGI GICHU	0722786 5231	
Dennis Karanja Mwaria	0704158 105	
John Muriuki Kirengeri	07	
NANCY WANGIKU KIRAGU	0701848 947	
Martha Wambui GIKIKA	0717507 232	
Joseph Gichuki Ndungu	0745121 354	
Kimyua MAINA		
John Chege MUSAURA	0710434 138	
BONIFACE KARURU MAINA	0729005 037	
Duncan MBUGUA	0703736 867	



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ENVIRONMENTAL KNOWLEDGE IN PRACTICE

04 14/08/2019

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
19	RACHEL MUMBI MBURU	RESIDENT KARAGOINI	MUMBI
20	AJERICH WANJUI KINORI	RESIDENT KAHEMBE	Wanjui
21	MARGARET WANJUI WAITHAKA	FARMER KAHEMBE	Margaret
22	Joseph Thuka Inwangi	FARMER Karagoini	Joseph
23	Teresiah Wanjiru Ndaba	FARMER Karagoini	Wanjiru
24	ELIZABETH WANJIRU THAGANA	FARMER KARAGOINI	Elizabeth
25	VERONICA WAMBUI KIRAU	RESIDENT KARAGOINI	Veronica
26	Margaret Muthoni Nderoki	KAHEMBE	M. Muthoni
27	Joseph Kiguty Ndinty	Mungetho	Joseph
28	ALEX KAHU	FARMER KARAGOINI	Alex
29	Mr. Lucy Wanjiku Nduahi	Kahembe	Lucy
30	Joel Ruo Ndavahi	Kahembe	Joel
31	David Ngachama	Farmer	David
32	Esther Nyangati	Kahembe	Esther
33	Nancy N. Janyokabi	Karagoini	Nancy
34	Christopher W. Njau	Kahembe Karagoini	Christopher
35	Reuben Eliud Mbutu	Farmer Kahembe	Reuben
36	CHARLES KURIA WAINAINA	KAHEMBE	Charles



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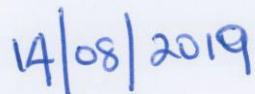
EMC Consultants

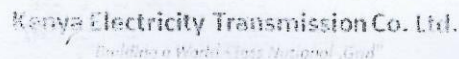
ENVIRONMENTAL KNOWLEDGE IN PRACTISE

14/08/2019

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
	David K. Kambugu	RESIDENT KARAGOINI	Ma
	Maina Kamburi	Resident	Ma
	JOH WAINAINA KAGRI	KARAGOINI	John
	JOHN MBUGUA	Resident - MUTANIGA	John
	P.C.E. A-LAZAROW K. MAINA	" - KARAGOINI	John
	Full Gospel Kamburi J. Muruthi	" - KARAGOINI	John
	Robert Machinga Githui	"	Robert
	Joseph Njuguna Thiong'o	"	Joseph
	Kimani Githui	"	Kimani
	Demas Maina Kaguomba	- Kaguomba	Demas
	Simon Githui Kimani	Karagoini	Simon
	CHARLES MWANGI KIMOTU	KARAGOINI	Charles
	Job Waiyaka Mweya	KARAGOINI Kabereba	Job
	CHARLES NGUGIA WAININU	Kaguomba	Charles
	WILSON MWANGI KIBE	Kaguomba	Wilson
	JOHN K. KIPLETINGA	Karagoini	John
	Benjamin Githui Kibei	KAGUOMBE Resident	Benjamin
	AKI Antony Kiana wagoi	Karagoine	AKI

[illegible]



14/08/2019

ENVIRONMENTAL KNOWLEDGE IN PRACTICE

NO	NAME	DESIGNATION	SIGNATURE
14	JOSEPH KIMANI WAMUGI	LESIAU (KATHENBE)	KIMANI
15	JAMES MWANGI KARUGA	KARAGOMI	JM
16	MICHEKA CHARLES KARUGA	KARAGOMI	CK
17	MARY WANJIECHI NOEBI	LESIAU	MW
18	MONICAH WANJIRU KAMAU	MUNGETHO	Monicah
19	DANIEL GITHOI GITHINJI	KARAGOMI	DG
20	DAVID MWANGI KERICHO	LESIAU (Mungetho)	DM
21	JOSEPH KANGARA KERICHO	LESIAU (Mungetho)	JK
22	PATRICIA WAHOMI	LESIAU (Mungetho)	Patricia
23	MARTIN KIBUMIA MURRY	KARAGOMI	MK
24	JOSEPH MWANGI KERICHO	LESIAU	JK
25	<del>JOSEPH KANGARA KERICHO</del>		

14/08/2019

**PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES**

NO	NAME	DESIGNATION	SIGNATURE
1	Walter Ngandu	Deputy Ngandu Ward	[Signature]
2	CYNTHIA AKOYI	ACC KIRIITA WARD	[Signature]
3	MARY W. WAHOMBE	CHIEF - LGSHAU LOCATION	[Signature]
4	JOSEPH K. KURIA	ASST. CHIEF MBUYU SUB.	[Signature]
5	LEAH M. NJOKI	ASST. CHIEF MUNGETHO SUB.	[Signature]
6	JOSEPHAT K. KIPSIMO	ASST. CHIEF KARAGDINI SUB.	[Signature]
7	JANE W. MUTATI	ASS. CHIEF KAHEMBE	[Signature]
8	MOSES K. MWANGI	RESIDENT - KARAGDINE	[Signature]
9	Peter G. Mathenge	Farmer - Kahembe	[Signature]
10	Margaret N Kagema	Farmer - Kahembe	[Signature]
11	ANN MUTHONI KARIUKI	RESIDENT MUNGETHO	[Signature]
12	TABITHA WANGECHI WANG'ONDU	Farmer Karagoini	[Signature]
13	JANE WANGECHI KARIUKI	RESIDENT MUNGETHO	[Signature]
14	JAMES GATIMU MWANGI	RESIDENT MUNGETHO	[Signature]
15	JEMIMAH WANJIRU MAHARUKA	RESIDENT MUNGETHO	[Signature]
16	Pauline Mhaguthui Kariuki	farmer Karago-ini	[Signature]
17	JANE WANJIRU GIONEN	RESIDENT MUNGETHO	[Signature]
18	MARY NJOKI GITHAS	RESIDENT KARAGO-INI	NJOKI

**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 04/06/2019 VENUE G.D.C GIDUNDUS (KIRIMA LOCATION)

NAME	PHONE NUMBER	SIGNATURE
John Kanyogote	0701697162 /	
Martha Wambui	0721518831	
HANNAH NSERI GITHIPI	0725259982	
Joseph Wamere Wanyohi	0722423369	
JACOB MUTHA	0797182987	
SAMUEL WANJOHI	0725005309	
GEORGE NJOROCIE	0707798144	
GRACE MACHARIA	0722634185	
FRANCIS MACHARIA GICHINI	0714785082	
LUCAS SHINGODEKE ISHOKA	0720218267	
Esther Wanjiku	0715661833	
Fredrick Komu	0724821153	
JAMES M NYUPI	0727792226	
Paul Maina Wachira		
MICHAEL NJIRU MURUPH	0721838745	
Stephen Ngunjiri Kamau	0721938139	
KIRIMA ROBERT	0724000512	

**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 04/06/2019 VENUE G.D.C Grounds (KIRIMA LOCATION)

NAME	PHONE NUMBER	SIGNATURE
John Kanyogoto	0701697162 /	
Martha Wambui	0721518831	
HANNAH NSERI GITHIPI	0725259982	
Joseph Wamere Wanyohi	0722423369	
JACOB MUKITA	0797182987	
SAMUEL WANJOHI	0725005309	
GEORGE NJOROCIE	0707798144	
GRACE MACHARIA	0722634185	
FRANCIS MACHARIA GICHINI	0714785082	
LUCAS SHINGODEKE ISHOKA	0720218267	
Esther Wanjiku	0715661833	
Fredrick Komu	0724821153	
James M Njiru	0727792226	
Paul Maima Wachira		
MICHAEL NJIRU MURUPH	0721838745	
Joseph Njiru Kamau	0721938139	
KIRIMA ROBERT	0724000512	



**KETRACO**

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04/06/2019



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ENVIRONMENTAL KNOWLEDGE IN PRACTISE

G.D.C Grounds (KIRIMA LOCATION)

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
48	JECINTA MUTHONI	0713 788 775	
49	JECINTA WAMBUI	0705823354	
50	MARGARET MUTHONI THEURI	0725 402479	
51	TABITHA MUTHONI GITANI		
52	JANE WANGUI MWANGI	0721 603 103	
53	ALICE M MUCHERU	0723015047	
54	FLORENCE W. KARIUKI	0717019558	
55	WILSON KARIUKI	072318 67 99	
56	SAGDEY WAGWAGU	0707643739	
57	HANNAH WANGI MBUGHA		
58	DANIEL NJUGUNA KAMAU	0711 275 235-	
59	SIMON NJIKIA KAMAU	072930 83 76	
60	MARY IVJERI GACHINE	0705084350	
61	PAUL GACHINE	0703227039	
62	MICHAEL GITHA MWANGI	0726287347	
63	ANNE WANGUGU MUCHIRI	0711 689 914	
64	ELIUD NGARUITA KARANJA	0712 999 13 4	
65	SIMON NDURU MWANGI	0702 196 944	

**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 06/08/19 VENUE Kirimagai Grounds

NAME	PHONE NUMBER	SIGNATURE
HEZRON NYAMBERI	0721584761 (DCC)	<i>[Signature]</i>
GLORIA JOICE AKINYI	0714157322	<i>[Signature]</i>
JOHN MUKAI NGITHIA	0726336666	<i>[Signature]</i>
William M. Gitonga	0723236443	<i>[Signature]</i>
Collin Mwendu	0727341185	<i>[Signature]</i>
PAUL AYIEKO	0720719977 (EMC-KETRACO)	<i>[Signature]</i>
LINET MBOVA	0733838081 (KETRACO)	<i>[Signature]</i>
<i>[Signature]</i>	071417091	<i>[Signature]</i>
MARINE M. LUSEKA	0708654684 (KETRACO)	<i>[Signature]</i>



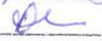







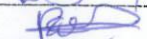

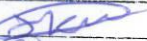




**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 6/8/19 VENUE Kumogoi Grounds

	NAME	PHONE NUMBER	SIGNATURE
81	Peter Karuki Nduaga	0741 609400	<i>[Signature]</i>
82	David Ngungu Mwangi	0729 003103	<i>[Signature]</i>
83	Lawrence Shikoro Mugo	0726521856	<i>[Signature]</i>
84	SMAINA KARIKI	070218898	<i>[Signature]</i>
85	BENARD MWANGI	20770590	<i>[Signature]</i>
86	FRANCIS WACHIRA KAHIA	0718694477	<i>[Signature]</i>
87	CELESTINE MUKITHI KAHIA	0728852945	<i>[Signature]</i>
88	ALBEMBERE MUKOKA WACHIRA	0722858182	<i>[Signature]</i>
89	JAMES KIMATHIA KAMAU	0724565861	<i>[Signature]</i>
90	HIRAIKE WATANI WATISINGA		<i>[Signature]</i>
91	FRANCIS K. MUGO	0721120568	<i>[Signature]</i>
92	JOEL MITHIGO MUKI	0725386433	<i>[Signature]</i>
93	STEPHEN KAMAU KABANGI	0727069326	<i>[Signature]</i>
94	LYDIA WANJIRU KIMANI	0728 20 21 86	<i>[Signature]</i>
95	PETER GITAU MWANGI	0700359173	<i>[Signature]</i>
96	MAR-I MUTHONI KIONGO	0714212344	<i>[Signature]</i>
97	Mbugua Sammy	0722 366339	<i>[Signature]</i>











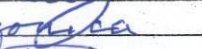






**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 06/08/19 VENUE Kirimangai Grounds

	NAME	PHONE NUMBER	SIGNATURE
98	JOHN MANA NYAGU	0710233797	
99	Francis Marutunga Ilahi	0703225403	
100	MOSES MUNGAI	0708369221	
101	Julius Mwangi	0713894614	
102	EVAN NYOGU	0725226930	
103	Alex MWAURA	0700543760	
104	JOHN RANJIA	0725512571	
105	James THUI	0729792188	
106	George MUKHO	0705381003	
107	Joseph Wambui	0728806897	
108	Henry Wambui	072238530	
109	PAUL KATHIA WAKIERU	0714113064	
110	JOSIAH MURIRA	0702527931	
111	JAMES MARICI	0725443623	
112	Bernard Gathiru	0725994596	
113	William Njuguna	0719404297	
114	JAMES NJATHA	0724838184	

**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 06/08/19 VENUE KIRIMANGAI GROUNDS

NAME	PHONE NUMBER	SIGNATURE
MARY NGERI KIMANI	0724425448	
JOHN LAWERU NJURGE	070748743	
FREDRICK M. KABIRO	071139456	
M. Wambui Kibui	0722178120	
BENSON MDEGWA	0723539133	
SYMON K. MWANGURA	0723257390	
GERALD CHEGEMURLEITHI	03400723916511	
PETER GACHARA MUNDU	0717958154	
DAVID RULIM	0721622474	
MICHAEL WACHARA GAKURU	0722903099	
PAUL MUNUHE KINGORI	0721821585	
DAVID MAACHARIA MWANGI	0725222364	
LUCY WANJIRU GICHEHA	0700205120	
VERONICA NYAMBURA KAMUKI	0715525477	
MARY NYAMBURA MUTURI	0714241567	
ANN MUTHONI MUTHUI	0724508231	
JOYCE WANJIRU RUARA	0728060915	

(OLJOROROK LOCATION).

LESIRKO MEETING

07/08/2019.



**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAL-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE \_\_\_\_\_ VENUE Hospital Hill Primary School


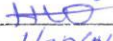






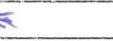
NAME	PHONE NUMBER	SIGNATURE
ANDREW KIBUKA NBURA	0729821143	
SAMUEL MURAYA MUTHICI	0724928770	
ESTHER WAKSIRU KANIMBU	0718 953314	
JANE WANJIKU	0701 826860	
SERAH KIANJIKU KIIRU	0723758423	
MARY WAMBUI KITHUNDU	0712664016	
TERESIA NJAMBI	0790140077	
PAUL NJOGU MURIUKI	0722224638	
JAMES MWALURA KARUKI	0725872809	
DAVID WACHIRU	0700224591	
ROBERT MWANGI MUTHONI	0721961146	
Shadrach K. Kamau	0721104271	
SIMON M. KINGORI	0725500627	
JAMES M. KIMANI	0743031557	
SIPHEN KARIU MAINA	0720834003	
JOHN WAINANA CHEGE	0727670019	
JOSEPH MURUKU MUTHICI	0724400066	



LESIRKO MEETING  
07/08/19

LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES

DATE \_\_\_\_\_ VENUE Hospital Hill Primary School

NAME	PHONE NUMBER	SIGNATURE
JANE WARIWA NJENGA	0726955287	
HANNAH WANGUI MWANGI	0797204596	
HANNAH MUTHANI NGETHE	0710468995	
MAINA CHEGE	0721817818	
M. Ndingira Mwangi	0721564070	
GEORGE MUGENYU KURIA	0721685618	
Samuel M. Kibee	07214756127	
PAUL Githago Wariwa	0731036547	
Tabitha Nyokabi	—	
ANNE NJERI MURRAY	—	

# PUBLIC MEETING LORIEN

12/10/2019

**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE- 12/10/2019


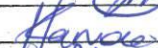

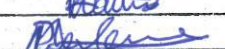
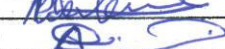






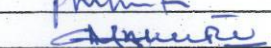

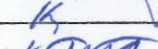

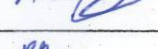
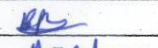
VENUE- LORIEN CENTRE

NAME	PHONE NUMBER	SIGNATURE
Simon Mui	Member	[Signature]
Wilson Bamot	Member	[Signature]
Mango Ngatet	Member	[Signature]
Daniel Shuma	Member	[Signature]
Stephen Kamari	Member	[Signature]
David Kimani	Member	[Signature]
Peter Kipsogen	Member	[Signature]
James Arap Suge	Member	[Signature]
Shukhe Kimani	Member	[Signature]
James Koach	Member	[Signature]
Majin mja	Member	[Signature]
Jackson Ioo	Chairman	[Signature]
Mr. Cheriot	Chief	[Signature]
Paul Ayieko	Member	[Signature]
Ronald Keegen	Member	[Signature]
	Member	
	Member	

# MAIRO-INYA LOCATION (PUBLIC CONSULTATION MEETING)

## LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES


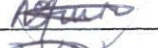


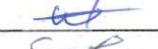

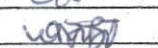
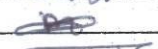
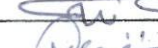



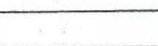

DATE 13/08/19 VENUE BAARI SEC SCHOOL (GROUNDS)

NAME	PHONE NUMBER	SIGNATURE
JAMES KARIMI KANJA	0727815088	
HENRI KAMAU	0129745689	
ROBERT WACHARA	0920374885	
DAVID M. WAMBURU	0123490516	
ISAAC KIHIMBA MUNGAI	0719740269	
KENNETH NDEGWA MBOGU	0728797585	
REUBEN KARIUKI	0127414207	
STEPHEN MACHARIA NDERITU	0729201135	
DAVID NJORGE	0726136260	
PAUL MBUTI	0722142624	
MAINA A. GAKURU	0721582706	
Muchemi Kamau	—	
KAMAU NGANGA	0728663161	
JAMES Njenga	—	
Robere Ndegwa	0711489076	
STEPHEN M. WATSON	0720692582	
JOSEPH MWANGI	07208251263	

**MURUINYA LOCATION**  
(PUBLIC CONSULTATION MEETING)

**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 13/08/19 VENUE BAARI SEC SCHOOL (GROUNDS)

NAME	PHONE NUMBER	SIGNATURE
PAUL RUARA MAINA	0710155241	
Rev. STEVENS MUIRU	0722 256 491	
Julius KARANJA	0706442526	
ROSE Wanjiru Ngavari	N/A	
Paul Ayieko	0720719972	
Naomi Rotich	0725932008	
SETHEN GACHARI NGETHA	078764114	
CHARLES WACHIRA NGATHA	0724159100	
PETER KIMANI	0777961392	
Wilson MAINA	0724307892	
Leonard Githui Muriithi	0729137415	
JACOB GITHUI GITHAE	0725344803	
JOSHUA NGATAT	0738237892	
Ronald Rongori	0725058332	



**KETRACO**

Kenya Electricity Transmission Co. Ltd.

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**NDIVAI BAPTIST CHURCH  
GROUND**

15/08/2019

**EMC Consultants**

ENVIRONMENTAL KNOWLEDGE IN PRACTICE

**PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP)  
AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM  
132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES**

NO	NAME	DESIGNATION	SIGNATURE
1	JAMES WAMWEN KIRARAN	ASST CHIEF MATHANGI	
2	TITUS N. WATHAKA	ASST CHIEF KIRERA	
3	JOEL M. KUNGORI	ASST CHIEF NDIUAI	
4	Simone KIBIRA KIMETI	RESIDENT	
5	Eustace Ngari Mwangi	RESIDENT NDIUAI	
6	PATRICK NGUGI KIRAI	" NDIUAI	
7	GODFREY GITAH MUKHEMI	" KIGAWA	
8	JANE WAMJERU MUCHEMI	RESIDENT KIGAWA	
9	PETER MATHEGE	" KIGAWA	
10	JOSEPH ISARIUKI	" KIGAWA	
11	Samuel Karamuki Mwangi	" KIGAWA	
12	ALICES KIRATI	RESIDENT KIRATI	
13	RAEL KIPTOO	" KIRATI	
14	ELIZABETH NDIUTA	RESIDENT NDIUTA	
15	Charity Kiragu	KIGAWA	
16	Susan Kiama	KIRATI	
17	Esther Gokumbui	KIRATI	
18	LUCY WANGUI	KIRATI	

19. J. KUNIAI SANGIRAKI

20. CYNTHIA AKOII

21. JOHN KAMOWDO

ACC - KESHAU PONGO

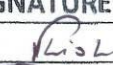
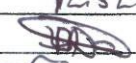
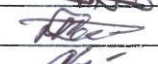
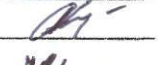


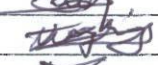
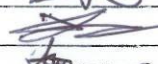
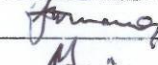

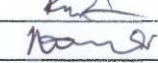
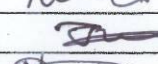
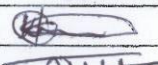
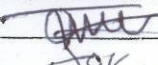
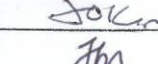



ACC - KIRIITA WARD

CNN CHIEF MATHANGI

15/08/2019

## NDIVAI BAPTISED CHURCH GROUP

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
	PAUL KIBE KIOH	ASST. CHIEF	
	JOSEPHINE W. MUGAMBI	ASSI. CHIEF	
	JOSEPH KAHARA HJOKA	ELDER	
	JOSEPH HDUNGU KAHUKU	ELDER	
	PETER MUTHOI MATU	ELDER	
	DAVID KARIUKI GACHUCHA	RESIDENT	
	DAVID H. KARETU	"	
	JACKSON MATISAU	"	
	JOSEPH MWANGI KIOHGA	"	
	JOSEPH MAINGI MWANGI	"	
	DEDAH MWANGI CHEGE	"	
	DAVID MAINA MURUTHI	"	
	MARTIAL WACHARA KIHORI	"	
	JOSEPHAT MBUGUA MACHARIA	"	
	WILLIAM GICHUTHI	"	
	JOHN MUGERA	"	
	JOAKIM MUGO HDIRANGU	"	
	JESE MWANGI HEMGA	"	



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EMC Consultants  
ENVIRONMENTAL KNOWLEDGE IN PRACTICE

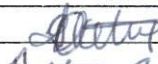
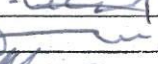

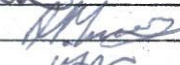
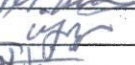

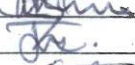
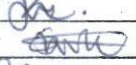


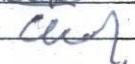
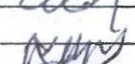

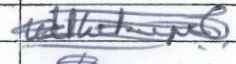



## NDIVAI BAPTISED CHURCH

PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP) AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGA-OL KALAU - RUMURUTI TRANSMISSION LINES

NO	NAME	DESIGNATION	SIGNATURE
	Hannah Nyokabi Kariuki	NDIVAI	
	BETH Rugubia Muthaa	NDIVAI	
	DAVID MAINA KANIARU	NDIVAI	
	BETH NJERI MURITHI	NDIVAI	
	Florence Kanyingi	NDIVAI	
	Lucy Wangari Kallioi	NDIVAI	
	RUTH MUMBI KIHUMBA	NDIVAI	
	LUCY NYAWIRA NDERWA	Nderwa	
	ANTONY GICHINGIRI MUTHI	NDIVAI	
	LYDIA XGAMU	XGAMU	
	MARGARET W. WATHARA	NDIVAI	
	Lucy Wadhwa	NDIVAI	
	BETH TJOKI	NDIVAI	
	JOSEPH KUNDU	XGAMU	
	LILIAN AUYAMBO	XGAMU	
	MARGARET WATHIERANI	NDIVAI	
	NDILUS WANGECHI	NDIVAI	
	MONICAH W. NDERITU	NDIVAI	

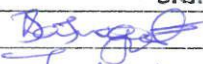
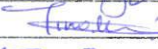
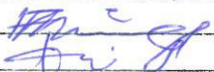
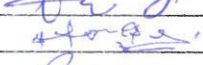
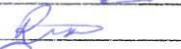


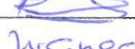




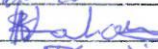


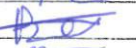

**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE 15/08/2019 VENUE NDIVAI BAPTISED CHURCH

NAME	PHONE NUMBER	SIGNATURE
GODFREY KIHUTHA GICHUTHI	0722979565	
GEORGE MURAGE	0729358979	
MICHAEL N. KAMAU	0727262877	
ALOIS MUIRURI MBUGUA	0728874501	
MICHAEL N. MUIRURI	0723206039	
NAHASITHI GICHUKI MBURU	0723732328	
JOSEPH M. KARIUKI	0717000646	
GRACE NYAMBURA NARUA	0725357867	
ALICE NYAWIRA		
PAULINE NYANJAU	0713438236	
LUCY NYAGUTHI		
FRANCIS KARIUKI	0716284940	
NDIVAI GICHUTHI	0709618623	
JOHN GICHUTHI	0726456777	
ANNE GICHUTHI	0793986989	
ELVIS NDIVAI	0714293906	
DANIEL MBUGUA	0796865823	






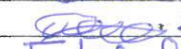



**LIST OF ATTENDANCE - PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

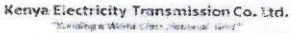
DATE Diamutia VENUE GICHAKA CHURCH  
05/08/2019.

	NAME	PHONE NUMBER	SIGNATURE
1	FRANCIS KADUHU NDERITU	0712 63 4361	
2	Timothy Methenge	0725 736 978	
3	KANJAU MWANGI	0711 236 551	
4	Moses MURURI GATHITHI	0710 601 445	
5	ALEX N. MWAURA	0706 566 573	
6	Richard MURIBI	0718 728 253	
7	Samuel Gitau Ngube	0711 305 803	
8	DAVID ICURIA ICABAIKU	0729 053 011	
9	MARGARET WANGARI MWANGI	0710 131 374	
10	JOHNS MITUGA MURUGA	0715 133 615	
11	Francis Muriu	0792 462 83	
12	George Gilchane	0724 080 890	
13	Stephen Ndungu Kahura	0726 902 860	
14	DAVID KARITHIA	0791 80 2002	
15	Ndungu Gitau	0719 444 446	
16	ROSE Wanjiru	0701 250 889	
17	MIRIAM WABIRU NIWAIRAH	0715 295 459	

**LIST OF ATTENDANCE –PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**

DATE Orangutia 05/08/2019 VENUE GICHAKA CHURCH

	NAME	PHONE NUMBER	SIGNATURE
18	Josh Aichanaga	0720101555	
19	Patrick Gicheha	0715777965	
20	Isaac K. Kimani	0721-540452	
21	Joseph Nganga Ngure	0798941980	
22	John Chani	0720488588	
23	Joseph W. Mathenge	0724914162	
24	FRANCIS W. MATHENGE	0718454065	
25	James Ndungu Kapara	0720801298	
26	Godfrey Thuku Kamau	0736462110	



11/10/2019



SAHAMA GROUND



**LIST OF ATTENDANCE -PREPARATION OF RESETTLEMENT ACTION PLAN (RAP), VULNERABLE AND MARGINALIZED GROUPS PLAN (VMGP), AND ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR 111KM 132KV KABARNET-RUMURUTI AND 70KM 132KV MENENGAI-OLKALAU RUMURUTI TRANSMISSION LINES**


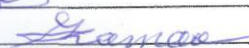






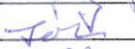





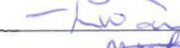
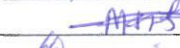

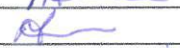







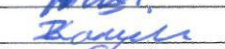




DATE 11/10/2019 VENUE SAHAMA CHIEFS OFFICE

	NAME	PHONE NUMBER	SIGNATURE
1.	Ronald Reagan	0725058332	
2.	Misheck Jithion	0728710001	
3.	Joyce Wambui	0724158545	
4.	Cecilia Wangu	0716110178	
5.	Magdaline Wairimu	0718396070	
6.	Teresa Wanjiku	0729292592	
7.	Mary Wanjiru	0711652263	
8.	Mwangi Wanjiru James	0727354383	
9.	Joseph Muthiri Thiong'o	0710238845	
10.	Benson Mdirangu Kibet	0727740190	
11.	Pauline Wanjiku Munene	0712418723 / 0726947156	
12.	Mwangi Wanjiku Wanjiku	0722156644	
13.	PETER M. MUTHUI	0721277652	
14.	JOHNSON KAMANDE	0724268679	
15.	Paul Ayieko	0720719977	



08/06/2019


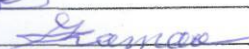






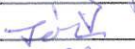





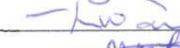
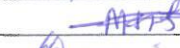

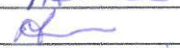







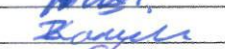




# WENDO / SABUGO CHIEFS CAMP

	NAME	PHONE NUMBER	SIGNATURE
1	SIRASHA KIHARA	0729736096	
2	Gideon Kamau	0723774258	
3	GICHORI KAMAU	0712196109 / 0710499452	
4	EUNICO Mithoni	071896109	
5	JANE WAMBUI	0706388863	
6	Sarah Wanjiru	071137902	
7	Samuel Ndungu Wanjiru	0714380710 / 0710412657	
8	John MUKUNDU MBUTHIA	0711180611	
9	JOHNSON M. WAINAINA	0727939240	
10	PETER WATITU WANJIRU	0725113131	
11	Jackson Murguna Mwangi	0729057018	
12	Mary Gathoni Gathumui	0724135134	
13	Lydia Wainimu Mwachia	0721965900	
14	Margaret Wanjui Njenge	07591121381	
15	Margaret Njoki Kimani	0723348898	
16	Mary Wanjui Gitau	070292441	
17	Glady Wainimu Njokoge	0714557011	
18	DANIEL WARAGA GATHITU	0723017485	
19	ZIPORAH NYAWIRA MAINA	0791649241	
20	LEAH NJERI MURAGU	0717566826	
21	NJOKOGE KARIUKI	0713997304	
22	MBURU GITU	0724140480	
23	ZAKARYA KAMAU	0722744297	
24	Samuel Muhoro	0726014295	
25	Samuel Mwangi	0723418959	
26	Geoffrey Kariuki	0712607272	
27	KINUTHIA KARIUKI	0729823379	
28	SIMON MIRANGA	0710335385	
29	Mary K. Rugi	0712589389	
30	ROBERT KABUTU	0728234477	



08/06/2019

# WENDO / SABUGO CHIEFS CAMP

	NAME	PHONE NUMBER	SIGNATURE
1	SIRASHA KIHARA	0729736096	
2	Gideon Kamau	0723774258	
3	GICHORI KAMAU	0712196109 / 0710499452	
4	EUNICO Mithoni	071896109	
5	JANE WAMBUI	0706388863	
6	Sarah Wanjiru	071137902	
7	Samuel Ndungu Wanjiru	0714380710 / 07104112657	
8	John MUKUNDU MBUTHIA	0711180611	
9	JOHNSON M. WAINAINA	0727939240	
10	PETER WATITU WANJIRU	0725113131	
11	Jackson Murguna Mwangi	0729057018	
12	Mary Gathoni Gathumani	0724135134	
13	Lydia Wainimu Mwachia	0721965900	
14	Margaret Wanjui Njenge	07591121381	
15	Margaret Njoki Kimani	0723348898	
16	Mary Wanjui Gitau	070292441	
17	Glady Wainimu Njokoge	0714557011	
18	DANIEL WARAGA GATHITU	0723017485	
19	ZIPORAH NYAWIRA MAINA	0791649241	
20	LEAH NJERI MURAGU	0717566826	
21	NJOKOGE KARIUKI	0713997304	
22	MBURU GITU	0724140480	
23	ZAKARYA KAMAU	0722744297	
24	Samuel Muthoo	0726014295	
25	Samuel Mwangi	0723418959	
26	Geoffrey Kavuki	0712607272	
27	KINUTHIA KARIUKI	0729823379	
28	SIMON MIRANGA	0710335385	
29	Mary K. Rugi	0712589389	
30	ROBERT KABUTU	0728234477	



## **I4.2 ANNEX B. MINUTES OF CONSULTATION MEETINGS**

**MINUTES OF MEETING HELD AT THE COUNTY EXECUTIVE COMMITTEE MEMBER FOR  
TRANSPORT, ENERGY & PUBLIC WORKS OFFICE - NYANDARUA COUNTY ON 26/06/2019**

**ATTENDANCE**

1. MR. GERISHAM NJOROGE-CEC, TRANSPORT, ENERGY & PUBLIC WORKS
2. MR.KAMAU MWANGI – CEC, LANDS
3. MR.ROBERT NDUMU – CHIEF OFFICER, TRANSPORT, ENERGY & PUBLIC WORKS
4. MR. RONALD REAGAN – EMC/RSS
5. MR. PAUL AYIEKO – EMC/RSS
6. MR.POLYCARP ODIEDO - Environmental Expert/

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am with a round of introductions from the participants. It was chaired by the Mr.Gerisham Njoroge, CEC TE&PW Nyandarua.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The CEC TE & PW welcomed us into his office.

He lauded the presence of the CEC Lands who had also wanted to be part of the meeting which he deemed as vital to the department.

Mr. Ronald Reagan, the project consultant introduced the team and explained that the project consultant was tasked to conduct:

- i) Resettlement Action Plan
- ii) Vulnerable and Marginalized Group Plan
- iii) Environmental & Social Impact Assessment for the above project.

He further went into details to explain the project locations and other details citing similar projects that had been earlier conducted in the county and other neighboring counties.

Mr. Paul Ayieko further added that the team would be conducting the exercise as soon as the consultations were done.

The CEC for Lands Mr. Kamau Mwangi took us through the land situation on the ground explaining that majority of the areas had titles and just a few areas had not been adjudicated citing sections of Gatimu Location. He went to further explain that his team was in the process of making sure all land in the area to be adjudicated before construction commences.

Mr.Gerisham, CEC TE&PW on the other cited lack of enough electricity in the region and that most households had no connection to power because of low voltage.

Mr. Ronald Reagan, the consultant, explained that the projects aim was to increase electricity capacity in the region and that there were proposals to put up a substation in Ol Kalou or Ol Jororok

towns or in between to mitigate such issues. He promised to give a feedback on the matter as soon as more information is shared.

Mr. Robert Ndumu, the Chief Officer TE&PW also expressed his gratitude to the project stating that the project will be beneficial in the long run.

The meeting ended shortly after at 11.00am.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER ENGAGEMENT MEETING HELD AT THE CEC TRANSPORT, ENERGY AND PUBLIC WORKS OFFICES IN NYANDARUA COUNTY**

QUESTIONS/COMMENTS	RESPONSES
When will the RAP process start?	The process will start immediately after we end our public consultations meetings.
Most of the Land Parcels in the Project area are adjudicated and owners have title deeds to show	Noted. This will be of great help during the compensation phase of the project
The project will be beneficial in the Long Run.	Yes. Once completed, there will be enough power in the region and that this may as well help in attracting investors in the county .

**MINUTES OF MEETING HELD AT THE COUNTY EXECUTIVE COMMITTEE MEMBER FOR ENERGY, WATER & ENVIRONMENT'S OFFICE - NAKURU COUNTY ON 20/06/2019**

**ATTENDANCE**

1. MR. SAMUEL KAGWE –CEC, ENERGY, WATER & ENVIRONMENT
2. MR. RONALD REAGAN – EMC/RSS
3. MR. PAUL AYIEKO – EMC/RSS
4. MR. POLYCARP ODIEDO - ENVIRONMENTAL EXPERT /EMC/RSS

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am chaired by the CEC

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT**

The CEC welcomed us into his office.

Mr. Ronald Reagan, the project consultant introduced the team and explained that the project consultant was tasked to conduct:

- i) Resettlement Action Plan
- ii) Vulnerable and Marginalized Group Plan
- iii) Environmental & Social Impact Assessment for the above project.

He further went into details to explain the project locations and other details citing similar projects that had been earlier conducted in the county and other neighboring counties.

The CEC wanted some clarification on matters compensation and how its going to be done and if they could get a copy of the report.

Mr. Ronald explained that the process would be based on the current market value of every asset affected and that no displacements or resettlements will be done before compensation is done.

The CEC further acknowledged that the project will be of great benefit to the surrounding communities.

The meeting ended at 10.30am.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENT MEETING HELD AT THE COUNTY COMMISSIONER'S OFFICE,  
NYANDARUA COUNTY**

QUESTIONS/COMMENTS	RESPONSES
When will the RAP process start?	The process will start immediately after we end our public consultations meetings.
Will the county get to have the report?	Yes, that can be arranged as soon as the report is disclosed.
Is there any compensation? And how is it going to be done?	Yes, there will be compensation for persons that are going to be affected by the project and all affected assets will be based on current market value

**MINUTES OF MEETING HELD AT THE COUNTY COMMISSIONER'S OFFICE - NYANDARUA  
COUNTY ON 24/06/2019**

**ATTENDANCE**

1. MR. BOAZ CHERUTICH –COUNTY COMMISSIONER
2. MR. RONALD REAGAN – EMC/RSS
3. MR. PAUL AYIEKO – EMC/RSS
4. MR. POLYCARP ODIEDO - ENVIRONMENTAL EXPERT / EMC Consultants

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am and introductions done thereafter.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The County Commissioner welcomed the team to the meeting.

Mr. Ronald Reagan, the project consultant introduced the team to the County Commissioner and went further to explain the project in details. He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

The county commissioner mentioned that most parts of the county was experiencing a lot of blackouts and projects such as these will bring stability in terms of electricity supply.

He also explained that most land in the area had been adjudicated and had titles.

Mr. Paul Ayieko explained that the project intended to bring stable power in the county that was largely going to attract more investments in the county.

The county commissioner commended the team and the meeting ended shortly thereafter at 10.30am

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENT MEETING HELD AT THE COUNTY COMMISSIONER'S OFFICE,  
NYANDARUA COUNTY**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Are all land parcels in the area adjudicated?	Yes, most land in the area have title deeds.
How many locations will be affected by the line in the Nakuru West sub-county?	A total of 13 Locations will be affected in Nyandarua County
The project will indeed help the electricity situation in the county.	Noted. The project will attract a lot of infrastructural development in the county due to stable electricity.

**MINUTES OF MEETING HELD AT THE COUNTY COMMISSIONER'S OFFICE - NAKURU COUNTY  
ON 19/06/2019**

**ATTENDANCE**

1. MR. KICHUSI JOHN –COUNTY COMMISSIONER
2. MR. KIBET TOM – ASSISTANT COUNTY COMMISSIONER, BAHATI WARD
3. MR. RONALD REAGAN – EMC/RSS
4. MR. PAUL AYIEKO – EMC/RSS
5. MR. POLYCARP ODIEDO - ENVIRONMENTAL EXPERT/ EMC Consultants

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 11.00am with a round of introductions by the participants, a session that was facilitated by Mr. Kichusi John, the County Commissioner.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The County Commissioner welcomed the team to the meeting. He highlighted the importance of paying his office a courtesy call giving scenarios of certain projects being implemented in the county without his knowledge.

Mr. Paul Ayieko, the project consultant thanked the County Commissioner for attending the meeting and did a brief introduction of the project.

He explained that the team was paying a courtesy call to him as the team would be embarking on the RAP exercise.

Mr. Ronald Reagan, the project consultant went further ahead to explain on the project location and what the project generally entails among other issues. He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

The Assistant County Commissioner Mr. Kibet also confirmed that line would be passing in his jurisdiction and that KETRACO surveyors had also paid him a visit at his offices during mapping.

The county commissioner on the other had lauded the government for undertaking such a good project that's going to benefit counties and communities.

The meeting ended shortly thereafter.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENTA MEETING HELD AT THE COUNTY COMMISSIONER'S OFFICE, NAKURU**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Are all land parcels in the area adjudicated?	Most of the land is generally adjudicated except for a few cases in Sabugo, Location.
How is the security situation on the ground?	
How many locations will be affected by the line in the Nakuru West sub-county?	
The project will indeed help the electricity situation in the county.	
We appreciate when the Organizations pay	
We have seen previous KETRACO projects before not being implemented in the County, how is this different?	

**MINUTES OF MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE – NAKURU  
NORTH SUB- COUNTY ON 19/06/2019**

**ATTENDANCE**

1. MR. KISILU MUTUA – DEPUTY COUNTY COMMISSIONER
2. MR. ROBERT KOIMA – C.I.P.U COMMANDER AP
3. MR. RONALD REAGAN – EMC/RSS
4. MR. PAUL AYIEKO – EMC/RSS
5. MR. POLYCARP ODIEDO - ENVIRONMENTAL SPECIALIST

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.25am with a round of introductions by the participants, a session that was facilitated by Mr. Kisilu , the Deputy County Commissioner.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The Deputy County Commissioner welcomed the team to the meeting. He acknowledged the presence of the C.I.P.U Commander AP as this was a critical government project in the area.

Mr. Paul Ayieko, the project consultant thanked the Deputy County Commissioner for attending the meeting and did a brief introduction of the project.

He explained that the team was paying a courtesy call to him as the team would be embarking on the RAP exercise.

Mr. Ronald Reagan, the project consultant went further ahead to explain on the project location and what the project generally entails among other issues. He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

The Deputy County Commissioner wanted to know how the project intended to solve any arising disputes.

He also added that there was need to let the local community to participate in the compensation and valuation process to avert any doubts.

Mr. Robert Koima on his part mentioned that, lauded the project as very good and encouraged the team to engage the local authorities especially the Chiefs and Assistant Chiefs in the locality for a smooth working environment. He promised to get in touch with them as soon as we are ready for the meetings.

Mr. Kisilu also added that there is need for KETRACO to utilize local manpower during the project citing employment as a pertinent issue in the region.

Mr. Ronald, clarified that the local youth in the area will be given first priority when it comes employment during the project implementation. He further added that, the consultant will hire local youth to assist the team in data collection during the RAP exercise.

There being no other business, the meeting ended at 11.00am

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER ENGAGEMENT MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE, NAKURU NORTH, SUB COUNTY**

QUESTIONS/COMMENTS	RESPONSES
Are all land parcels in the area adjudicated?	Most of the land is generally adjudicated except for a few cases in Sabugo, Location.
How is the security situation on the ground?	The security situation is fine. Chiefs will be on hand to offer any further assistance
How many locations will be affected by the line in the Nakuru North sub-county?	Thayu and Sabugo Locations are the only locations being affected in Nakuru North
The project will indeed help the electricity situation in the county.	Yes. This may help bolster development in the region and increase electricity supply in the county
Will the NCL be involved in valuations?	Yes, the National Land Commission will definitely be involved as they are the sole custodians of all Land in Kenya
We are having issues with local unemployed youth in the region, how will the project assist on this?	The project intends to hire local youth during all phases of the project implementation for both menial and technical jobs if available.
When will the project commence construction?	The project will commence construction immediately after the project gets finances from the World Bank upon approval of the report and all matters compensation resolved.

**MINUTES OF MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE – NAKURU WEST SUB- COUNTY ON 20/06/2019**

**ATTENDANCE**

1. MR. JOHN NGARAMA – DEPUTY COUNTY COMMISSIONER
2. MR. RONALD REAGAN – EMC/RSS
3. MR. PAUL AYIEKO – EMC/RSS
4. MR. POLYCARP ODIEDO - ENVIRONMENTAL EXPERT

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am with a round of introductions by the participants, a session that was facilitated by Mr. Kisilu , the Deputy County Commissioner.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT**

The Deputy County Commissioner welcomed the team to the meeting.

Mr. Ronald Reagan, the project consultant took the opportunity to elaborate on the project location and what the project generally entails among other issues.

He discussed issues ranging:

- i) Resettlement Action Plan for the Project
- ii) Vulnerable and Marginalized Groups Plan for the Project
- iii) Environmental and Social Impact Assessment for the project.

He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

The Deputy County Commissioner wanted to know how the project intended to solve any arising disputes.

Mr. Paul Ayieko, Project Consultant explained that the project will develop a Grievance Redress Mechanism that will be setup to help resolve the disputes.

He also added that there was need to let the local community to participate in the compensation and valuation process to avert any doubts.

Mr. Ronald also mentioned that, the team would require the assistance of the DCC's office in linking the project with all the local administrative units to assist the project during the RAP exercise. This he noted and promised to give a feedback by end of business today.

Mr. Paul, also mentined that the local youth in the area will be given first priority when it comes employment during the project implementation. He further added that, the consultant will hire local youth to assist the team in data collection during the RAP exercise.

There being no other business, the meeting ended at 11.00am

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENTA MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE,  
NAKURU WEST, SUB COUNTY**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Are all land parcels in the area adjudicated?	Most of the land is generally adjudicated except for a few cases in Sabugo, Location.
How is the security situation on the ground?	The security situation is fine. Chiefs will be on hand to offer any further assistance
How many locations will be affected by the line in the Nakuru North sub-county?	Thayu and Sabugo Locations are the only locations being affected in Nakuru North
The project will indeed help the electricity situation in the county.	Yes. This may help bolster development in the region and increase electricity supply in the county
Will the NCL be involved in valuations?	Yes, the National Land Commission will definitely be involved as they are the sole custodians of all Land in Kenya
We are having issues with local unemployed youth in the region, how will the project assist on this?	The project intends to hire local youth during all phases of the project implementation for both menial and technical jobs if available.
When will the project commence construction?	The project will commence construction immediately after the project gets finances from the World Bank upon approval of the report and all matters compensation resolved.

**MINUTES OF MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE –  
NYANDARUA NORTH SUB- COUNTY ON 25/06/2019**

**ATTENDANCE**

1. MR. WALTER NGAIRA – DEPUTY COUNTY COMMISSIONER
2. MR. JOHN KUNTAI SAINGIRAI – ASSISTANT COUNTY COMMISSIONER I
3. MR. GEORGE KARAMA - ASSISTANT COUNTY COMMISSIONER
4. MR. RONALD REAGAN – EMC/RSS
5. MR. PAUL AYIEKO – EMC/RSS
6. MR. POLYCARP ODIEDO - EMC/RSS

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.30am with a word of prayer from Mr. George Karama, the ACC I thereafter Mr. Walter chaired the meeting starting us off with a round of introductions.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The Deputy County Commissioner welcomed the team to the meeting noting the presence of his 2 Assistant County Commissioners in the meeting.

He explained that he needed to have the 2 ACC's had to be in the meeting because the transmission line was passing through their area of jurisdiction and that they were best suited to explain the logistics that may be required.

Mr. Ronald Reagan, the project consultant on the other hand took the opportunity to elaborate on project explaining that KETRACO as an organization had secured funding from the World Bank and that they intended to carry out the above line that passed through the 3 counties. He went to further explain the project exact locations and details

He discussed issues ranging:

- i) Resettlement Action Plan for the Project
- ii) Vulnerable and Marginalized Groups Plan for the Project
- iii) Environmental and Social Impact Assessment for the project.

He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

Mr. Walter Ngaira, sought to know if the project was intending to resettle project affected persons.

Mr. Ronald, the consultant explained that, yes, the project was going to resettle some people and that is the main reason the team was conducting the RAP exercise. This was going to help in knowing the number of people that will be affected and plans to be put in place on how they were going to be compensated and resettled in accordance to the World Bank's policy OP.4.12 on involuntary resettlement.

Mr. John Kuntai also lauded the government on the project. He explained that in his area, there were very few people with electricity connection because of lack enough power in the region. He saw this project as an opportunity for the county to bolster its electricity capacity and locals to have easy access to power after the project is complete.

Mr. George Karama also mentioned that the only major issue he foresees was the issue of Land Succession cases. Many locals had not updated title names form the original owners. This he clarified that, he had addressed the matter with the local chiefs to sensitize the locals on the same and that his office was currently dealing with the issue.

Mr. Paul Ayieko, Project Consultant explained that the project will develop a Grievance Redress Mechanism that will be setup to help resolve the disputes.

He also added that there was need to let the local community to participate in the compensation and valuation process to avert any doubts.

Mr. Paul, also mentioned that the local youth in the area will be given first priority when it comes employment during the project implementation. He further added that, the consultant will hire local youth to assist the team in data collection during the RAP exercise.

There being no other business, the meeting ended at 11.30am

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER ENGAGEMENT MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE, NYANDARUA NORTH, SUB COUNTY**

QUESTIONS/COMMENTS	RESPONSES
Are all land parcels in the area adjudicated?	Most of the land is generally adjudicated except for a few cases in Sabugo, Location.
How is the security situation on the ground?	The security situation is fine. Chiefs will be on hand to offer any further assistance
How many locations will be affected by the line in the Nakuru North sub-county?	Thayu and Sabugo Locations are the only locations being affected in Nakuru North
The project will indeed help the electricity situation in the county.	Yes. This may help bolster development in the region and increase electricity supply in the county
Will the NCL be involved in valuations?	Yes, the National Land Commission will definitely be involved as they are the sole custodians of all Land in Kenya
We are having issues with local unemployed youth in the region, how will the project assist on this?	The project intends to hire local youth during all phases of the project implementation for both menial and technical jobs if available.

When will the project commence construction?	The project will commence construction immediately after the project gets finances from the World Bank upon approval of the report and all matters compensation resolved.

**MINUTES OF MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE –  
NYANDARUA WEST SUB- COUNTY ON 25/06/2019**

**ATTENDANCE**

1. MR. HEZRON NYAMBERI – DEPUTY COUNTY COMMISSIONER
2. MR. JUNE P KIAMA – C.I.P.U
3. MR. RONALD REAGAN – EMC/RSS
4. MR. PAUL AYIEKO – EMC/RSS
5. MR. POLYCARP ODIEDO - ENVIRONMENTAL EXPERT/EMC

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am with a round of introductions. Mr. Nyamberi, the Deputy County Commissioner chaired the meeting.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV  
TRANSMISSION LINE KETRACO PROJECT**

The Deputy County Commissioner welcomed the team to the meeting. He also addressed the presence of the CIPU Commander and his importance to the meeting.

Mr. Kiama is the commander of the Critical Infrastructure Projects Unit Commander.

Mr. Ronald Reagan, the project consultant took the opportunity to elaborate on the project location and what the project generally entails among other issues.

He discussed issues ranging:

- i) Resettlement Action Plan for the Project
- ii) Vulnerable and Marginalized Groups Plan for the Project
- iii) Environmental and Social Impact Assessment for the project.

He also explained how the team intended to conduct the RAP exercise and what that would mean with regards to the whole project.

The DCC, mentioned that the area was largely peaceful and there have been no incidences of insecurity in a long time. He added that the local administration will be on hand to assist the team during the exercise hence assuring us of security.

Mr. Kiama, the CIPU Commander wanted to know when the project would start this being a critical national government project. Mr. Ronald explained that the project had timelines and there was no definite time, but assured the commander that the project will get in touch with his office as soon as the go ahead is given.

Mr. Paul Ayieko, Project Consultant explained that the project will develop a Grievance Redress Mechanism that will be setup to help resolve the disputes.

He also added that there was need to let the local community to participate in the compensation and valuation process to avert any doubts.

Mr. Paul, also mentioned that the local youth in the area will be given first priority when it comes employment during the project implementation. He further added that, the consultant will hire local youth to assist the team in data collection during the RAP exercise.

There being no other business, the meeting ended at 11.00am

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENTA MEETING HELD AT THE DEPUTY COUNTY COMMISSIONER'S OFFICE,  
NYANDARUA WEST, SUB COUNTY**

QUESTIONS/COMMENTS	RESPONSES
Are all land parcels in the area adjudicated?	Most of the land is generally adjudicated except for a few cases in Sabugo, Location.
How is the security situation on the ground?	The security situation is fine. Chiefs will be on hand to offer any further assistance
How many locations will be affected by the line in the Nakuru North sub-county?	Thayu and Sabugo Locations are the only locations being affected in Nakuru North
The project will indeed help the electricity situation in the county.	Yes. This may help bolster development in the region and increase electricity supply in the county
Will the NCL be involved in valuations?	Yes, the National Land Commission will definitely be involved as they are the sole custodians of all Land in Kenya
We are having issues with local unemployed youth in the region, how will the project assist on this?	The project intends to hire local youth during all phases of the project implementation for both menial and technical jobs if available.
When will the project commence construction?	The project will commence construction immediately after the project gets finances from the World Bank upon approval of the report and all matters compensation resolved.

**MINUTES OF MEETING HELD AT THE FORESTER OFFICE, BAHATI STATION - NAKURU COUNTY ON 19/06/2019**

**ATTENDANCE**

1. MR. SAMUEL KAVEO –FORESTER I
2. MR.RAPHAEL ONGERO – FORESTER INCHARGE
3. MR. RONALD REAGAN – EMC/RSS
4. MR. PAUL AYIEKO – EMC/RSS
5. MR. POLYCARP ODIEDO - ENVIRONEMENTAL EXPERT/EMC

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am chaired by Mr.Samuel Kaveo, and introductions followed thereafter.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT**

Mr. Samuel again welcomed us into his office.

Mr. Ronald Reagan, the project consultant introduced the team and explained that the project consultant was tasked to conduct:

- i) Resettlement Action Plan
- ii) Vulnerable and Marginalized Group Plan
- iii) Environmental & Social Impact Assessment for the above project.

He further went into details to explain the project locations and other details citing similar projects that had been earlier conducted in the county and other neighboring counties.

Mr.Paul Ayieko the project consultant wanted to know if there would be any forest cover that would be affected by the routing of the line.

Mr.Raphael Ongero, Forester Incharge, upon looking at the map confirmed that the line would be passing through Bahati Forest, a gazetted forest in Sabugo Location and that trees will be damaged during the construction.

Mr. Samuel also added that the line would be passing through a lot of private forest covers.

The meeting ended shortly after at 10.30am.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENT MEETING HELD AT THE FORESTERS'S OFFICE,BAHATI STATION -  
NAKURU COUNTY**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Is the line passing through a gazzetted forest?	Yes, the line would be passing through Bahati Forest in Sabugo Location
The line would also be passing through private forest covers.	Noted.
Is there any compensation? And how is it going to be done?	Compensation will be done, and it will be Inter-Departmental within the Government.
Consult local communities especially those owning private forest covers.	Noted.
When will the project construction commence?	There is no definite timeline but as soon as the RAP is approved and all compensation matters settled, the project construction will begin.

**MINUTES OF MEETING HELD AT THE ECOSYSTEM CONSERVATORS OFFICE, OL KALOU - NYANDARUA COUNTY ON 20/06/2019**

**ATTENDANCE**

1. MR. JOSPHAT NZIOKA –CONSERVATOR
2. MR. RONALD REAGAN – EMC/RSS
3. MR. PAUL AYIEKO – EMC/RSS
4. MR.POLYCARP ODIEDO - ENVIRONMENTAL EXPERT/EMC

**AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT

**PRELIMINARIES:**

The meeting started at 10.00am with introductions.

**MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT**

Mr. Nzioka, the Conservator welcomed us to the meeting.

Mr. Ronald Reagan, the project consultant introduced the team and explained that the project consultant was tasked to conduct:

- i) Resettlement Action Plan
- ii) Vulnerable and Marginalized Group Plan
- iii) Environmental & Social Impact Assessment for the above project.

He further went into details to explain the project locations and other details citing similar projects that had been earlier conducted in the county and other neighboring counties.

Mr. Ronald Reagan, the consultant also wanted to know if the line would be passing through a gazetted forest within the affected locations in Nyandarua.

Mr. Nzioka, explained that the line would not be passing through a gazetted forest in Nyandarua County. He also noted that there were a lot of private forest covers in the area.

Having no other agenda, the meeting ended shortly thereafter at 10.30am.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENT MEETING HELD AT THE ECOSYSTEM CONSERVATOR'S OFFICE IN OL  
KALOU - NYANDARUA COUNTY**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Will the transmission line be passing through a gazzetted forest?	No. The line will only be passing through land parcels with private forest covers.
When will the project commence?	There is no definite timeline but as soon as the RAP is approved and all compensation matters settled, the project construction will begin.
Consult local communities especially those owning private forest covers.	Noted.

## **MINUTES OF MEETING HELD AT THE LANDS OFFICE - NAKURU COUNTY ON 20/06/2019**

### **ATTENDANCE**

1. MR. STANLEY NJOROGI – LAND ADJUDICATION & SETTLEMENT OFFICER
2. MR. RONALD REAGAN – EMC/RSS
3. MR. PAUL AYIEKO – EMC/RSS
4. MR. POLYCARP ODIEDO -ENVIRONMENTAL EXPERT/EMC

### **AGENDA:**

1. RAP/VMGP/ESIA ON THE MENENGAI – OLKALOU – RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT

### **PRELIMINARIES:**

The meeting started at 10.00am started off with introductions chaired by Mr. Stanley Njoroge, the Lands Adjudication and Settlement Officer in the County

### **MINUTE 1/RAP/VMGP/ESIA ON THE MENENGAI-OL KALOU-RUMURUTI 111KM 132KV TRANSMISSION LINE KETRACO PROJECT**

Mr. Stanley welcomed us to the meeting in his office.

Mr. Ronald Reagan, the project consultant introduced the team and explained that the project consultant was tasked to conduct:

- i) Resettlement Action Plan
- ii) Vulnerable and Marginalized Group Plan
- iii) Environmental & Social Impact Assessment for the above project.

He further went into details to explain where the project transmission line would be passing and how the team was intending to undertake the RAP process citing specific details.

He also handed over a hard copy of the project map to the meeting.

Mr. Stanley Njoroge wanted some clarification on whether NEMA and NLC had been consulted on the project, because of the destructions and resettlement that was going to take place.

Mr. Ronald assured the Mr. Stanley Njoroge, that all relevant government agencies had been extensively consulted on the issue.

Mr. Stanley Njoroge, also explained that, as the Settlement Officer in the county, the Land Parcels in the area were majorly adjudicated and had titles except for a few areas where sub-divisions had occurred. He assured the team that his office was coordinating and working on the issues promptly.

The meeting ended shortly after at 10.30am.

**SUMMARY OF QUESTIONS, VIEWS, COMMENTS ARISING FROM THE STAKEHOLDER  
ENGAGEMENT MEETING HELD AT THE LANDS'S OFFICE - NAKURU COUNTY**

<b>QUESTIONS/COMMENTS</b>	<b>RESPONSES</b>
Was NEMA and NLC consulted?	Yes, all relevant government agencies were extensively consulted with regards to the project
Are all land parcels adjudicated in the area.	Yes. All Land parcels in the area are adjudicated and have titles.
How will the land compensation be done?	Compensation will be done, using the current market value of the land in coordination with NLC.
Can the project share the shape files and maps with the County Lands Office?	Yes. The project will share the shapefiles and maps with the office.

**Minutes for Public Consultation Meeting Held at Bahati Location Chiefs Office on 05/06/2019/.**

**Present;**

**National Government:**

Mr. Kichuen John -Deputy County Commissioner Nakuru West.

Mr. Paul Mbuthia- Area Chief

Mr. John Njoroge- Area Assistant Chief

Mr. Ndaba Joseph-Area Assistant Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmental and RAP Specialist

Mr. Polycarp Odiedo - Consultants (Environmental Expert)

**1. Introduction**

This public Barraza took place at Chiefs Office in Nakuru County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 10:00AM and was preceded by prayers led by Rev Mbuthia.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the baraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
John Njoroge-The meeting is very informative, but I have not seen any	KETRACO Team/Consultants-The consultant with the KETRACO team have a the proposed line in our machines (GPS) we will

beacon at my place how will I know am affected	walk along the line and identify those that will be affected by the project the beacons where not placed at every persons property..
Wilson Njuguna Mwangi-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Mbugua Peterson Mwangi-Can we build houses on the property after the cut-off date and census has been done?	KETRACO Team/Consultant-The community is advised not to build under the line after the census since only what is there at census will be inventoried and compensated for.
Gitau Simon Mbugua-What if I own more than one property and they are all affected?	KETRACO Team/Consultant-All property affected will be compensated without any prejudice.

### **Conclusion**

The meeting ended at 11:10 am with a word of prayer from the area Village Elder Mr. Gitau. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Gatumbiro Location Chiefs Camp on 08/08/2019/.**

**Present;**

**National Government:**

Mr. Hezron Nyaberi -Deputy County Commissioner Nyandarua West.

Mr. Huldah Okeyo – Assistant County Commissioner

Mr. Peter Njogu-Senior Chief

Mr. Kibichu Joshua- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmentalism)

Mr. Joshua Kibet- KETRACO Surveyor

Mrs. Marine Luseka- KETRACO Social Specialist

Mr. Daniel Mkanda-KETRACO Land Valuer

Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public Barraza took place at Gatumbiro Location Chiefs Camp in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 12:00AM and was preceded by prayers led by area Chief Mr. Joshua.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
David Kibiru- If I have a small parcel of Land and it has been affected all of it where will I go?	KETRACO Team/Consultant-In case of that then you become a vulnerable PAP hence you'll be given first priority.
Phillis Jane-My land has been sub-divided and in case all of them has been affected how will it be?	KETRACO Team/Consultant-Each and every parcel of land will be valued differently and it will be given its values.
Joseph Njuguna-Can KETRACO do for us some CSR for this community?	KETRACO Team/Consultant-The Community should come up with proposals so that the company can check what is viable for them.

### **Conclusion**

The meeting ended at 1:00 pm with a word of prayer from Mr. Karanja. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Gatimu/Kangui Locations Kianjata Primary School on 09/08/2019/.**

**Present;**

**National Government:**

Mr. Hezron Nyaberi -Deputy County Commissioner Nyandarua West.

Mrs. Milford Bett – Assistant County Commissioner

Mrs. Caroline Njoki- Area Chief

Mr. Peter Karanja-Senior Chief

Mr. Erastus Warungu- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmentalism)

Mr. Joshua Kibet- KETRACO Surveyor

Mrs. Marine Luseka- KETRACO Social Specialist

Mrs. Naomi Rotich –KETRACO Social Specialist

Mr. Daniel Mkanda-KETRACO Land Valuer

Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public Barraza took place at Gatimu/Kangui Location Kianjata Primary School in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:30AM and was preceded by prayers led by area ACC Mr. Wilford Bett.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

## **Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

<b>Comments and Issues</b>	<b>Response</b>
John Ngumi- How can we know the list of persons affected?	KETRACO Team/Consultant-Currently we cannot know the list until the RAP exercise will be over is when we will know how many people are affected and under what category
Joseph Murithi-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Dancan Kimani-What are the documents do I need to have?	KETRACO Team/Consultant-The documents we will need at title deed of the parcel of land that will be affected, National ID, Phone number.
Lucy Mukami Njuguna-Will the compensation be uniform?	KETRACO/Consultant Team-Compensation will not be the same since different people will be affected differently e.g. Land, Structure, crops, trees
Mwangi Kimani- If am totally affected how will it be?	KETRACO Team/Consultant-If someone is totally affected then he/she will be given first priority.
Joseph Kinyua-What will happen to me if my whole property falls under the intended transmission line?	KETRACO Team/Consultant-One who loses all the property is classified as vulnerable and will be given priority during the compensation.
Ndegwa Wanyoike- How will the project benefit us?	KETRACO Team/Consultant-The power line will ensure there is sufficient power to the National grid which will boost the supply within the four Counties.
Kimani Jane-Beacon was placed at my place without my knowledge does this means I will be affected.	KETRACO Team/Consultant-Yes if the beacon is at your place then it means you'll be affected.

Muhoro Karanja- Are there Maps within this areas and can KETRACO do some CSR for the community?	KETRACO Team/Consultants- Yes we have Maps which show areas that will be affected and the community should just come up with proposals and the company will see what suits the community.
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### **Conclusion**

The meeting ended at 2:00 pm with a word of prayer from Mr. Simon Njau. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Karagoini WAKA JUNIOR hall on 14/08/2019/.**

**Present;**

**National Government:**

Mr. Walter Ngaria -Deputy County Commissioner Nyandarua East.

Madam Cynthia – Assistant County Commissioner

Mr. Kimani WA Mathias-Senior Chief

Mr. Kibichu Joshua- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmentalism)

Mr. Joshua Kibet- KETRACO Surveyor

Mrs. Marine Luseka- KETRACO Social Specialist

Mr. Daniel Mkanda-KETRACO Land Valuer

Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public Barraza took place at Karagoini Waka Junior Hall in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 12:00AM and was preceded by prayers led by area Chief Mr. Joshua.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Grace Njoki- If I have a small parcel of Land and it has been affected all of it where will I go?	KETRACO Team/Consultant-In case of that then you become a vulnerable PAP hence you'll be given first priority.
Clement Jane Njoroge-My land has been sub-divided and in case all of them has been affected how will it be?	KETRACO Team/Consultant-Each and every parcel of land will be valued differently and it will be given its values.
Joseph Njuguna-Can KETRACO do for us some CSR for this community?	KETRACO Team/Consultant-The Community should come up with proposals so that the company can check what is viable for them.
Peter Nduati- If I bought land after the surveyor had passed how will it be?	KETRACO Team/Consultant- The documents will be used to carry out compensation eg title deed, agreement and also the local administration will help solve any issues.

### **Conclusion**

The meeting ended at 2:00 pm with a word of prayer from Head Teacher Mr. Kipsoimo. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Kirima Location GDC Grounds on 04/06/2019/.**

**Present;**

**National Government:**

Mr. Kichuen John -Deputy County Commissioner Nakuru West.

Mr. Charles Mwangi- Area Chief

Mr. John Njoroge- Area Assistant Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmental and RAP Specialist)

Mr. Polycarp Odiedo - Consultant (Environmental)

**1. Introduction**

This public Baraza took place at Geothermal Development Company grounds in Nakuru County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led by Naomi Njoki.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the baraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Ezekiel Ndiba-The meeting is very informative, but what of those not present, how will they get the information?	KETRACO Team/Consultants-The consultants urged those present to spread word to those not present.

Wilson Njuguna Mwangi-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Mbugua Likoye-Can we build houses on the property after the cut-off date and census has been done?	KETRACO Team/Consultant-The community is advised not to build under the line after the census since only what is there at census will be inventoried and compensated for.
Gitau Mbugua-What if I own more than one property and they are all affected?	KETRACO Team/Consultant-All property affected will be compensated without any prejudice.
Njeri Moica-Can one enter into a contract with proponent in regards to compensation? I may want to be paid on a quarterly basis for use of my property.	KETRACO Team/Consultant-The proponent is not acquiring the property but compensating for loss of use of land. Hence compensation is only once.
Mburu Maina Njoroge-What will happen to me if my whole property falls under the intended transmission line?	KETRACO Team/Consultant-One who loses all the property is classified as vulnerable and will be given priority during the compensation.
Peterson Karanja- Is there a grievance redress mechanism system in place and will it be effective?	KETRACO Team/Consultant-There is a grievance redress mechanism in place which with corporation from the PAPs is expected to handle any issues fairly.

### **Conclusion**

The meeting ended at 2:30 pm with a word of prayer from the area Chief. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Kirimagai Location Assistant County Commissioner Ground on 05/08/2019/.**

**Present;**

**National Government:**

Mr. Hezron Nyaberi -Deputy County Commissioner Nyandarua West.  
Mr. Ann Okeyo – Assistant County Commissioner  
Mr. Daniel Mugnai- Area Chief  
Mr. Peter Njogu-Senior Chief  
Mr. Maina Gichugu- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader  
Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist  
Mr. Polycarp Odiedo - Consultant (Environmentalism)  
Mr. Joshua Kibet- KETRACO Surveyor  
Mrs. Marine Luseka- KETRACO Social Specialist  
Mr. Daniel Mkanda-KETRACO Land Valuer  
Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public baraza took place at Oraimutia Location Gichaka AIC Church in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led by Susan Njoki.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the baraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Gideon Kamau- I saw some beacons in my land does this mean I will be affected?	KETRACO Team/Consultant-Yes this is true the surveyor had passed through the property and it means you'll be affected by the project.
Susan Njogu-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Peter Karanja-Can we build houses on the property after the cut-off date and census has been done?	KETRACO Team/Consultant-The community is advised not to build under the line after the census since only what is there at census will be inventoried and compensated for.
John Gatimu-What if I own more than one property and they are all affected?	KETRACO/Consultant Team-All property affected will be compensated without any prejudice.
Can one enter into a contract with proponent in regards to compensation? I may want to be paid on a quarterly basis for use of my property.	KETRACO Team/Consultant-The proponent is not acquiring the property but compensating for loss of use of land. Hence compensation is only once.
What will happen to me if my whole property falls under the intended transmission line?	KETRACO Team/Consultant-One who loses all the property is classified as vulnerable and will be given priority during the compensation.
Ndegwa Wanyoike- How will the project benefit us?	KETRACO Team/Consultant-The power line will ensure there is sufficient power to the National grid which will boost the supply within the four Counties.
Lucy Kamau-Will there be a negotiation if in case what I have been given as compensation I feel is too little?	KETRACO Team/Consultant-The Values will be done at the current market value in case one is not comfortable we have channels to be followed to address such issues

### **Conclusion**

The meeting ended at 2:00 pm with a word of prayer from Mr. Njuguna. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Lersako Location Hospital Hill Secondary School on 07/08/2019/.**

**Present;**

**National Government:**

Mr. Hezron Nyaberi -Deputy County Commissioner Nyandarua West.  
Mr. Abdi Housman – Assistant County Commissioner  
Mrs. Ann Njuguna- Area Chief  
Mr. Peter Njogu-Senior Chief  
Mr. Julia's Warungu- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader  
Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist  
Mr. Polycarp Odiedo - Consultant (Environmentalism)  
Mr. Joshua Kibet- KETRACO Surveyor  
Mrs. Marine Luseka- KETRACO Social Specialist  
Mr. Daniel Mkanda-KETRACO Land Valuer  
Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public Barraza took place at Lersako Location Hospital Hill Secondary School in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:30AM and was preceded by prayers led by area Chief Mrs. Ann.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Peter Mureshi- How many meters is the proposed power line?	KETRACO Team/Consultant-The proposed power line is 30 meters. 15 meters on the right and 15 meters on the left
Stephen Kairo-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Njuguna Kuria-What are the documents do I need to have?	KETRACO Team/Consultant-The documents we will need at title deed of the parcel of land that will be affected, National ID, Phone number.
John Munene-Will the compensation be uniform?	KETRACO/Consultant Team-Compensation will not be the same since different people will be affected differently e.g. Land, Structure, crops, trees
Tabitha Nyokabi- Will there be another public Barraza after this?	KETRACO Team/Consultant-Yes there will be a series of meetings as this process starts.
Joseph Kinyua-What will happen to me if my whole property falls under the intended transmission line?	KETRACO Team/Consultant-One who loses all the property is classified as vulnerable and will be given priority during the compensation.
Ndegwa Wanyoike- How will the project benefit us?	KETRACO Team/Consultant-The power line will ensure there is sufficient power to the National grid which will boost the supply within the four Counties.
Lucy Kamau-Will there be a negotiation if in case what I have been given as compensation I feel is too little?	KETRACO Team/Consultant-The Values will be done at the current market value in case one is not comfortable we have channels to be followed to address such issues
Maina Karanja- Are there Maps within this areas	KETRACO Team/Consultants- Yes we have Maps which show areas that will be affected.

## **Conclusion**

The meeting ended at 2:00 pm with a word of prayer from Mr. Karanja. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Mairo-Inya- Baari Secondary School Grounds on 13/08/2019/.**

**Present;**

**National Government:**

Mr. Walter Ngaria-Deputy County Commissioner Nyandarua East.  
Madam Cynthia – Assistant County Commissioner  
Mrs. Wairau Njuguna- Area Chief  
Mr. Peter Karanja-Senior Chief.

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader  
Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist  
Mr. Polycarp Odiedo - Consultant (Environmentalism)  
Mr. Joshua Kibet- KETRACO Surveyor  
Mrs. Marine Luseka- KETRACO Social Specialist  
Mr. Daniel Mkanda-KETRACO Land Valuer  
Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public Barraza took place at Mairo-Inya-Baari Secondary School Ground in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led by School Head teacher Mr. Joshua .

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Peter Maina- How will I know the day you people will be coming because we also have other duties?	KETRACO Team/Consultant-We approximate to be around this place in the

	next three weeks but once we will be close we will alert the area chief to pass information.
Sarah Njoki-What are the things that will be affected within the 30 meters as claimed by this team from KETRACO?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected and what exactly has been affected as per now we cannot say what will be affected.
Njuguna Kuria-What are the documents do I need to have?	KETRACO Team/Consultant-The documents we will need at title deed of the parcel of land that will be affected, National ID, Phone number.
Ndegwa Wanyoike- How will the project benefit us?	KETRACO Team/Consultant-The power line will ensure there is sufficient power to the National grid which will boost the supply within the four Counties.
Nderitu Kamau-Will there be a negotiation if in case what I have been given as compensation I feel is too little?	KETRACO Team/Consultant-The Values will be done at the current market value in case one is not comfortable we have channels to be followed to address such issues
Maina Wa Kamotho- Are there Maps within this areas	KETRACO Team/Consultants- Yes we have Maps which show areas that will be affected.

### **Conclusion**

The meeting ended at 2:00 pm with a word of prayer from Mr. Karanja. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

## **Minutes for Public Consultation Meeting Held at Ndivai Baptized Church Grounds on 15/08/2019/.**

### **Present;**

#### **National Government:**

Mr. Walter Ngaria-Deputy County Commissioner Nyandarua East.

Madam Cynthia – Assistant County Commissioner

Mr. John Kamondo-Senior Chief.

#### **KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmentalism)

Mr. Joshua Kibet- KETRACO Surveyor

Mrs. Marine Luseka- KETRACO Social Specialist

Mr. Daniel Mkanda-KETRACO Land Valuer

Mrs. Linet Mbove-KETRACO Environmentalist

### **1. Introduction**

This public Barraza took place at Ndivai Baptized Church ground in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led Rev.Samwel

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

### **Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Hezron Kabuga Njau - How will I know the day you people will be coming because we also have other duties?	KETRACO Team/Consultant-We approximate to be around this place in the next three weeks but once we will be close we will alert the area chief to pass information.
Sarah Njoki-What are the things that will be affected within the 30 meters as claimed by this team from KETRACO?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected and what exactly has been affected as per now we cannot say what will be affected.
Magdalene Kihio -What are the documents do I need to have?	KETRACO Team/Consultant-The documents we will need at title deed of the parcel of land that will be affected, National ID, Phone number.
Ndegwa Mugnai- How will it be if my sons have built there houses at my home and we have all been affected by the project but the land is mine I have not sub-divided?	KETRACO Team/Consultant-If the Sons have built there houses within the home stead and they have been affected the sons will be compensated for the structures but the land will be given to the father.
David Kipmosoi- Are there Maps within this areas and how can we know if we have been affected and the list of people who will be affected?	KETRACO Team/Consultants- Yes we have Maps which show areas that will be affected but as per now we cannot give out the exact number since we don't know the people who will be affected and what exactly will be affected.

## **Conclusion**

The meeting ended at 2:10 pm with a word of prayer from Mr. John Muia. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Oraimutia Location Gichaka AIC Church on 05/08/2019/.**

**Present;**

**National Government:**

Mr. Hezron Nyaberi -Deputy County Commissioner Nyandarua West.

Mr. Ali Hassan – Assistant County Commissioner

Mr. Njoroge Mwangi- Area Chief

Mr. John Ndungu- Area Chief

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmental and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmental)

Mr. Joshua Kibet- KETRACO Surveyor

Mrs. Marine Luseka- KETRACO Social Specialist

Mr. Daniel Mkanda-KETRACO Land Valuer

Mrs. Linet Mbove-KETRACO Environmentalist

**1. Introduction**

This public baraza took place at Oraimutia Location Gichaka AIC Church in Nyandarua County. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led by Susan Njoki.

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the baraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
John Njoroge-The meeting is very informative, but what of those not present, how will they get the information?	KETRACO Team/Consultants-The consultants urged those present to spread word to those not present.
Wilson Kanoki-How will I know that my property is affected?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected.
Josphat Likoye-Can we build houses on the property after the cut-off date and census has been done?	KETRACO Team/Consultant-The community is advised not to build under the line after the census since only what is there at census will be inventoried and compensated for.
Gitau Mbugua-What if I own more than one property and they are all affected?	KETRACO Team/Consultant-All property affected will be compensated without any prejudice.
Njeri Moica-Can one enter into a contract with proponent in regards to compensation? I may want to be paid on a quarterly basis for use of my property.	KETRACO Team/Consultant-The proponent is not acquiring the property but compensating for loss of use of land. Hence compensation is only once.
Mburu Njoroge-What will happen to me if my whole property falls under the intended transmission line?	KETRACO Team/Consultant-One who loses all the property is classified as vulnerable and will be given priority during the compensation.
Peterson Karanja- Is there a grievance redress mechanism system in place and will it be effective?	KETRACO Team/Consultant-There is a grievance redress mechanism in place which with corporation from the PAPs is expected to handle any issues fairly.

## **Conclusion**

The meeting ended at 2:30 pm with a word of prayer from the area Chief. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

**Minutes for Public Consultation Meeting Held at Chiefs Office Wendo Location Nakuru East on 08/06/2019/.**

**Present;**

**National Government:**

Mr. Kisilu Mutua-Deputy County Commissioner Nakuru North.

Mr.Kiru John-Area Chief

Mr. John Paul-Senior Chief.

**KETRACO /Consultant Team**

Mr. Ronald Reagan –Consultant (GIS Specialist and Team Leader

Mr. Paul Ayieko –Consultant (Environmentalism and RAP Specialist

Mr. Polycarp Odiedo - Consultant (Environmentalism)

**1. Introduction**

This public Barraza took place at Chiefs Office in Nakuru County Wendo Location. It was attended by diverse project stakeholders that included women and the youth as well potential project affected persons and the local administration officials. The meeting commenced at 11:00AM and was preceded by prayers led Rev.Samwel Muhoro

The Consultants then introduced themselves to the assembled Stakeholders. The public was made aware of the intended project for Resettlement Action Plan /Environmental Impact Assessment and Vulnerable Marginalized Group for the proposed Menegai- Ol-kalau-Rumuruti 132Kv transmission line and that the Consultants were there to undertake an inventory of Assets belonging to the Community. The consultants informed the Barraza on the processes they would follow while conducting the RAP exercise.

**Discussions**

The community members present were urged to give their views on the project, which they did, a summary of the consultative exercise is tabled below;

Comments and Issues	Response
Peter Kabuga Njau - How will I know the day you people will be coming because we also have other duties?	KETRACO Team/Consultant-We approximate to be around this place in the

	next three weeks but once we will be close we will alert the area chief to pass information.
Sarah Njoki Munene-What are the things that will be affected within the 30 meters as claimed by this team from KETRACO?	KETRACO Team/Consultant-Surveyors have already mapped out the proposed transmission line. The RAP team with the use of GPS equipment will walk along the line and identify those affected and what exactly has been affected as per now we cannot say what will be affected.
Susan Munyoki Ngao -What are the documents do I need to have?	KETRACO Team/Consultant-The documents we will need at title deed of the parcel of land that will be affected, National ID, Phone number.
Ndegwa Mugnai Njoroge- How will it be if my sons have built there houses at my home and we have all been affected by the project but the land is mine I have not sub-divided?	KETRACO Team/Consultant-If the Sons have built there houses within the home stead and they have been affected the sons will be compensated for the structures but the land will be given to the father.
David Njuguna Ndavo- Are there Maps within this areas and how can we know if we have been affected and the list of people who will be affected?	KETRACO Team/Consultants- Yes we have Maps which show areas that will be affected but as per now we cannot give out the exact number since we don't know the people who will be affected and what exactly will be affected.

### **Conclusion**

The meeting ended at 2:10 pm with a word of prayer from Mr. John Muia. The community resolved to support the project to its conclusion and stressed the need for them to be involved in all aspects of the project.

## **I4.3 ANNEX C. SELECTED PHOTOGRAPHS**

## PHOTO PLATE MENENGAI - OL KALOU – RUMURUTI TRANSMISSION LINE



Section of Ol Kalou Town



Market Day in Ol Kalou Town



Carrot Trader in Gatimu Location



Milk Trader in Lesirko Location



Church affected by the project



Sample vegetation in Mairoinya Location,  
Nyandarua County



Sample water pan in Muruku Location



Consultants addressing community residents



Sample Angle Point in Mukuru Location,  
Nyandarua



A section of an access road in Oraimutia  
Location, Nyandarua



Sample Livestock in Gatimu Location, Nyandarua



A section of Ruiru Shopping Center, in Ruiru Location, Nyandarua County



Public Consultation meeting in Ndivai Location, Nyandarua



A section of the Ol Jororok – Nyahururu Highway.







Sample vegetation in Charagita Location, Nyandarua



Sample residential structures in Gatumbiro Location, Nyandarua



<p>Maize Farming in Leshau Location, Nyandarua County</p>	<p>A section of the Ol Kalou – Nakuru Railway Line in Ol Kalou, Nyandarua County</p>
	
<p>Section of the topographical terrain in Sabugo Location, Nyandarua</p>	<p>Section of an access road in Lesirko Location, Nyandarua</p>
<p>Section of an access road in Lesirko Location, Nyandarua</p>	<p>Section of an access road in Lesirko Location, Nyandarua</p>
	
<p>Sample residential houses in Kirima location</p>	<p>Public meeting in Wendo Location</p>

## **I4.4 ANNEX D. MAP OF TL ROUTE**

Map showing The Transmission Line Across The Three Counties

