



KENYA ELECTRICITY TRANSMISSION COMPANY

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
FOR**

**PROPOSED GILGIL – THIKA -NAIROBI EAST – KONZA
400KV POWER TRANSMISSION LINE**

ESIA STUDY REPORT

FEBRUARY 2017

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Type of Facility	400Kv Power transmission line
Financier	China International Water & Electric Corp P.O. BOX 38653-00100, NAIROBI
Location	Traverses Nakuru, Nyandarua, Kiambu and Machakos counties
Name and address of the Proponent	Kenya electricity transmission company Kawi complex, block B, South C, P. O. Box 34942 – 00100, Nairobi. Email: info@ketraco.co.ke Mobile phone: (+254) 719 018000
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DECLARATION

This ESIA study report was done in accordance to the requirements of the Environmental (Impact Assessment and Audit) Regulations, 2003, pursuant to The Environmental Management and Coordination Act, (EMCA) 1999 and acceptable international standards.

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Finally, we wish to register special gratitude to all the Chiefs and assistant chiefs for their immense assistance and cooperation in organizing public meetings in their respective areas of jurisdictions.

Lastly, we appreciate the contribution of the local communities and other stakeholders for their cooperation and willingness to give their views and comments concerning the proposed project during our public meetings and interviews as part of the public participation process.

ACRONYMS AND ABBREVIATIONS

DOHS	Directorate of Occupational Health & Safety
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
ERC	Energy Regulatory Commission
ESIA	Environmental & Social Impact Assessment
ESMP	Environmental & Social Management Plan
IUCN	International Union for Conservation of Nature
KETRACO	Kenya Electricity Transmission Company
MW	Mega Watts
NEMA	National Environment Management Authority
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
kV	Kilo Volt

TABLE OF CONTENTS

ACKNOWLEDGEMENT	iv
ACRONYMS AND ABBREVIATIONS	v
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF MAPS	xiii
EXECUTIVE SUMMARY	xiv
CHAPTER ONE: INTRODUCTION	19
1.1 Background	19
1.1.1. Energy in kenya	19
1.1.2. Proposed project	19
1.2 Objectives of ESIA	20
1.3 Scope	20
1.4 Methodology.....	21
1.4.1 Understanding the transmission line route	21
1.4.2 Data collection	21
1.4.3 Environmental Baseline Study (EBS)	22
1.4.4 Environmental Impact Assessment (EIA).....	22
CHAPTER TWO: PROJECT DESCRIPTION.....	24
2.1. Proposed line route.....	24
2.1.1. Gilgil-Thika transmission line section	24
2.1.2. Thika-Nairobi East transmission line section	25
2.1.3. Nairobi East – Konza transmission line section	26
2.2. Project activities	27
2.2.1. Construction.....	27
2.2.2. Operation	27
2.2.3. Decommissioning.....	27
2.3. Transmission Line Design	27
2.3.1. Design Procedure.....	27

2.3.2. Design Conditions.....	28
2.4. Earth Cable	29
2.5. Insulator-Strings and Fittings	31
2.5.1. Insulator-strings and Earth Cable-strings	31
2.5.2. Types of Insulators.....	31
2.5.3. Grading Rings.....	32
2.5.4. Fittings	32
2.6. Lightning Protection and Grounding	33
2.6.1. Lightning protection measures	33
2.6.2. Types of pole/tower grounding devices.....	34
2.7. Conductor Transposition and Phase Commutation.....	34
2.8. Cross-over and Ground Clearance	34
2.9. Steel Tower	35
2.9.1. Overview.....	35
2.9.2. Type of Poles/Towers	36
2.9.3. Use of Standard Towers.....	36
2.10. Foundation.....	37
2.10.1. Overview.....	37
2.10.2. Design Requirements	37
2.10.3. Types of Foundation	38
2.11. Design standards.....	39
2.12. Land requirement for the transmission line wayleave	41
CHAPTER THREE: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK	42
3.1. Environmental Policy Framework.....	42
3.1.1 The National Environmental Action Plan (NEAP) 1994	42
3.1.2 Sessional paper No. 6 (1999).....	42
3.2. Overview of relevant legislation.....	42
3.2.1 The Environmental Management and Co-ordination Act, 1999	43
3.2.2 The Environmental Impact Assessment and Audit Regulations 2003(Legal Notice No. 101)	46
3.2.3 The Energy Act, 2006	46

3.2.4	The Forests Act, 2005	47
3.2.5	The Agricultural Act	47
3.2.6	The Wildlife Conservation and Management Act, Cap 376	47
3.2.7.	Way leave Act 292	48
3.2.8.	Trust Lands Act (Cap 288).....	48
3.3.	Institutional Framework	48
3.3.1.	Ministry of Energy and petroleum.....	48
3.3.2	Energy Regulatory Commission	49
3.3.3.	National Environmental Management Authority (NEMA)	49
3.3.4.	KETRACO	51
3.4.	International Conventions Applicable in Kenya	51
3.5.	World Bank Safeguard Policies.....	52
CHAPTER FOUR: BASELINE CONDITIONS		56
4.1.	Physical Environment	56
4.1.1	Geography and Topography	56
4.1.2	Geology.....	57
4.1.3	Soil	57
4.1.4	Climate	57
4.1.5	Water (Surface and Groundwater Resources).....	58
4.1.6.	Landscape	58
4.2	Biological Environment	59
4.2.1.	Flora	59
4.2.2.	Fauna.....	60
4.3.	Socio-Economic and Cultural Environment.....	60
4.3.1.	Population and Demographic Features of the respondents	61
4.3.2.	Land use	64
4.3.3	Ethnicity	64
4.3.4.	Land tenure	64
4.3.5.	Source of livelihood	65
4.3.6.	Sources of energy.....	66

CHAPTER FIVE: PUBLIC CONSULTATION AND PARTICIPATION	67
5.1 Introduction	67
5.2. Consultation Methodology	67
5.3 Views of the public about the project	68
CHAPTER SIX: PROJECT ALTERNATIVES	71
6.1. Transmission Line route selection.....	71
6.2. Materials selection	71
6.3. The “No Action” Alternative	71
CHAPTER SEVEN: POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS AND MITIGATION MEASURES.....	73
7.1. Overview	73
7.2 Positive impacts	74
7.2.1 Creation of employment.....	74
7.2.2 Injection of money into the local economy	74
7.2.3 Creation of market for construction materials	74
7.2.4. Economic growth.....	74
7.2.5 Improved ICT Access.....	74
7.3 Negative impacts during construction	75
7.3.1. Soil erosion	75
7.3.2. Waste disposal.....	75
7.3.4. Noise & vibration	76
7.3.5. Air quality	76
7.3.6. Surface Water	77
7.3.7. Occupational Health and safety	78
7.3.8. Disturbance of Traffic.....	79
7.3.9. Flora and Fauna	79
7.3.10. Land take	80
7.3.11. Impact on public properties and common resources	80
7.4 Negative impacts during operation	81
7.4.1. Soil.....	81
7.4.2. Waste disposal.....	81

7.4.3. Aesthetic and visual impacts	81
7.4.4 Exposure to Electromagnetic Field	81
7.4.5. Impacts on Wildlife Habitats and Migratory Birds	82
7.5 Decommissioning Phase.....	82
7.5.1. Concerns over Occupational Safety and Health	82
7.5.2. Vehicular and Human Traffic Impacts	82
7.5.3. Impacts from Solid and Liquid Wastes	82
7.5.4. Noise and Vibration Impacts	82
7.5.5. Emissions and air pollution.....	83
7.5.6. Increase in Social Vices	83
CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN.....	84
8.1 Introduction	84
CHAPTER NINE: ENVIRONMENTAL & SOCIAL MONITORING	92
9.1 Introduction	92
9.2 Internal Monitoring	92
9.3. External Monitoring.....	94
9.4. Environmental Audits (EA)	94
CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS	96
10.1 Conclusions	96
10.2 Recommendations	96
APPENDICES.....	97
Appendix I: Minutes for Public Barazas	98
A. Meeting at Limuru Nyakinyua ACK Church, Limuru Nyakinywa Location, Kinangop Sub County	98
B. Meeting at Turasha Chief’s Office, Munoru Sub-Location in Nyandarua County.....	102
C. Meeting at Langalanga Sub-Location Chief’s Office, Karunga Location in Gilgil Sub County.....	106
D. Nyakio Shopping Centre in Haraka Location, Nyandarua County	110
E. Gituru B ECD Nursery School in Mununga Sub-Location, Naivasha East Location	114

F. Meeting at Karati Primary School in Githafai Location, Nyandarua County ..	117
G. Meeting at Kalusysa Market, Lukenya Location, Athi-River Sub-County.....	120
H. Meeting at Ituru Location, Gatundu South Sub-County.....	123
I. Meeting at Kiasa Centre in Machakos County	126
Appendix II: Public participation list.....	129
A. Meeting at Ituru chief’s office attendance List.....	129
B. Meeting at Kalusya attendance list.....	130
C. Meeting at Kiasa trading centre attendance list	137
D. Meeting at Malaa market attendance list.....	142
E. Meeting at asst. chief’s office at Munoru B Attendance Lists	145
F. Meeting at Limuru Nyakinyua ACK church attendance list	146
G. Meeting at Langa langa chiefs office attendance list	149
H. Meeting at Gituru B ECD attendance list	155
I. Meeting at Karati primary school attendance list	157
J. Meeting at Nyakio shopping centre attendance list	158
Appendix III: Sample questionnaires.....	159

LIST OF TABLES

Table 2.1: Administrative areas where the transmission line passes	25
Table 2.2: Administrative areas where the transmission line passes	26
Table 2.3: Administrative areas where the transmission line passes	26
Table 2.4. Meteorological Conditions for Design of Transmission Lines.....	28
Table 2.5 Canary Conductor Performance Parameters	30
Table 2.6. Condor Conductor Performance Parameters.....	30
Table 2.7. Lynx Conductor Performance Parameters	30
Table 2.8. OPGW-48 Performance Parameters	31
Table 2.9. ACS No.7/8 Awg Performance Parameters	31
Table 2.10. Minimum Ground Clearance and Cross-over Clearance	34
Table 2.11. Poles/Towers Plan	36
Table 4.4: Population per counties.....	61

LIST OF FIGURES

Figure 2.1. An Entire Circulated Transposition of Line.....	34
Figure 2.2. Double circuit lattice steel tower configurations	36
Figure 4.1: The line passes through the edge of the Rift valley in Nyandarua county	56
Figure 4.2: Landscape near Karati Pr. School, Nyandarua county.....	59
Figure 4.3: the landscape and lake Naivasha at the horizons	60
Figure 5.1: Public baraza at chief’s office in Langalanga, Gilgil.....	69
Figure 5.2: Public baraza at Gituru B ECD nursery school, Nakuru county.....	69
Figure 7.1: Affected structures at Gituru secondary school, Nyandarua county	80

LIST OF MAPS

Map 1. Map showing Gilgil-Thika transmission line	24
Map 2. Thika-Nairobi East transmission line.....	25
Map 3. Nairobi east-Konza transmission line	26

EXECUTIVE SUMMARY

I. Preamble

China International Water & Electric Corp. (CWE) who is financier of this study, on behalf of KETRACO, contracted Enwag Company Ltd to undertake Environmental and Social Impact Assessment (ESIA) for the proposed Gilgil - Thika - Nairobi East-Konza 400kV Transmission Line

This purpose of the assessment was to ensure that the significant environmental and social impacts of the proposed project at the preconstruction, construction, operation and decommissioning stages have been considered and assessed at the project planning phase.

II. Background

The Kenya Electricity Transmission Company Limited (KETRACO) is a state corporation fully owned by the government. It was incorporated in 2008 pursuant to Sessional paper No. 4 of 2004 on Energy. 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.

The proposed 400kV transmission line and associated substations as important part of the development plan will be constructed by KETRACO. In 2014, KETRACO appointed Feedback Infra Private Limited to conduct feasibility study for “Task I” of Kenya’s Power Transmission Improvement Project and Power Grid Corporation of India Ltd. to conduct feasibility study for “Task IV” of the same Project. The Project in question is an important part in KETRACO grid planning. Lot 1 Gilgil-Thika-Nairobi East-Konza Transmission Line originates from “Task I” feasibility study report.

III. Study Objectives

The principal objective of this assessment was to identify significant potential impacts of the project on environmental and social aspects, and to formulate recommendations to ensure that the proposed project takes into consideration appropriate measures to mitigate any adverse impacts to the environment and people’s health through all of its phases (construction, operations and decommissioning phases).

The specific objectives of this ESIA were to:

- Identify and assess all potential environmental and social impacts of the proposed project;

- Identify all potential significant adverse environmental and social impacts of the project and recommend measures for mitigation;
- Verify compliance with the environmental regulations and relevant standards;
- Identify problems (non-conformity) and recommend measures to improve the environmental management system;
- Generate baseline data that will be used to monitor and evaluate the mitigation measures implemented during the project cycle;
- Recommend cost effective measures to be used to mitigate against the anticipated negative impacts;
- Prepare an Environmental Impact Assessment Study Report compliant to the Environmental Management and Coordination Act (1999) and the Environmental (Impact Assessment and Audit) Regulations (2003), detailing findings and recommendations.

IV. Study Methodology

The approach to this exercise was structured such as to cover the requirements under the EMCA, 1999 as well as the Environmental Management and Coordination (Impact Assessment and Audit) Regulations 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan as well as decommissioning. In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, desktop studies, public consultations with members of the community in the project areas, survey, photography, and discussions with key people in KETRACO (the proponent).

The key activities undertaken during the assessment included the following:

- Consultations with the key project stakeholders including the project proponent, community members, county administration, opinion leaders and county departmental heads. The consultations were based on the proposed project, site planning and the project implementation plan;
- Physical inspections of the proposed project area which included observation of available land marks, photography and interviews with the local residents;
- Evaluation of the activities around the project site and the environmental setting of the wider area through physical observations and literature review;
- Review of available project documents; and
- Report writing, review and submissions.

V. Project Description

The proposed 400kV transmission line is in three (3) sections: Gilgil – Thika, Thika – Nairobi East and Nairobi East – Konza. The details are as follows:

- Gilgil-Thika transmission line, line path length about 113km.
- Thika-Nairobi East transmission line, line path length about 21km.
- Nairobi East-Konza transmission line, line path length about 65km.

VI. Policy, Legal and Institutional Framework

There are several laws, policies and guidelines that have been put in place in Kenya and Internationally. These laws are meant to help in environmental protection and conservation and also for peaceful co-existence in the ecosystem. We have reviewed a wide range of policy, institutional and legislative framework to address the major causes of environmental degradation and negative impacts on ecosystem emanating from industrial and economic development programmes.

These laws and policies are geared towards mitigating any social and environmental negative impacts that may result from a proposed project. Details are outlined in chapter 3 of this Report.

VII. Potential Project Impacts

Anticipated Project Impacts shall be both positive and negative impacts, this study report outlines how the positive impacts will be enhanced while also highlighting how the negative impacts will be mitigated. Project Impacts are summarized in the table below:

No.	Impact	Construction activities			Operations
		Casting & foundation	Tower erection	Stringing	
1.	Soil	√	-	√	-
2.	Waste disposal	√	√	-	-
3.	Noise	√	√	√	√
4.	Air quality/emissions and dust	√	-	-	-
5.	Forest resource, flora and fauna	√	-	√	√
6.	Electromagnetic fields	-	-	-	√
7.	Land take	√	-	-	-
8.	Surface water	√	-	-	-
9.	Aesthetics and visual impact	√	√	-	-
10.	Traffic and transport	√	√	√	-
11.	Accident risks	√	√	√	√
12.	Hazards due to natural disaster	-	-	-	√
13.	Loss of landuse	√	-	-	-
14.	Socio-economic	√	-	√	√

VIII. Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) has been developed for the proposed project. This plan provides a logical framework within which the negative environmental and social impacts identified during the ESIA study can be mitigated and the positive impacts enhanced. Monitoring and management practices as well as monetary compensation are considered and cost estimates included. Responsibilities and time frames for the implementation of the various aspects of the ESMP have been identified. This plan shall be followed at all times during project implementation.

IX. Conclusions

The intensity of impacts will be relatively higher at the tower construction sites within the RoW. These impacts are related to land degradation, noise, waste handling, air quality and vegetation clearance. These potential impacts are easy to mitigate through proper construction planning. However, impacts on vegetation could be locally substantial during construction phase since stringing may necessitate removal of some trees to create access. This impact on vegetation is transient and reversible. Impacts on wildlife during construction are related to possible effects on wildlife movement if tower construction and stringing across animal migration route coincide with their movements. This is easily mitigated by scheduling construction so that it does not coincide with animal migrations.

During construction, potential impacts on local communities and enterprises are largely positive, as the construction activities provide direct job opportunities and indirectly create income from trading through supply contracts, food vendors, accommodation, entertainment etc. However, these positive impacts are limited to the duration of the construction activities and would not have a significant sustainable positive impact on the local economy.

X. Recommendations

Clearance of Vegetation: the transmission line crosses through Kamae plantation forest where cypress and pine trees will be affected. Ketraco to consult KFS on how best to minimize the impact or compensatory re-forestation. Unnecessary clearing of vegetation should be avoided in order to reduce soil erosion. However, the company shall ensure re afforestation is done and the cleared areas retain their aesthetic value.

Resettlement Action Plan (RAP): A comprehensive Resettlement Action Plan should be conducted by the proponent to identify those who will be affected by the proposed project and compensate them accordingly.

Mitigation Measures: Mitigation measures outlined in this study report should be adhered to and the Environmental and Social Management Plan (ESMP) implemented

to the letter. The implementation of this ESMP will be key in achieving the appropriate environmental management standards as detailed for this project.

Transmission line at critical areas: The proposed transmission line should be redesigned to minimise negative impacts where it crosses the Proposed Kenya – Ethiopia 500HDC Transmission line and Gituru secondary school.

Licence: All the negative impacts identified can be mitigated, and will restore the ecosystem to near or original state. We thereby recommend that the proponent should be licenced by NEMA to continue with the construction of the proposed project

The proponent should work closely with local people, community leaders, County Government and other stakeholders to ensure smooth implementation of the project.

CHAPTER ONE: INTRODUCTION

1.1 Background

1.1.1. Energy in Kenya

The Government of Kenya (GOK) unveiled “Vision 2030” in 2007. Energy, infrastructure, building, agriculture, manufacture, mining, tourism, whole sale and retail sale, financial service and information technology are identified key development industries in “Vision 2030”. The government is determined to develop Kenya into a new industrialized medium income nation from low income agricultural economic one. The government is pledged to provide high quality life to all citizens. In the country’s perspective, the government has put energy industry on priority development and pointed out that development of energy industry is an important foundation for achieving sustainable economic growth and transformation in the country.

GOK enacted “Least Cost Power Development Plan” (LCPDP) subsequently in 2011 and revised it in 2013. According to LCPDP, 21,000km long high voltage (HV) transmission line will be constructed new to increase power capacity of 22,000MW. Under current power supply scheme of Kenya, electric supply has covered approximately 30% of total population and its near future objective is to achieve 40% of rural power supply coverage by 2020. High expansion of power industry at present and in near future is reasonably anticipated in Kenya.

1.1.2. Proposed project

China International Water & Electric Corp. (CWE) who are financiers of this study, on behalf of KETRACO, contracted Enwag Company Ltd to undertake the Environmental & Social Impact Assessment (ESIA) for the proposed Gilgil – Thika -Nairobi East – Konza 400kv Power Transmission Line.

China International Water and Electric Corporation signed an MOU with MOE&P on 12 May 2015 and the two parties entered into the commercial contract of Kenya Transmission Line Project on 26 May 2016. The Project will be executed on EPC+F basis with financing from Chinese banks.

The proposed 400kV transmission line and associated substations as important part of the development plan will be constructed by KETRACO. In 2014, KETRACO appointed Feedback Infra Private Limited to conduct feasibility study for “Task I” of Kenya’s Power Transmission Improvement Project and Power Grid Corporation of India Ltd. to conduct feasibility study for “Task IV” of the same Project. The Project in question is an important part in KETRACO grid planning. Lot 1 Gilgil-Thika-Nairobi East-Konza Transmission Line originates from “Task I” feasibility study report.

1.2 Objectives of ESIA

This study seeks to meet the following objectives:

- i. To identify elements of environment likely to be affected by the project and/or likely to cause adverse impacts to the project including natural and man-made environment.
- ii. To identify any potential losses or damage to flora, fauna and natural habitats.
- iii. To identify the negative impacts and propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the project.
- iv. To specify environmental monitoring and audit requirements, if necessary, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted.
- v. Prepare an environmental impact assessment study report compliant with the Environmental management and Coordination Act (1999) and detailing findings and recommendations

1.3 Scope

The ESIA was carried out in compliance with the Government of Kenya's Environmental Management & Co-ordination Act of 1999 and the Environmental (Impact Assessment & Audit) Regulations, June 2003, World Bank's Safeguard Policies among other relevant laws, regulations, and guidelines. To meet the objectives stated in section 1.2 above, the consultant undertook the following tasks.

- i. **Literature review:** gathering environmental and social information pertaining to the project
- ii. **Description of the baseline environment:** collecting and present baseline information on the environmental characteristics
- iii. **Detailed Description of the proposed project:** describing the proposed project, its geographic location, ecological, general layout of facilities including maps at appropriate scale where necessary
- iv. **Legislative and Regulatory Framework:** identifying and describing all pertinent regulations and standards governing environmental quality, solid and liquid waste management, health and safety, protection of sensitive areas, land use control at the national and local levels and ecological and socio-economic issues including compliance issues.
- v. **Identification of potential Impacts:** Analysis and description of all significant changes expected due to the proposed project

- vi. **Occupational Health and Safety Concerns:** Analysis and description of all occupational health and safety concerns likely to arise as a result of the construction of the proposed project
- vii. **Public Participation:** Consultations with the public on the positive and negative impacts of the proposed project
- viii. **Mitigation Measures:** Proposing feasible mitigation measures for the negative impacts that could result from the proposed transmission line project.
- ix. **Environmental Management Plan:** Developing an Environmental Management Plan to mitigate negative impacts:
- x. **Monitoring Plan:** Developing an Environmental Monitoring Plan
- xi. **ESIA Report:** Preparation and submission of an Environmental and Social Impact Report.

1.4 Methodology

1.4.1 Understanding the transmission line route

The first step in environmental assessment of the proposed project is to understand the proposed line route based on map, also analyse the direct and indirect environmental impacts; which is so important to determine the scope and depth of the study.

1.4.2 Data collection

Required data is gathered based on the activities and main components of the project as well as characteristics of the study area which was done through desk and field study.

i. Desk study

- Review of environmental laws, regulations and standards, all environmental Acts, laws and regulations of Kenya and national and international standards, related to the project and potential pollutions were reviewed. In addition, all national protected areas were analysed to see if any was affected by the project.
- Search in reputable internet websites
- Getting data and information from proponent about designs of the project and maps of the area. A description of the project was done in the report and all project activities in construction and operation phases separately with emphasize on destructive activities on environmental parameters were identified.

ii. Field Study

Considering the proposed project traverses through four (4) counties, the visit was focused on the route. The visits were made to identify and study the environment of the project region from the important viewpoints such as flora and fauna species and habitats. To identify the fauna species and collecting sufficient data from the region, the study area was evaluated on the basis of the region transects considered.

Collecting the data and information on the basis of the desk and field studies, leads to perfect understanding of the rules, regulations and standards of the environment and the organizational structure of the related organs, as well as the project and its components, the existing status of the study area environment comprising physical-chemical, biological-ecological and economical-social and cultural parameters.

1.4.3 Environmental Baseline Study (EBS)

EBS was provided based on the gathered data in desk and field studies. In fact EBS is a survey about present status of the environment of the project. In this step, Physio-chemical, Biological-Ecological and Sociological characteristics of the environment are studied.

The main parameters of physical study include:

- Meteorology (main factors of climate and air quality)
- Topography and landscape
- Geology (mostly in terms of potential effect on ground water)

To understand the present condition of pollution in the study area, questionnaires were administered to the local people, along with field studies and obtaining information from public *barazas*.

The main parameters of Biological-ecological study include:

- Flora
- Fauna (important and threatened fauna species, biodiversity, possible migration routes)
- Habitats (habitat types, vulnerable habitats and protected areas)

The main parameters of Sociological study include:

- Social criteria (population, education)
- Economic criteria (employment, economic activities, land use, infrastructure)
- Cultural criteria (language, religion, cultural heritage)

It is worth to mention that Resettlement Action Plan (RAP) will be carried out later to determine the project cultural & socio – economic effects such as land acquisition, dispossession of cultural heritage.

1.4.4 Environmental Impact Assessment (EIA)

The approach of ESIA study is:

- To determine all positive and negative environmental impacts of the project for construction and operation phases separately, Analysis and assessment,
- Environmental Management Plan (EMP) including mitigation plan

First of all, the possible environmental impacts (negative and positive) in construction and operation phases are identified and classified based on the recognition of the environment, project activities.

After identifying the impacts, the best assessment method was selected based on the project characteristics, scale of work, availability of data and information and time schedule of the study; and impacts were assessed and analyzed through a proper assessment method.

CHAPTER TWO: PROJECT DESCRIPTION

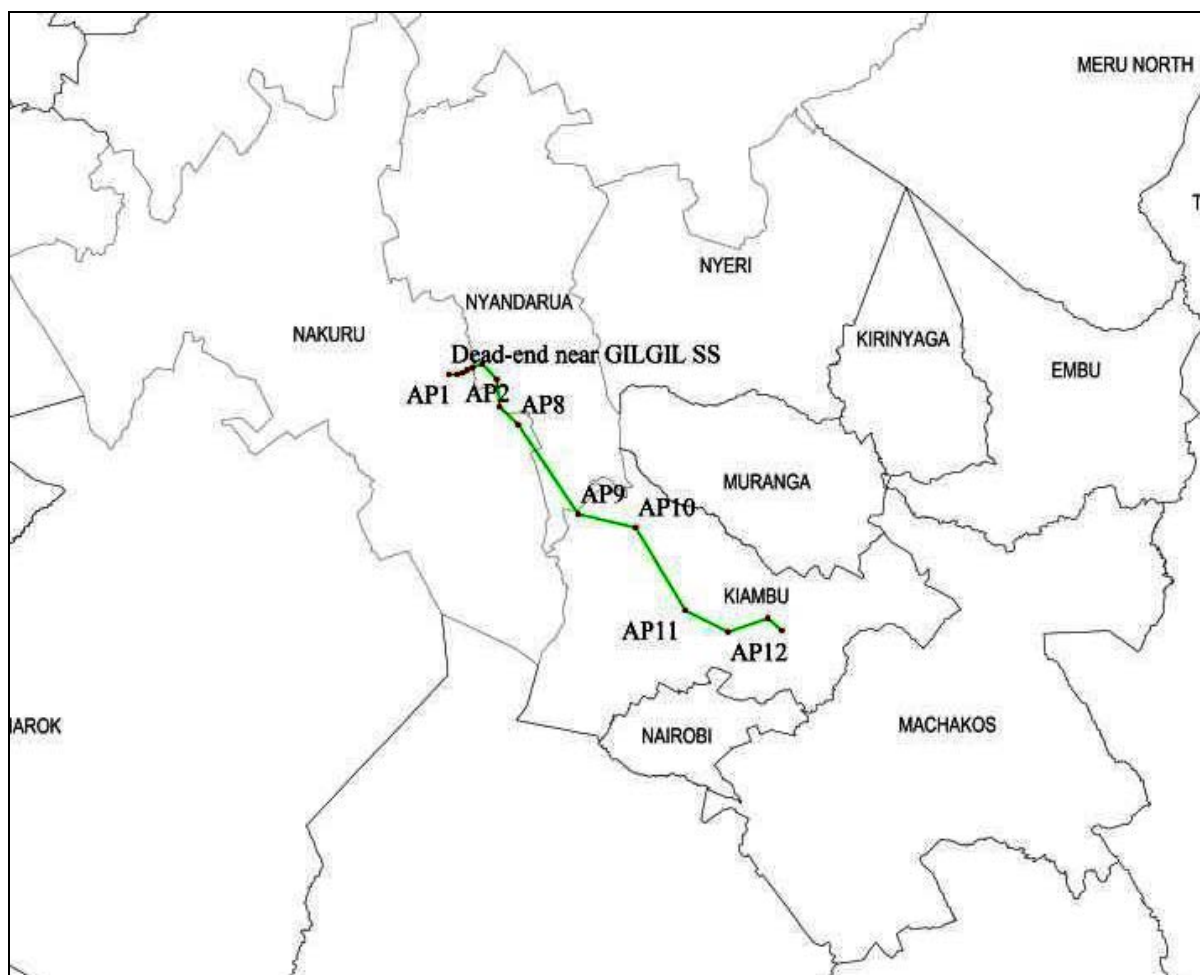
2.1. Proposed line route

The proposed 400kV transmission line is in three (3) sections: Gilgil – Thika, Thika – Nairobi East and Nairobi east – Konza. The details are as follows:

- Gilgil-Thika transmission line, line path length about 113km.
- Thika-Nairobi East transmission line, line path length about 21km.
- Nairobi East-Konza transmission line, line path length about 65km.

2.1.1. Gilgil-Thika transmission line section

The proposed transmission line will originate from Gilgil and terminate at Thika. The total length of the proposed transmission lines is 113 km traversing Nakuru, Nyandarua and Kiambu counties. The map below shows the map route.



Map 1. Map showing Gilgil-Thika transmission line

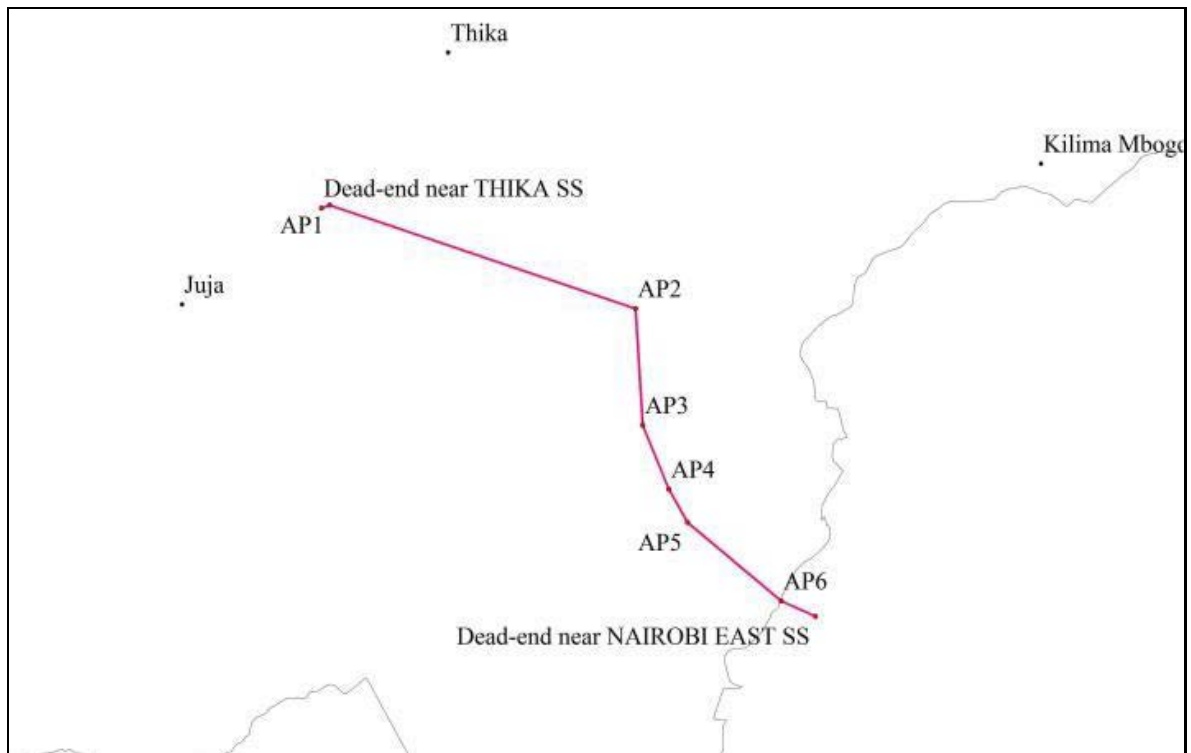
The line passes through seven (7) locations as shown in the table 2.1 in sequence from AP1 -AP10.

Table 2.1: Administrative areas where the transmission line passes

No.	AP (Angle Points)	Location	County
1	1 - 4	Karunga	Nakuru
2	4 - 6	Turasha	Nyandarua
3	6 - 8	Murungaru	Nakuru
4	8 - 9	Naivasha East	Nakuru
		Githafai	Nyandarua
		Nyakio	
5	9 - 10	Kamae	Kiambu
6	10-13 Proposed substation	Ituru	Kiambu
		Ndarugu	
		Kiganjo	
		Komothai	
		Juja	
		Ruiru	

2.1.2. Thika-Nairobi East transmission line section

The proposed line originates from a proposed substation located along Nairobi-Thika highway and between Juja and Thika town. The entire line length is about 21km and is in Kiambu county. Map 2.2. show the proposed transmission line.


Map 2. Thika-Nairobi East transmission line

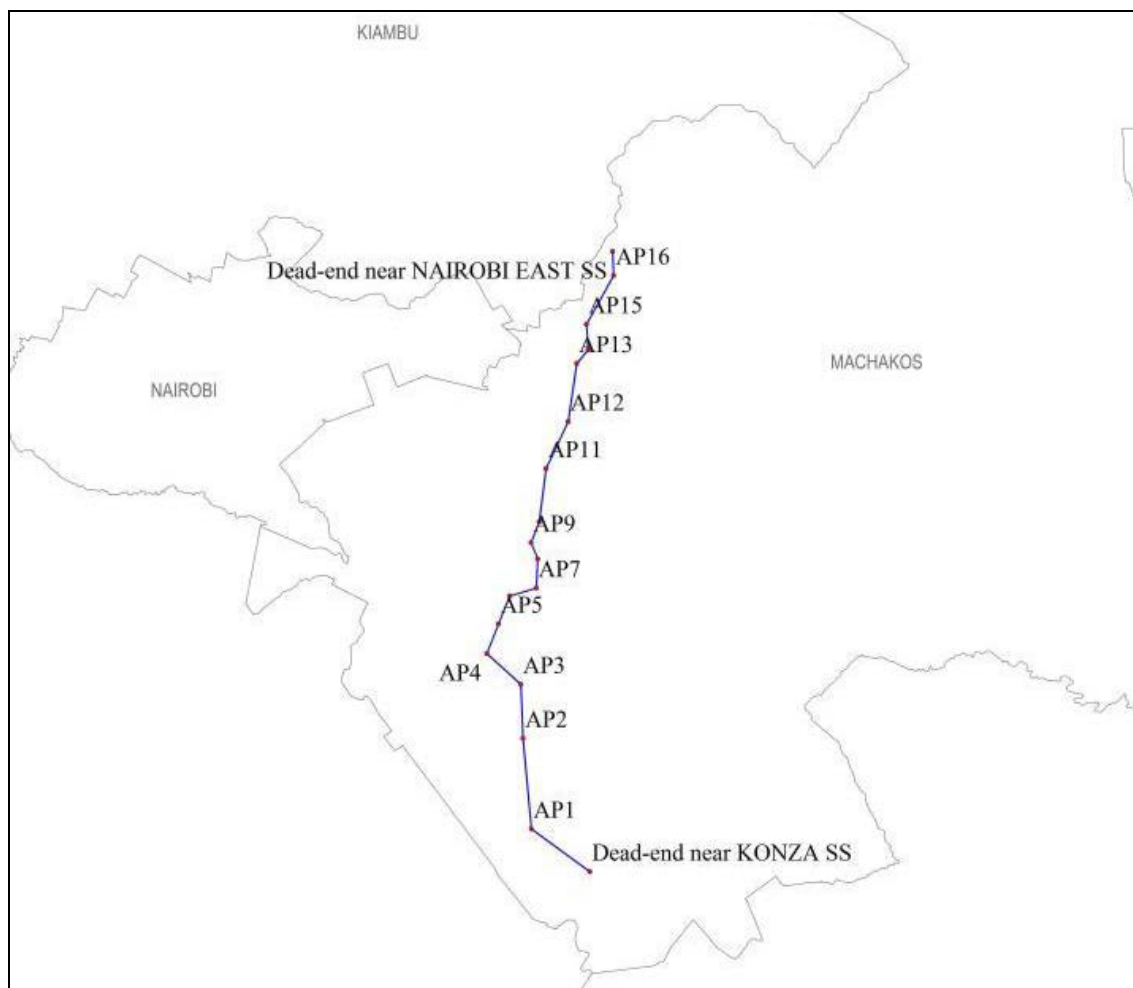
The line passes through two (2) locations as shown in the table 2.2 in sequence from AP1 -AP6 to the substation.

Table 2.2: Administrative areas where the transmission line passes

No	Angle points	Location	County
1	1 -6 substation	Gatuanyaka	Kiambu
		Koma rock	Machakos

2.1.3. Nairobi East – Konza transmission line section

Nairobi east – Konza transmission line originates from Malaa in Machakos county and runs through the county upto Konza with a length of about 65km. Map 2.3 shows the transmission line.


Map 3. Nairobi east-Konza transmission line

The line passes through three (3) locations as shown in the table 2.3 in sequence from AP16 -AP1 to proposed substation.

Table 2.3: Administrative areas where the transmission line passes

	Angle points	Location	County
	AP16 - AP1 Proposed substation	Koma rock	Machakos
		Lukenya	Machakos
		Kinanie	Machakos

2.2. Project activities

The proposed projects' activities can generally be divided into three stages, namely: construction; operation; and decommissioning of the transmission line as described below.

2.2.1. Construction

The construction of the transmissions line will require bush clearance and the creation of some temporary access roads to the transmission construction sites. The construction of the transmission towers themselves will require some localised vegetation clearance. Materials arising from the excavation for the tower foundations (soil, rock etc.) would either be spread in appropriate areas surrounding the line or removed to another site as agreed. The foundations will be in filled with cement supplied via ready-mix-cement trucks or alternatively mixed on site. Following tower erection, conductor stringing, which may involve the use of a mobile crane, will occur and may result in the need for some tree cutting along the Right of Way (RoW).

2.2.2. Operation

Once constructed, the transmission line will require minimal maintenance. Yearly visual inspection of the Over Head Transmission Line (OHTL) towers and conductors is expected. After a period of many years, the entire system would need a detailed survey and overhaul. There may be a requirement for occasional visits to remove tree or branches that start to grow too close to the OHTL. Access rights may need to be retained to allow for maintenance works in the future.

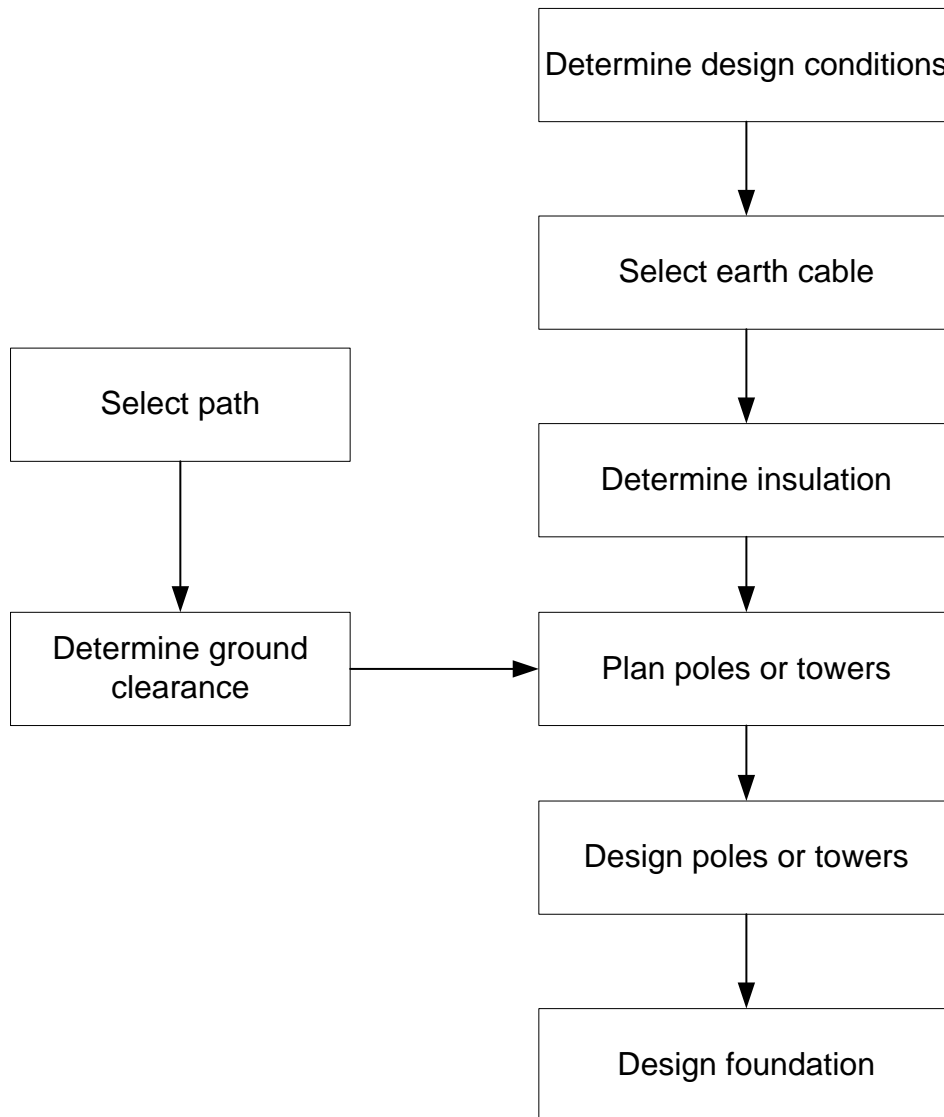
2.2.3. Decommissioning

The transmission line is likely to remain in place for many years and therefore any decommissioning works would be a long time in the future. Towers and strings/conductors would be dismantled and removed and materials recycled/re-used as far as possible. Any areas disturbed would be restored to pre-project conditions and/or to conditions acceptable to NEMA. Environmental impacts associated with the decommissioning process would be minimised through the implementation of an environmental management plan (EMP).

2.3. Transmission Line Design

2.3.1. Design Procedure

Design of transmission line was carried out according to the following flow chart:



2.3.2. Design Conditions

1) Design meteorological conditions

The combination of meteorological conditions for design of the Project is given in the table below.

Table 2.4. Meteorological Conditions for Design of Transmission Lines

Project Operation Conditions	Temperature °C	Wind Velocity (m/s)	Frost Thickness (mm)
Highest temp.	45	0	0
Lowest temp.	0	0	0
Max. frosting	-	-	-
Design wind velocity	15	36 (3s)	0
Annual mean temp.	25	0	0

Atmospheric over-voltage	15	15	0
Operation over-voltage	25	20	0
Installation	10	10	0

2) Level of Contamination and Thunder-Lightning Days

Line level of contamination is Grade IV, IEC, i.e., creepage distance is not less than 31mm/kV. Thunder-lightning days are 120 days/year.

3) Safety Coefficient

(i) Conductor

Max. operation tension safety coefficient 2.5;

Average operation tension safety coefficient 5.0.

(ii) Grounding cable and OPGW

Max. operation tension safety coefficient 2.5;

Average operation tension safety coefficient 5.0.

(iii) Insulator-String and Fitting

Insulator-string and fitting safety coefficient 2.5.

(iv) Steel Tower

Normal working condition (max. tension working conditions): safety coefficient 2.0;

Broken cable working condition (normal+one broken grounding cable or one conductor): safety coefficient 1.5.

Falling tower working condition: safety coefficient 1.0.

(v) Foundation

Normal working condition (max. tension working conditions): safety coefficient 2.5;

Broken cable working condition (normal+one broken grounding cable or one conductor): safety coefficient 1.75.

Maintenance and installation working condition: safety coefficient 2.0.

2.4. Earth Cable

The earth cable used in the transmission lines is ACSR. Spacing of double split conductor is 400mm. For models of conductors, see the table below. Conductor models and characteristics are provided in the table below.

Table 2.5 Canary Conductor Performance Parameters

Description		Unit	Specification
Construction	Aluminum	Strands/Dia. mm	54/3.279
	Steel	Strands/Dia. mm	7/3.279
Cross Area	Aluminum	mm ²	456.06
	Steel	mm ²	59.10
	Total	mm ²	515.16
Outside diameter (OD)		mm	29.51
DC resistance		Ω/km	≤0.06351
Calculated tensile breaking strength		N	140950
Calculated weight		kg/km	1724

Table 2.6. Condor Conductor Performance Parameters

Description		Unit	Specification
Construction	Aluminum	Strands/Dia. mm	54/3.08
	Steel	Strands/Dia.mm	7/3.08
Cross Area	Aluminum	mm ²	402.84
	Steel	mm ²	52.19
	Total	mm ²	455.03
Outside diameter (OD)		mm	27.74
DC resistance		Ω/km	≤0.07191
Calculated tensile breaking strength		N	123940
Calculated weight		kg/km	1522

Table 2.7. Lynx Conductor Performance Parameters

Description		Unit	Specification
Construction	Aluminum	Strands/Dia.	30/2.79
	Steel	Strands/Dia.	7/2.79
Cross Area	Aluminum	mm ²	183.4
	Steel	mm ²	42.8
	Total	mm ²	226.2
Outside diameter (OD)		mm	19.53
DC resistance		Ω/km	≤0.1576
Calculated tensile breaking strength		N	79800
Calculated weight		kg/km	842

400kV line earth cable: one ACS 7/3.26 ACSR and one 48-core OPGW.

220kV line earth cable: one 48-core OPGW.

132kV line earth cable: one 48-core OPGW.

Earth cable models and characteristics are given in the table below.

Table 2.8. OPGW-48 Performance Parameters

No. of cores		48
International standard No.		IEE 1138, IEC 60794-4-1
Wave	nm	1550
Cross area		221.02
Outside diameter (OD)		19.4
Unit weight	kg/km	<850
Rated tension strength	Newton	≥ 93,000
Equivalent Young modulus	N/mm ²	≥ 70,000

Table 2.9. ACS No.7/8 Awg Performance Parameters

Standard: ASTM B416

Title of standard		No.7/8 Awg
Standard		ASTM
Type		ACS
Cross area	mm ²	58.56
Cable dia.	No./mm ²	7/3.26
Outside Diameter (OD)	mm	9.78
Unit weight	kg/km	390
Rated tension strength	kN	70.81
Equivalent Young modulus	N/mm ²	162000
Linear elongation coefficient	/°C	12.96×10 ⁻⁶

2.5. Insulator-Strings and Fittings

2.5.1. Insulator-strings and Earth Cable-strings

Insulator-strings are long-rod composite ones and fittings are constructed of metal materials conforming to the respective IEC requirements.

2.5.2. Types of Insulators

Insulators are constructed into aerodynamic shape and so designed to minimize the contamination of dust and other solid adhesion. Insulator-string will determine the size of tower head.

Long-rod composite insulators are constructed of boron RTV silicon rubber, conforming to technical parameter requirements and duly approved by the Engineer. The materials for composite insulators shall be of recognized quality and made to accepted mix design. The materials shall be tested to meet technical and testing requirement given in IEC61109. Insulator material type test report shall be submitted for review.

Straight line tower insulators are usually of suspension type. Suspension insulator shall be supplied with replaceable shield ring. Suspension and tension support of the type designated in technical parameter table shall be used for phase-conductor. Yoke plate is used to fix split conductor.

Composite long rod insulators shall be supplied with caps and pins in accordance with IEC61466-1 requirements.

2.5.3. Grading Rings

Grading rings are constructed of recognized galvanized mild steel or aluminum and fitted on all suspension and tension insulator-strings. The device is fixed onto insulator fitting but not directly installed on conductor clamp or insulator head. The device shall be so design to reasonably reduce the damage to conductor and fittings by flashover. The usual shape and type of active end is so designed not to limit the replacement of insulator when the line is alive.

Grading rings are necessary for 220kV and above transmission line system. For application in 220kV system and 230kV system, grading rings are assembled at end of suspension insulators; for application in 345kV and above systems, the two grading rings shall be assembled at both ends of the insulator.

2.5.4. Fittings

Suspension and strain clamps used for conductor and earth cable should be of recognized type and light in weight. All clamps shall be so designed to avoid the possibility of strand separation or single strand deformation.

Sufficient load carrying area shall be maintained between fitting in order to avoid point contact as much as possible.

All bolts and nuts shall meet the requirements for bolts and nuts used in tower installation and shall be secured by anti-theft bolts except where specified otherwise. The mechanical strength of fitting shall conform to requirements and minimum failure load of each member shall be clearly provided in construction drawings.

All steel members shall be constructed of steel, ductile cast iron or forged cast iron and galvanized and shall have sufficient strength, wear resistant and withstand repeated vibration. Split pins shall be constructed of nonferrous metal or stainless steel and designed into self-locking type.

Tension string fittings shall be so designed to meet the requirement for replacing strain clamps and hangers of strings.

(i) Conductor suspension clamps

Suspension clamps shall be light in weight as much as possible, constructed of aluminum alloy and so designed to avoid the possibility of strand deformation and individual strand separation and enable conductor to turn freely vertically.

Except jumper strings, suspension clamps shall be supplied with pre-stranded wire of suitable size to be installed on conductor to stop complete conductor falling with pre-stranded wire when load is less than 2500kg. Special attention shall be paid to corona loss of different parts of fittings.

(ii) Conductor strain clamps

Strain clamps are of compression type. Each clamp shall be supplied with galvanized steel U-shape or ball-shape fitting, aluminum cap and aluminum jumper press, bolted secured jump line and terminal.

(iii) Earth cable suspension clamps

A set of earth cable suspension clamp shall include a suspension clamp, fitting and tie-cable hung on top of towers. Centrally rotating suspension clamp is constructed of forged cast iron, ductile cast iron or drop-forged steel.

The tie-cable is constructed of galvanized steel strand and connected with steel tower steel material for grounding.

(iv) Earth cable strain clamps

A set of earth cable strain clamp includes two clamps and a jump line clamp. The set is hung on tower hanging point and jump line clamp is fixed on top of tower.

Strain clamp is suitable for OPGW and constructed of galvanized forged cast iron, ductile cast iron or drop-forged steel. Jump line clamp is so designed to enable two pieces of jump line to be securely connected onto towers.

Ultimate breaking strength of earth cable strain fitting shall be not less than 95% of earth cable rated breaking strength. Its minimum slip load shall be not less than 50% of earth cable rated breaking strength.

2.6. Lightning Protection and Grounding

2.6.1. Lightning protection measures

Thunder lightning activity is strong locally. To reduce lightning strike trip rate, double earth cable is installed for 400kV line and towers and earth cable-outside conduct protection angle is not over 5°; single earth cable is installed for 220kV and 132kV

line and towers and earth cable-outside conduct protection angle is not over 30°; tower span middle clearance S between conductor and earth cable shall be $S \geq 0.012L+1$.

2.6.2. Types of pole/tower grounding devices

Each pole/tower is earthed. Pole/tower grounding device is of horizontal radial type. Grounding resistance is suitably reduced at both end incoming and outgoing cable sections in order to improve lightning protection.

2.7. Conductor Transposition and Phase Commutation

Conductor at both sides of double-circuit steel towers in the Project is arrayed in negative phase sequence in order to reduce electromagnetic impact and unbalanced current.

When the transmission line is over 200km, an entire transposition will be applied in order to reduce unbalanced current at the time of normal operation of neutral direct grounded grid and safeguard normal operation of electrical equipment. In transposition of double circuit conductor, transposition will be performed for each circuit three times. See Figure 2.1 for circulated transposition.

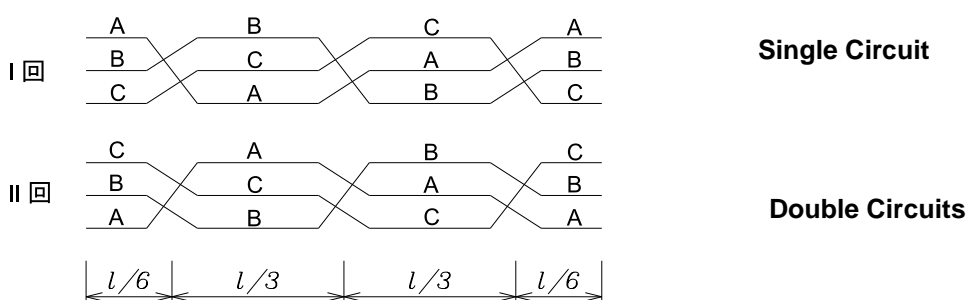


Figure 2.1. An Entire Circulated Transposition of Line

2.8. Cross-over and Ground Clearance

Minimum ground clearance of conductor and cross-over clearance shall conform to the requirements given in Table 2.7 (max. sag refers to sag of conductor at +75°C).

Table 2.10. Minimum Ground Clearance and Cross-over Clearance

Type of Cross-over	Min. Ground Clearance (m)		
	400kV	220kV	132kV
Ordinary ground	8.8	7.5	6.4
Cross over road	9.0	8.0	8.0
Cross over the highest OPGW or grounding wire at the lowest conductor span with low voltage rating	4.4	3.7	3.2

Cross over the line on which a person can stand at the lowest conductor san with low voltage rating	5.3	4.6	3.8
Cross-over railway	9.0	8.5	8.5
Cross over electrified railway, structures or fames or other structures on which a person can stand	6.1	6.1	6.1
Road or other road on which other mobile crane can be operated	12.2	11.5	11.1
Wall, structure or other structure on which a person can stand or against which a ladder can lean	5.3	5.3	5.3
Street light	4.0	3.5	3.5

2.9. Steel Tower

2.9.1. Overview

All towers are self-standing grid steel towers. See the enclosed figure for the dimension of steel towers, however, the dimension is only for information and subject to adjustment in detailed design.

400kV and 220kV double circuit overhead line towers are constructed of drum type and bird-bone towers are used for 132kV single circuit transmission line.

Steel towers shall be so designed that conductor, earth wire and all fittings can be hung by insulators under every working condition.

Two pieces of earth wire are used for protection of double-circuit transmission line; One piece of earth wire hung on top of towers is used for protection of single circuit transmission line. See Table of Characteristic Parameters for earth wire parameters.

Double-circuit terminal towers can hold 4 pieces of earth wire and single circuit terminal tower can hold two.

Suspension fittings are used on straight line towers and strain fitting on strain towers for clamping earth wire.

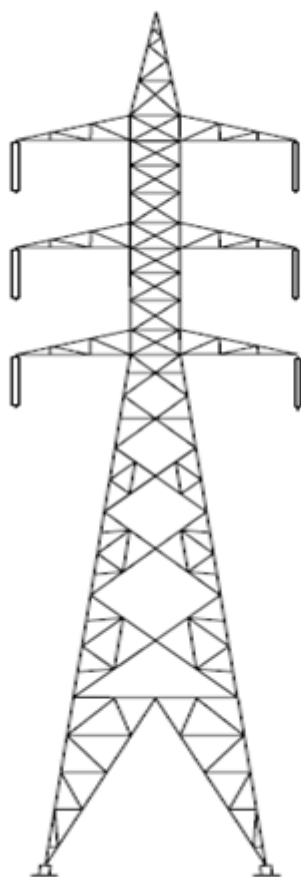


Figure 2.2. Double circuit lattice steel tower configurations

2.9.2. Type of Poles/Towers

Types of poles/towers for 400kV, 220kV and 132kV line are planned as follows:

Table 2.11. Poles/Towers Plan

Type	Condition	Corner Angle Degree	Type of String
S	Straight	0° - 2°	Suspension
LA	Corner	0° - 10°	Strain
MA	Corner	10° - 30°	Strain
HA	Corner	30° - 60°	Strain
DE	Terminal	60° - 90°(0° - 45°)	Strain (terminal)

Standard height steel tower is supposed on the basis of basic span, maximum conductor sag and specified normal ground clearance at highest ambient temperature.

2.9.3. Use of Standard Towers

For lines of different voltage rating, designed standard towers are as follows:

- When the line path is straight, S towers and suspension insulator-string are usually used.
- When the line corner angle is not over 2° , suspension insulator-string are also usually use, but neighbouring spans shall be reduced.
- When the line corner angle is over 2° , corner towers and strain strings are used.
- LA towers may be used as strain straight line towers.

Terminal towers DE and strain strings are used at transmission line terminal. DE towers are designed to withstand all specified load no matter whether down conductor is suspended. Down conductor may extend at any angle of DE tower, but it shall deviate from tower central line by over 45° horizontally. Terminal tower and substation gantries or down conductor between anchor tower structures shall be in slack span and slack strain strings are usually used at both ends.

2.10. Foundation

2.10.1. Overview

Design of all standard foundation and special foundation meets the load requirements of the above towers. Cement content and water-cement ratio of tower foundation concrete shall be determined by approved mix design and conform to BS EN206-1. Tower foundation structural design shall follow BS EN1992 or other equivalent standard.

For self-standing towers, anchor bolt secured plug-in angle steel is used for connection between foundation and towers. Tower leg load s transferred through plug-in angle steel to concrete foundation. For each tower type, plug-in angle steel shall be designed into a standard shape regardless of the actual situation. Plug-in angle steel shall be completely wrapped in foundation concrete slab and touch foundation bottom. Plug-in angle steel is part of the foundation and it has same safety coefficient as foundation.

Except foundation reinforcement, all underground steel structure, whether part of tower or part of foundation, shall be galvanized and completely wrapped in concrete at least 300mm below ground and to concrete bottom, in concrete thickness of 75mm. When it is necessary, steel structure or foundation concrete shall be protected in approved manner. The cover of foundation reinforcement is not less than 50mm.

The type of foundation for particular tower shall be determined with optimum economic alternative and duly approved. Special foundation and extended type are designed only when required and followed with due approval.

2.10.2. Design Requirements

The following shall be taken into account in the design of standard foundation:

- Load transferred from tower has the same load combination as the load sustained by the tower and the load includes the adjustment coefficient of wind load on tower.
- Tower weight.
- Relevant soil parameters.
- Relevant safety factor.
- Ultimate stress of concrete and reinforcement.

Tower foundation shall be designed so strong to withstand top horizontal acting force. Seasonal rainfall, drought, circulating load and wind-led tower vibration shall be considered in design. In submerged areas, tower foundation height shall be above ground by suitable distance to protect tower from being inundated in corrosive water. Top surface of foundation is usually made to slope in order to drain rainwater. In addition, a 100mm blinding concrete shall be placed at bottom.

2.10.3.Types of Foundation

Following types of tower foundation are designed at the stage according to geological conditions of the lines and types of towers discussed above:

(1) RCC slab foundation

RCC slab foundation is initially determined the standard tower foundation in the Project according to geological conditions. Foundation pit is excavated by hands or in mechanical means and concrete is cast in-situ. Plug-in angle steel is directly embedded into concrete and load is transferred through angle steel and bolts to concrete slab.

Under any circumstance, foundation bottom stress shall be not over allowed bearing capacity of foundation. Eccentricity resulting from any dual way load shall be not over one third area range of foundation bottom center. Under any circumstance, foundation bottom void area resulting from eccentricity shall be not over 25% of total foundation bottom area.

(2) Rockbolted foundation

In rocky areas, rockbolted foundation may be used when surface rock or shallow ground rock is hard. Rockbolts are mode of not less than 25mm dia. deformed bar. They are directly inserted into drilled holes and the holes are then grouted. No., depth, spacing and other parameters of rockbolts are determined according to rock mass quality.

(3) Special foundation

Special foundation is usually designed for particular towers and adjusted according to actual geological conditions of towers. Special foundation other than standard foundation shall be designed when allowed bearing capacity of foundation is found

very low in study of the Project soil and its classification, when particle soil fissure ground water table is very high or in case of other situation. Special foundation usually has the following two types: deep hole concrete piles with cap (drilled and concreted, or penetrated) or concrete raft foundation.

Piled foundation comprises many bored piled or precast penetrated piles and its depth is determined by geological conditions at towers. The bearing capacity of piled foundation is determined by pile head load capacity or soil shear strength on effective pile side area within pile depth depending on whether piles are end-bearing piles or friction piles. Soil mass below pile cap is not considered to have contribution to piled foundation bearing capacity.

When tower soil mass is disturbed by other civil works or within backfilled area, raft slab foundation may be selected. The foundation comprises four main pillars and joint concrete slab. The four pillars are well positioned.

2.11. Design standards

Except where specified otherwise, the Works shall be constructed in compliance with the latest IEC edition or recommendations or British Standard (BS).

Transmission line shall be designed conforming to IEC/BS and members of steel towers (such as angle steel and bolts may be manufactured in accordance with GB (Chinese Standard). Other associated equipment shall be designed, manufactured, tested and installed in accordance with IEC, EN or equivalent standards.

IEC 60038 Standard voltages

IEC 60071-1 to 5 Insulation Coordination

IEC 60044-1 Instrument transformers part 1: Current transformers

IEC 60044-5 Instrument transformers part 5: Capacitor voltage transformers

IEC 62271-100 High-voltage switchgear and control gear-part 100: High-voltage alternating-current circuit-breakers

IEC 62271-102 High-voltage switchgear and control gear-part 102: High-voltage alternating current disconnectors and earthing switches

IEC 60076 Power transformers

IEC 60099-4 Surge arresters

IEC 60214 Tap-changers

IEC 60815 Selection and dimensioning of high-voltage insulators intended for use in polluted conditions

IEC 60834-1 Teleprotection equipment of power systems

- IEC 60909 Short-circuit currents in three-phase a.c. systems
- IEC 60947 Low voltage switchgear and control gear
- IEC 61000-4-4 Electromagnetic compatibility (EMC)
- IEC 61000-6-5 Electromagnetic compatibility (EMC)
- IEC 61089 Round wire concentric lay overhead electrical stranded conductors
- IEC 61230 Live working - Portable equipment for earthing or earthing and short circuiting
- IEC 61243-1 Live working - Voltage detectors
- IEC-CISPR 18 Radio interference characteristics of overhead power lines
- IEC 157 LV switchgear and control gear (Part-I)
- IEC 158 Low Voltage Control gear (Part-I)
- IEC 255 Electrical Relays (Part-3,Part-5~8,Part-21)
- IEC 478 Stabilize Power Supplies DC output
- IEC 529 Classification of degree of protection provided by enclosure (IP code)
- IEC 617/BS 3950 Electrical Protective Systems for A.C. Plant
- IEC 60870-5-104 Telecontrol equipment and systems
- IEC 61850-7 Basic communication structure for substation and feeder equipment
- IEEE Std80-2000 Guide for Safety in AC Substation Grounding
- IEC 60826 Design Criteria of Overhead Transmission Lines
- IEC 60652 Loading tests on overhead line structures
- ASTM B232 Standard Speciation for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR)
- BS 215 Specification for Aluminum conductors and aluminum conductors, steel-reinforced - For overhead power transmission
- IEC 61773 Overhead lines – Testing of foundations for structures
- IEC 61284 Overhead lines – Requirements and tests for fittings
- IEC 60383 Insulators for overhead lines with a nominal voltage above 1000V
- IEC 61109 Insulators for overhead lines - Composite suspension and tension insulators for A.C. systems with a nominal voltage greater than 1000 V - Definitions, test methods and acceptance criteria
- BS EN-50341 Overhead Electrical Lines Exceeding AC 45kV

2.12. Land requirement for the transmission line wayleave

As per KETRACO RPF, it requires a way leave corridor of equivalent to 60m width for 400 kV lines. Along the 30m wide corridor, an appropriate clearance between conductors and vegetation and structures needs be maintained which requires that houses and trees more than 12 feet are removed for the entire life of the transmission line.

However, farming and grazing within the corridor is generally permitted. As for the tower foundations, they will require a permanent area based on design of 400 kV line tower.

CHAPTER THREE: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1. Environmental Policy Framework

3.1.1 The National Environmental Action Plan (NEAP) 1994

According to this plan, it's recognized that the development projects on the environment i.e. industrial, economic and social development programs that do not take care of environmental considerations in their operations are not sustainable. Under the NEAP process, EIA was introduced and among the key targets recognized were the industrialists, business community and local authorities.

3.1.2 Sessional paper No. 6 (1999)

Policy guidelines on environment and development – the key policy objectives of this paper include:

- Ensuring that all development projects at the inception stage and programs, as well as policies consider environmental considerations.
- Ensuring that an EIA study report is prepared for any undertaking or development project before implementation.
- Coming up with effluent treatment standards that will conform with acceptable health guidelines
- It's important to note that issues of wastewater management and human settlements are given prominence and therefore, the policy recommends re-use and recycling of residues i.e. wastewater, use of low waste generation technologies and increasing public awareness on benefits of a clean environment. It also recognizes the role of stakeholders in all these initiatives within their localities.
- The paper encourages better planning in rural and urban areas in provision of needs i.e. water, drainage system, waste disposal facilities et al.

3.2. Overview of relevant legislation

The EIA for this project is conducted in accordance with the requirements of the Environmental Management and Co-ordination Act, No. 8 of 1999 and the Environmental (Impact Assessment and Audit Regulations, 2003) Legal Notice No.101. In addition, the study takes into account other legislation related to the project. These include: Energy Act 2006, the Public Health Act Cap 242, the Physical Planning Act, the local Government Act Cap 265, the Forest Act (2005) and the World Bank guidelines on EIA procedures.

For a long time, legal provisions touching various aspects of environmental protection and management were scattered in 77 different statutes. This set up did not offer adequate protection of the environment mainly due to weak legal and institutional framework and conflicts between the various Statutes and sectors. In (1999), a Bill to provide for the establishment of a comprehensive legal and institutional framework for the management and protection of the environment was enacted into law as the Environmental Management and Co-ordination Act, 1999 and received Presidential assent on 6th January, 2000. This Act has addressed the shortcomings of the previous legislation in that it has instituted controls and set up effective institutions.

3.2.1 The Environmental Management and Co-ordination Act, 1999

The main objective of EMCA (1999) and the related Regulations is to provide for the establishment of an appropriate legal and institutional framework including procedures for the management of the environment in Kenya. The Act further aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. In addition, Act seeks to harmonize all the 77 sector specific legislation touching on the environment in a manner designed to ensure protection of the environment. This is in line with national objectives and sustainable development goals enunciated in Agenda 21 of the Earth Summit. As such, in terms of environmental management, EMCA (1999) provides a comprehensive and an appropriately harmonized legal and institutional framework for the handling of all environmental issues in Kenya and supersedes all sectoral laws.

Part VI of EMCA (1999) makes provision for the carrying out of EIA. It is mandatory for any person being a proponent of a project, to submit a study report to NEMA in a prescribed format. After perusing the proponent report, and NEMA is satisfied that the proposed project is likely to have significant negative impacts in the environment, it will direct the proponent of the project to undertake at his or her own expense an environmental impact assessment study and prepare a report. NEMA shall publish such a report and invite comments thereon from the public before deciding to issue an environmental impact license. The NEMA, at any time after issuing the environmental impact assessment license, may direct the proponent to submit a fresh environmental impact study where there is substantial change in the project or where environmental threats, not earlier foreseen, have emerged.

Some key Sections of the Act relevant to the proposed project are:

Section 3 – Entitlement to Clean and Healthy Environment.

The proposed power transmission line project shall maintain a clean and healthy environment and the proponent and its contractors has a duty to safeguard and enhance environmental management in accordance with sub-sections 1, 2, 3, 4, and 5.

Section 50 – Biological Diversity

The proposed water project shall ensure that at the operation phases, conservation of biological diversity shall be observed as prescribed in (a) to (g) of this section.

Section 51 & 52 – Biological resources

The project shall enforce all measures to ensure conservation of biological resources both *in situ* and *ex situ* to ensure species threatened with extinction are protected.

Section 78 – Air quality

The proponent shall enforce air quality standards and be maintained as per NEMA's Standard and Enforcement Review Committee requirements.

Section 87 – Handling and Disposal of Wastes

The proponent shall adhere to the disposal of wastes requirement in such a manner as not to cause pollution to the environment or ill health.

Section 102 – Excess Noise

Noise during construction of the project especially from the construction vehicles and machinery is prohibited and shall be maintained to the desirable levels as is also pointed out in Cap 394.

The subsidiary legislations under EMCA 1999 is discussed in detailed as follows:

- i. **Environmental Management and Co-ordination (Water Quality) Regulations 2006:** The New Water Quality Regulations provide for the protection of lakes, rivers, streams, springs, wells, and other water sources. The regulations also stipulate that all industries should refrain from any actions, which may directly or indirectly cause water pollution. All industries are therefore required to refrain from discharging effluent into water bodies. This regulation gives a minimum distance from a water body for which any development may be undertaken and as such affect the proposed projects with regards to the choice of line route.
- ii. **Environmental Management and Co-ordination (Waste Management) Regulations 2006:** The Waste Management Regulations sets out standards for handling, transportation and disposal of various types of wastes. The regulations stipulate the need for facilities to undertake, in order of preference, waste minimisation or cleaner production, waste segregation, recycling or composting. These regulations provide guidelines on how to store, transport and dispose any wastes generated during the construction and maintenance phases of the transmission lines. Some of these wastes may fall under the hazardous wastes category and thus require particular disposal arrangements.
- iii. **Environmental Management and Coordination (Conservation of Biodiversity, Access to Genetic Resources and Benefit Sharing) Regulations 2006:** The Conservation of Biodiversity Act Sections 5-9 provides for the protection of endangered species, creation of an inventory, and monitoring of their status,

- protection of environmentally significant areas, provision of access permits, material transfer agreements and benefit sharing. These regulations will guide the routing of the transmission line with a view to avoiding areas of environmental significance and protection of endangered species.
- iv. **Environmental Management and Co-ordination (Noise and Excessive Vibrations) Regulations 2009:** These have recently been gazetted. The regulations define noise as any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment. The regulations prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.
 - v. **Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006:** The Fossil Fuel Emission Control Regulations provide for acceptable emission standards in Kenya. Section 4 of the regulations states that any internal combustion engine for motor vehicles and generators must comply with the emission standards provided for in the First Schedule of those regulations. Hence anyone who operates such engines whether on the road, street, public highway or any premises, which emits smoke in excess of the emissions standard in the First Schedule contravenes the regulations and is liable to prosecution. Section 8 provides that any person intending to use any fuel catalysts other than those permitted by the authority to disclose it and seek prior approval. Establishments (including construction sites) that use generators as alternative sources of energy must take account of the regulation on the emission standards.
 - vi. **Environmental Management and Coordination (Air Quality) Regulations, 2008:** These regulations provide for the safeguarding of the ambient air quality and give guidelines to prevent and control air pollution. The first and seventh schedules of the regulations provide a list with associated emission limits of prohibited, controlled, and un-controlled air pollutants. The regulations also give ambient air quality tolerance limits. The regulations will be particularly relevant to the construction works (including transportation).
 - vii. **Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009.** These regulations provide for the protection of all wetlands on both private and public land. The regulations provide for sustainable exploitation of wetlands and are aimed at maintaining both the wetlands and hydrological, ecological, social and economic functions and services.

3.2.2 The Environmental Impact Assessment and Audit Regulations 2003(Legal Notice No. 101)

Regulation 24 – EIA licence: - Environmental Impact License shall be issued after the authority approves the study report under regulations 23, and shall be issued in form and accompanied by the prescribed fee of 0.1% of the total cost of the project.

Regulation 28 – false or incorrect information: -Substantial change or modification and when project poses an environmental threat or revelation that information or data given by the license were false, incorrect or intended to mislead.

Regulation 24 – Annual Environmental Audit: - Annual environmental auditing after presentation of an EIA study report shall be undertaken by the licensee to ensure the implementation of environmental management plan is audited on regular basis, an audit report submitted to NEMA annually and ensuring that the criteria to audit is based on environmental management plan developed during the EIA process or after the initial audit.

Regulation 40 - Monitoring changes after project implementation

Monitoring by NEMA and Lead Agencies shall be done to establish any possible changes in the environment and their possible impacts, immediate and long term effects of its operations, identify and determine parameters and measurable indicators and conduct changes that occurred after implementation.

The proposed project must have an ESIA license before implementation. Proponent has commissioned this ESIA study since the proposed project is listed in Second Schedule of EMCA, 1999.

3.2.3 The Energy Act, 2006

The main sector-specific law that regulates the electricity sub-sector in Kenya is the Energy Act, 2006. The Act establishes the Ministry of Energy (MoE), Energy Regulatory Commission (ERC), Kenya Electricity Generating Company (KenGen), Kenya Power and Lighting Company (KPLC) and Kenya Electricity Transmission Company (KETRACO).

The Energy Act, 2006 provides for the way an electricity supply licensee is permitted to enter land for purposes of constructing electric lines. It highlights the process of establishing wayleaves and compensation for wayleaves, how complaints relating to compensation can be settled and the issue of compulsory acquisition of land for wayleaves purposes. Several other statutes complement the Energy Act in the regulation of the electricity sub-sector.

This Act will be triggered through entering of land for purposes of wayleaves establishment and for construction of transmission line. The ESIA Study was partly been undertaken in fulfilment of requirements of the Energy Act.

3.2.4 The Forests Act, 2005

The Forests Act, 2005 provides for the establishment, control and regulation of Forests. The Act created a new semi-autonomous body, the Kenya Forest Service (KFS) and supportive institutions for management and conservation of all types of forests. This Act mandates the KFS to conserve and manage all forests. It also sets out the roles and responsibilities of communities in managing forests. KFS is also responsible for formulating policies regarding the management, conservation and use of all types of forest areas in the country. The Act embraces the concept of participatory forest management and gives particular consideration to formation of forest community associations, which are recognized as partners in management. It enables members of forest communities to enter into partnership with KFS through registered Community Forest Associations. It also allows lease arrangements by interested groups to supplement government efforts in plantation forest.

The Act is relevant for the proposed transmission line where it traverses Kamae forest in Kiambu county. KFS will be informed of the impact on the forest and the trees to be affected by the transmission line, particularly at the construction stage. The Proponent will enhance conservation efforts in the area by planting indigenous trees to compensate for lost vegetation during construction phase.

3.2.5 The Agricultural Act

Legislative control over soil conservation and land development are mainly controlled within this Act, and many of the provisions can be generally applied beyond those lands suitable for agriculture. The administration of the Act can impose land conservation orders on lands to control cultivation, grazing and clearing. These controls may be necessary to protect the land against soil erosion, to protect fertility, and to maintain catchments. Local authorities are generally empowered to administer these sections of the Act, and the District Agricultural Committee is entitled to make regulations relating to these controls. The Agriculture Act is the principal land use statute covering, inter-alia, soil conservation and agricultural land use in general.

The Agricultural Land-Use Rules under Cap 318 are clear on activities proscribed in riparian areas and it's essential that the proposed construction of transmission line does not contradict requirements of this Act.

3.2.6 The Wildlife Conservation and Management Act, Cap 376

This Act was enacted to consolidate and amend the law relating to the protection, conservation and management of wildlife in Kenya, and for purposes connected therewith and thereto. Section 9 of the Act states that 'the Director of Wildlife Conservation shall, through the officers of the service, control, manage and maintain all national parks'. It also states that within the National Park, the Director may:

- Reserve or set aside any portion of the park as a breeding place for animals or as nurseries for vegetation;
- Authorize the construction of such roads, bridges, airfields, buildings and fences, the provision of such water supplies, and the carrying out of such other works, as may be necessary for the purposes of the park;
- With the approval of the Minister, let sites for the erection of hotels, or other accommodation for the visitors to the park provided that nothing in any document connected with the letting shall be construed as in any manner abridging the overall control of the Park by the Service, or as preventing the Director from giving directions as to the manner in which the premises concerned shall be managed.

The Proponent shall implement the proposed measures in this document towards protection and conservation of wildlife in the project areas.

3.2.7. Way leave Act 292

The Act provides for certain undertakings to be constructed e.g. transmission lines, pipelines, canals, pathways etc., through over or under any lands. This project is under the provision of the Act. Section 3 of the Act states that the Government may carry any works through, over or under any land whatsoever, provided it shall not interfere with any existing buildings or structures of an on-going activity.

In accordance with the Act (Section 4), notice will be given to community members before carrying out works and it shall provide a full description of the intended works and targeted place for inspection. Any damages caused by the works would then be compensated to the owner as per the section.

This will be the main legislation guiding wayleaves agreements, compensation for loss or damage to assets, loss of earnings and general inconvenience.

3.2.8. Trust Lands Act (Cap 288)

Some proportion of the land through which the proposed transmission line traverses falls under the Trust Land Act. Trust lands and those living within the jurisdiction of such land have received special consideration under the new Constitution of Kenya, 2010 and therefore in considering compensation and resettlement under the Act special considerations will be made to address provisions which will be triggered by issues of acquisition, compensation and disadvantaged persons.

3.3. Institutional Framework

3.3.1. Ministry of Energy and petroleum

The Ministry of Energy and petroleum is responsible for all the issues related with energy in the Republic of Kenya. The Ministry is in charge of enforcement of the

Energy Act, 2006. The energy sector is mainly made up of two sub-sectors; electricity and petroleum sub-sectors. Other sub-sectors are still not fully developed but the Ministry is exploring their viability and ways to develop them.

3.3.2 Energy Regulatory Commission

Energy Regulatory Commission (ERC) is established under the Energy Act, 2006 with the following objectives and Functions:

- (i) Regulate the electrical energy, petroleum and related products, renewable energy and other forms of energy;
- (ii) Protect the interests of consumer, investor and other stakeholder interests;
- (iii) Maintain a list of accredited energy auditors as may be prescribed;
- (iv) Monitor, ensure implementation of, and the observance of the principles of fair competition in the energy sector, in coordination with other statutory authorities;
- (v) Provide such information and statistics to the Minister as he may from time to time require;
- (vi) Collect and maintain energy data;
- (vii) Prepare indicative national energy plan; and
- (viii) Perform any other function that is incidental or consequential to its functions under the Energy Act or any other written law.

Under the Energy Act, 2006, ERC is mandated with the task of licensing electricity generating, transmission and distribution entities.

The Energy Act, 2006 spells out the procedures to be followed when entering land for purposes of installing electricity conductors. The Act also spells out procedure for negotiating and paying out compensation to those affected by an electricity-related project. It lays out procedures to be followed where compulsory acquisition is necessary. The Act spells how affected persons dissatisfied by the decision of the ERC can appeal to the Energy Appeals Board. Those dissatisfied with the ruling of the Energy Appeals Board can appeal to the High Court.

The Energy Act, 2006 gives authority to the electricity provider to enter land during operation and maintenance of the electricity installations and to lop tree branches where such branches encroach on the wayleaves. The Act also gives direction on how electricity lines should interact with other infrastructure such as roads and railway lines.

3.3.3. National Environmental Management Authority (NEMA)

The National Environment Management Authority (NEMA) is established under Section 7 of the Environmental Management and Co-ordination Act No. 8 of 1999

(EMCA). NEMA is the institution with the legal authority to exercise general supervision and co-ordination over all matters relating to the environment, and is the principal instrument of the Government charged with the implementation of all policies relating to the environment.

NEMA's functions include:

- Coordinating the various environmental management activities being undertaken by the lead agencies.
- Promote the integration of environmental considerations into development policies, plans, programmes and projects, with a view to ensuring the proper management and rational utilization of environmental resources, on sustainable yield basis, for the improvement of the quality of human life in Kenya.
- To take stock of the natural resources in Kenya and their utilization and conservation.
- To establish and review land use guidelines.
- Examine land use patterns to determine their impact on the quality and quantity of natural resources.
- Carry out surveys, which will assist in the proper management and conservation of the environment.
- Advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements.
- Advise the Government on regional and international conventions, treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements.
- Undertake and coordinate research, investigation and surveys, collect, collate and disseminate information on the findings of such research, investigations or surveys.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes for which environmental audit or environmental monitoring must be conducted under this Act.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation, and evolve remedial measures where accidents occur (e.g. floods, landslides and oil spills).
- Monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities. Management objectives must be adhered to and adequate early warning on impending environmental emergencies is given.

- Undertake, in cooperation with relevant lead agencies, programmes intended to enhance environmental education and public awareness, about the need for sound environmental management, as well as for enlisting public support and encouraging the effort made by other entities in that regard.
- Publish and disseminate manual codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.
- Render advice and technical support, where possible, to entities engaged in natural resources management and environmental protection, so as to enable them to carry out their responsibilities satisfactorily.
- Prepare and issue an annual report on the State of Environment in Kenya and in this regard, may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency (NEMA).
- NEMA is the body that coordinates and administers the Environmental Impact Assessment (EIA)/ Environmental Audit (EA) on behalf of the Cabinet secretary for Environment and Natural Resources. EIA/EA is applicable to both public and private sector development projects and programmes. A scheduled activity will not receive the necessary authorization from NEMA to proceed or continue operating, until all EIA/EA requirements have been fulfilled and accepted by NEMA.

3.3.4. KETRACO

Kenya Electricity Transmission Company Limited (KETRACO) came into being as a result of energy sector reforms as enabled by the Energy Act of 2006 and further supported by Sessional paper No. 4 of 2004 on Energy. KETRACO was incorporated in 2008 and registered under the Companies Act, Cap 486. It is wholly owned by the Government and as such, 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 new electricity transmission lines and associated substations. These new lines will include 132kV, 220kV, 400kV and 500kV High Voltage Direct Current (HVDC).

3.4. International Conventions Applicable in Kenya

Kenya has ratified various international conventions on environment that are applicable to this study. Conventions are agreements that are legally binding on states that have become parties to them. Kenya has the **International Convention on Biological Diversity (1992)** which promotes the protection of ecosystems and natural habitats, respects the traditional lifestyles of indigenous communities, and promotes the sustainable use of resources.

Kenya is also party to the **World Heritage Convention (1972)** which is concerned with cultural and natural heritage. The convention deals with monuments and areas that are deemed to be of “outstanding universal value” in terms of beauty, science and/or conservation. Kenya has several sites that have been declared World Heritage Sites such as Lamu town, Mt. Kenya’s natural forests, and Sibiloi National Park near Lake Turkana. Any deterioration or disappearance of such heritage is a loss to all the nations of the world.

The importance of wetlands and water birds are also covered under the **Ramsar Convention 1971**, which governs wetlands of international importance. The convention entered into force in Kenya in 1990 and it governs Lake Nakuru, Lake Baringo, and Lake Natron, which is a shared ecosystem between Kenya and Tanzania. Kenya is therefore committed to avoid degradation of wetlands under its jurisdiction.

Kenya has also ratified the Agreement of the Conservation of Eurasian Migratory Water Birds (2001) and the African Convention on the Conservation of Nature and Natural Resources (1968), the Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (CITES) 1973 which prohibits trade in species such as Dugongs and also in Ivory. The proponent will need to ensure that these important conventions are not violated during construction, operation or decommissioning of the proposed projects.

The **United Nations Framework Convention on Climate Change (UNFCCC or FCCC)** is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from 3rd to 14th June, 1992. The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The treaty itself sets no mandatory limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. In that sense, the treaty is considered legally non-binding. Instead, the treaty provides for updates (called "protocols") that would set mandatory emission limits. The principal update is the **Kyoto Protocol**, which has become much better known than the UNFCCC itself.

3.5. World Bank Safeguard Policies

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrowers in the identification, preparation, and implementation of programs and projects. Safeguard policies have often provided a platform for the participation of

stakeholders in project design, and have been an important instrument for building ownership among local populations.

The World Bank's environmental assessment policy and recommended processes are described in **Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment**. Its purpose is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The preparation of the environmental assessment is the responsibility of the borrower, but the Bank's task manager assists and monitors the project and screens it in order to determine the nature and extent of the environmental work required. The Operational Directive includes checklists of potential issues for an environmental assessment. It also proposes outlines and models for the assessment and prescriptions for the assessment and the screening procedures.

Environmental review begins with identifying the seriousness of the potential harm. The Bank screens all new projects and assigns each one of four categories based upon the character, dimension, and sensitivity of the environmental issue.

- Category A: Projects which may have a significant impact on the environment and thus require a complete environmental assessment.
- Category B: Projects that may only have limited, specific environmental effects which should be investigated but do not necessarily require an in-depth environmental assessment.
- Category C: Projects for which an environmental analysis is not normally necessary e.g. education; family planning; health; nutrition; institutional development; technical assistance; and human resource projects.
- Category D: Environmental projects which do not require an assessment for the reason that environmental development is the focus of the project, and it is assumed that any environmental consequences have already been considered.

For those projects for which a full EIA is not required, but are in need of some environmental analysis (Category B), an Environmental Mitigation or Environmental Management Plan often will suffice (these are also prepared for category A projects as a part of the full EIA).

The Bank's requirement for mitigation plans includes: a description of all adverse environmental impacts; a description and technical details for each mitigation measure; the assignment of responsibilities for carrying out the mitigation measures; an implementation schedule for the mitigation measures; monitoring and reporting procedures; and; cost estimates.

The Bank expects the borrower to ensure coordination among government agencies and to take into account the views of affected groups and local Non-Governmental Organisations (NGOs). It also requires the borrower to provide relevant information to affected groups and local NGOs and to hold meaningful consultations with them.

The environmental assessment should form part of the overall feasibility study or project preparation and be submitted to the Bank which decides on the loan.

While the EIA is being prepared, drafts should be made available, and the final EIA must be available prior to the final appraisal of the project. The borrower submits the final EIA when it is complete to the Bank prior to the Bank's appraisal. During the appraisal phase, the Bank and the borrower together review the assessment. At this time any unclear issues are resolved, and the two parties determine whether the recommendations from the assessment have been incorporated into the project design.

The impact assessment will later provide the framework through which the project is evaluated as it is being implemented by the borrowing country. The borrowing country must inform the Bank of its compliance with the environmental conditions, the status and effectiveness of the mitigating measures, and the findings of the monitoring program. In the final phase of the process, project-completion reports are required to evaluate environmental effects. The reports are to take a particular notice of whether the original assessment correctly identified the potential environmental consequences, and determine whether the mitigating measures were successful.

Environmental Assessment is one of the 10 environmental, social, and legal Safeguard Policies of the World Bank. Other safeguard policies of relevance to this study include:

- Bank Safeguard Policy 4.04 Natural Habitats;
- Bank Safeguard Policy 4.10 Indigenous People; and
- Bank Safeguard Policy 4.12 Involuntary Settlement.

OP/BP 4.04 Natural Habitats: This safeguard policy requires a precautionary approach to natural resources management and requires the conservation of critical environments during project development. In order to ensure conservation and project sustainability, this policy requires that:

- Project alternatives are sought when working in fragile environments; and
- Key stakeholders (e.g. KWS) are consulted during the project design, implementation, monitoring and evaluation of mitigation.

OP/BP 4.10 Indigenous People: The World Bank recognises that the identities and cultures of Indigenous Peoples are inextricably linked to the lands on which they live and the natural resources on which they depend. These distinct circumstances expose Indigenous Peoples to different types of risks and levels of impacts from development projects, including loss of identity, culture, and customary livelihoods, as well as exposure to disease.

Gender and intergenerational issues among Indigenous Peoples are also complex. As social groups with identities that are often distinct from dominant groups in their national societies, Indigenous Peoples are frequently among the most marginalized

and vulnerable segments of the population. As a result, their economic, social, and legal status often limits their capacity to defend their interests in and rights to lands, territories, and other productive resources, and/or restricts their ability to participate in and benefit from development. At the same time, the Bank recognises that Indigenous Peoples play a vital role in sustainable development and that their rights are increasingly being addressed under both domestic and international law.’

OP/BP 4.12 Involuntary Resettlement: ‘The World Bank’s experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.’

‘This policy contributes to the World Bank’s mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For all projects that are proposed for Bank financing and affect Indigenous Peoples, the Bank requires the borrower to engage in a process of free, prior, and informed consultation. The Bank provides project financing only where free, prior, and informed consultation results in broad community support to the project by the affected Indigenous Peoples. Such Bank financed projects include measures to (a) avoid potentially adverse effects on the Indigenous Peoples’ communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive’.

CHAPTER FOUR: BASELINE CONDITIONS

This chapter discusses the physical environment and socio-economic set up along the line route from Gilgil-Thika-Nairobi east – Konza. The details on the information was largely based on available information per affected counties i.e. Nakuru, Nyandarua, Kiambu and Machakos.

4.1. Physical Environment

4.1.1 Geography and Topography

Nakuru County lies at an average altitude of 1,890 masl, in the Rift Valley Province. Soil composition in the county is complex as it is influenced by intensive variation in relief rainfall climate, past volcanic activities and the underlying rocks.

Nyandarua County has a total land area of 3,304 km². It lies between latitudes 0° 8' N and 0° 50' N and between longitudes 35° 13' E and 36° 42' E. The county borders Laikipia County to the north, Nyeri and Murang'a Counties to the east, Kiambu County to the south and Nakuru County to the west. Nyandarua County mainly lies in the Aberdares highland, comprising the Kinangop Plateau, Ol Kalou/Ol Joro Orok Plateau and Ol Kalou/Ol Joro Orok Salient



Figure 4.1: The line passes through the edge of the Rift valley in Nyandarua county

Kiambu county is located in central Kenya; the county lies between latitudes 00 25' and 10 20' south of equator and longitude 360 31' and 370 15' to the east. The area is generally hilly to the North, West, scattered hills in the central and southern parts,

gentle plains to the East and South East, there are several valley bottoms scattered all over centripetal drainage system draining into the Athi Basin. The altitude ranges from 1,600 meters above sea level at the lower zones to about 2,200 meters above sea level in the West & North-Western parts.

Machakos county lies at between 1000-2000 meters above sea level. The ground landscape is undulating with slightly elevated grounds interrupted by valleys which are occupied by seasonal rivers.

4.1.2 Geology

The line crosses diverse geological formations. The Kiambu area lies in the tertiary volcanic rocks region of central Kenya. The geology of the region can further be classified as Kerichwa Valley Tuffs along the river valleys and the Middle and Upper Kerichwa Valley Tuffs found on the higher ground.

The soils comprise basically two types of soils, namely;

- Soils developed on ashes and other pyroclastic rocks of recent volcanoes. These soils are found in the upper catchment of the mountains (Aberdare Range including the Kikuyu Escarpment. These soils are well drained, very deep, dark reddish brown to brown, very friable, clay loam to clay, with a thick humic topsoil; in places shallow to moderately deep and rocky.
- Soils developed on volcanic footridges comprising dissected lower slopes of major older volcanics and mountains on undulating to hilly terrain. These soils are well drained, extremely deep, dark reddish brown to dark brown, friable with acidic humic topsoil.

4.1.3 Soil

The soil distribution in the project area is complex and is influenced by intensive variation in relief, climate, past volcanic activities and the underlying rocks. The main soil types in some areas are *calcic gleysols*, *andohaplic pheozems*, *gleyic cambisols*, *ando-calcic regosols*, *lithosols*, and *calcic xerosols*, from the *lacustrine* plain through the volcanic plain to the volcanic hills respectively. Generally, the soils in the study area have high phosphorus, calcium, magnesium and potassium concentrations but are low in respect of nitrogen and carbon.

4.1.4 Climate

Nyandarua County experience two rainy seasons per year. The long rains are typical between March and May, and the short rains between September and November. The annual average rainfall is about 800 mm, which supports agriculture. Agriculture is important in the county, as it is the main occupation of the residents, and crops of this region are delivered to the nearby urban centres like Nairobi, Nakuru and Gilgil and over larger distances to cities like Mombasa and Kisumu.

The project-affected part of Nakuru County lies within the range of the Intertropical Convergence Zone. The rainfall distribution has a bi-modal character. The long rains are experienced from April to June and the short rains from October to November. Mount Kenya and the Aberdare Ranges capture moisture from the easterly monsoon winds, casting a significant rain shadow over the Lake Naivasha Basin. The spatial distribution of the rain varies from approx. 600 mm at Naivasha Town to approximately 1,700 mm at the slopes of the Aberdare Ranges.

Kiambu county experiences bi-modal type of rainfall. The long rains fall between mid-march to May followed by short rains between mid-October to November. line traverse Gatundu which experiences an average annual rainfall ranging between 800 and 2000mm which varies along the agro-ecological.

The climate for Machakos county is semi-arid with hilly terrain. The climate of the study area is arid and semi-arid type in character with dry and wet periods. The rainfall of the area is about 500 millimeters annually distributed in short and long rains of September to December and March to May respectively. Temperatures rise steadily to highs of about 35 degrees centigrade and to lows of about 16 degrees centigrade.

4.1.5 Water (Surface and Groundwater Resources)

Lake Naivasha lies in the Eastern Rift Valley at an altitude of 1,890 masl and covers approximately 100 km². The proposed line traverses the permanent Malewa, Thiririka, Rwabura and Nairobi rivers.

4.1.6. Landscape

The Gilgil-Thika transmission line section traverses hilly terrain and some section is undulating and covered with tree plantations especially in Kimae forest and Gatundu areas. From Gilgil, the line passes Malewa farm then turns south-eastwards, ascends a steep hill and runs along the provincial boundary of Rift Valley and Central Provinces. The top of the ridge is made up of a flat land with sparse settlements which continues to the edge of the National Youth Service Training Centre's plot boundary.



Figure 4.2: Landscape near Karati Pr. School, Nyandarua county

4.2 Biological Environment

4.2.1. Flora

Kamae Forests contain mostly trees of 7 - 40 m height or more, with often interlocking crowns. Evergreen forests are characterized by individual trees that may shed leaves, but the canopy as a whole remains green throughout the year (e.g. composed of trees such as *Olea eurpaea* subsp. *cuspidata*). Deciduous forests are characterized by trees that lose their leaves during the dry season (e.g. *Acacia* and *Combretum* spp.). These are found in Gatundu and Nyandarua areas of Kiambu and Nyandarua Counties respectively.

At the sections traversing Machakos county, is under shrubs and savanna grass vegetation cover. Exotic grass and trees are found along the riparian buffer zones. The proposed project route is situated in areas where cattle, sheep and goats grazing is dominant, hence vegetation is highly consumed by the grazing animals.



Vegetation along the proposed line route

4.2.2. Fauna

Within Naivasha area, the Lake Naivasha is known as Important Bird Area (IBA) and holds over two hundred bird species, including the endangered and rare species such as Great Crested Grebe (critical), Maccoa Duck (endangered), African Darter, Great Egret, Saddle-billed Stork, White-backed Duck, Baillon’s Crake and African Skimmer (all vulnerable). Coot and Yellow-billed Duck, which formerly could be enumerated in ten thousand, reappear in single thousands in the years when submerged aquatic plants are found. Jacana or Lily Trotter, formerly present in thousands can now only be counted in few hundred at most, concentrated on tightly-packed Hyacinth fringes in northern areas.

Lake Naivasha is also important for riparian mammals, primarily the population of approximately 600 - 700 *Hippopotamus amphibious*, which represents the largest meta-population of this specie in the Kenya Rift. Its numbers have remained stable for the past two decades. Marsh mongoose and otter are rarely-seen but important predators of Crayfish. Plains mammals, notably zebras and Thomson’s gazelles inhabit the riparian zone of larger properties, such as the Marula - Morendat - Manera ranches at the river entries and can move relatively freely around the north-west. Crescent Island is a private game reserve. The Gilgil-Thika line is approximately 10km from lake Naivasha as shown in the figure below.



Figure 4.3: the landscape and Lake Naivasha at the horizons

4.3. Socio-Economic and Cultural Environment

The proposed transmission line route traverses four (4) counties, mainly rural areas. Most of the counties traversed are settlement areas of Nakuru, Kiambu and

Nyandarua counties except Machakos county. The line avoids towns such as Gilgil, Thika and Machakos and urban settlements.

The population profile given in the Table below is based on the 2009 National Population census.

Table 4.4: Population per counties

County	Male	Female	Total
Nakuru	804,582	798,743	1,603,325
Nyandarua	292,155	304,113	596,268
Kiambu	802,609	820,673	1,623,282
Machakos	543,139	555,445	1,098,584

4.3.1. Population and Demographic Features of the respondents

During the study, some households were sampled randomly and questionnaires administered to the household head.

i. Demographics of respondents

The socio – economic survey was done during the month of November 2016 and it targeted household heads and those who would be affected directly by the project.

Out of the 78 respondents interviewed, 9.0% were from Nyakio location, 17% were from Naivasha East Location, 26% were from Karunga location, 19.2% were from Murungaru location, 11.5% were from Karati, and 11.5% were from Turasha location. The respondents were sampled randomly from all the locations that the transmission line traverses through to ensure that everyone is engaged and without bias.

ii. Gender

As shown in the figure 4.4, the gender distribution of the respondents was found to be 28.2% while women were 71.8%. This is because when it comes to land issues, men are more involved than women since men are land owners and decision makers when it comes to land matters in the community.

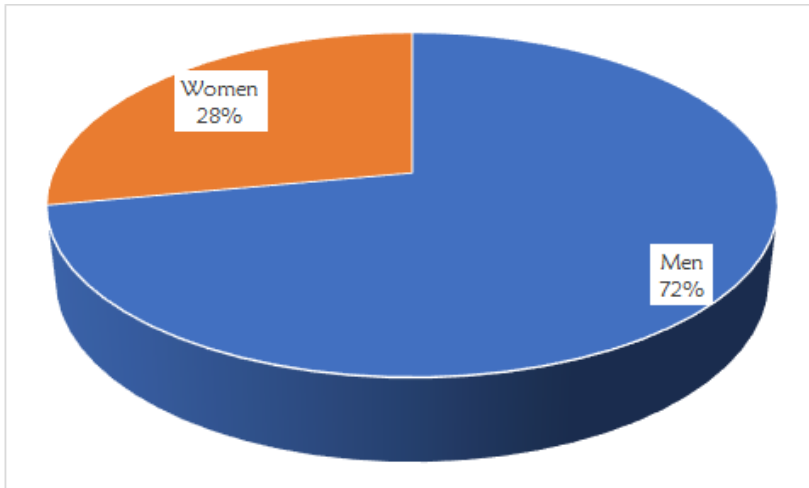


Figure 4.4: Gender

iii. Age

As indicated in the figure below, over 50% of respondents fall within the age bracket of over 36 years with majority (45%) falling in the age bracket of 46 to 65 years. This translates to the people who are more productive and are involved with land issues and the general development of the community at large. Only a 1% of the respondents were aged between 18 to 25 years.

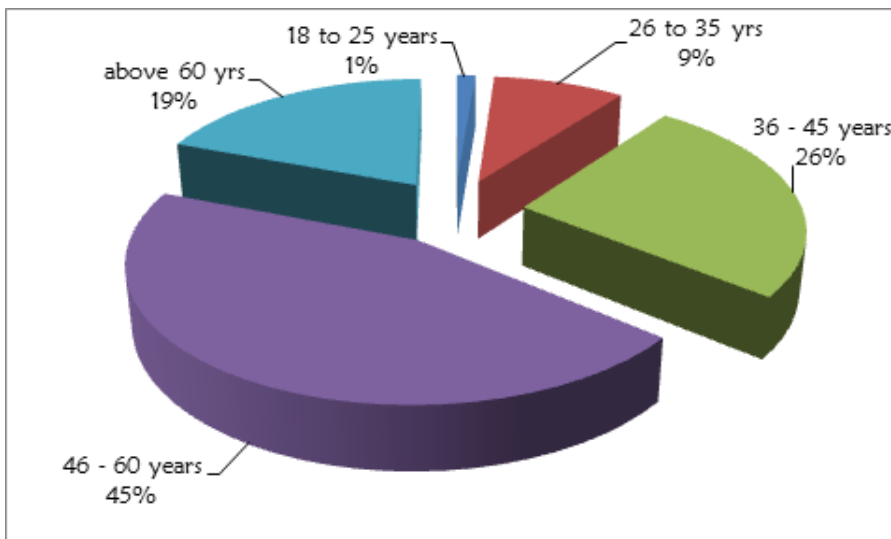


Figure 4.5.: Age

iv. Marital status

Of the respondents interviewed, 86% of them were married, 10% widowed, 3% divorced and 1% separated meaning that minority (less than 15%) of the respondents are vulnerable group.

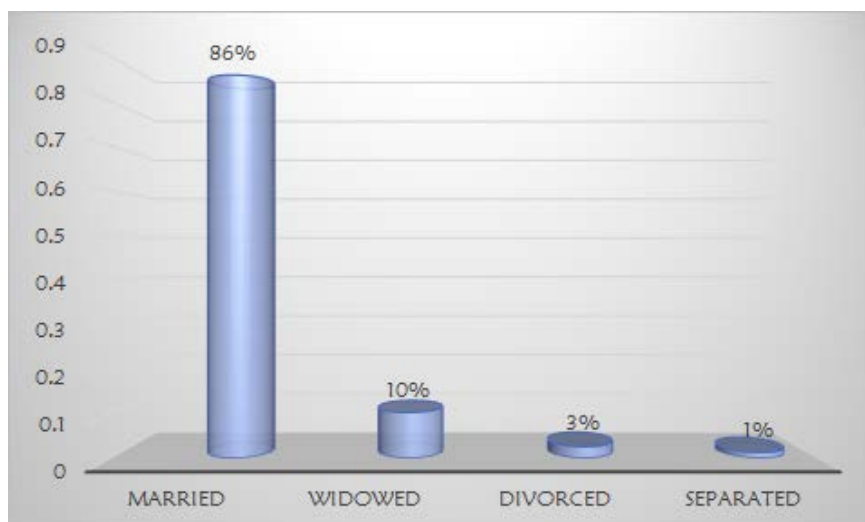


Figure 4.6: Marital status of the respondents

v. Level of education

There are few educational institutions in the project area. They include secondary schools, primary schools, and nurseries. Table below shows minority (1%) of the respondents have never attended any level of school and majority (over 80%) had the mid lower level of education at primary and Secondary; while only 1% had university education. This implies that majority of the community members can read and write and that the literacy level of the community involved is very high.

Table 4.5: Level of education

Education level	Percent (%)
Primary	52.6%
Secondary	33.3%
Post-Secondary	11.5%
University	1.3%
Never attended	1.3%

vi. Household size

Most of the married respondents (46.2%) said that their household size consist of 7 and above members while 43.6% said their household size is between 4 and 6 members. Only 10.3% had household members who are less than 3. This shows that the impact of the affected households will be significant since when relocation will be done, quite a number of people would be affected.

Table 4.6: Household size

Size of the household	Percent (%)
Less than 3	10.3%
4 to 6	43.6%
7 and Above	46.2%

vii. Source of income

From the table below; the source of income of the respondents was found to be mainly from crop farming and livestock keeping (62.8%); while 21% of those interviewed said that they solely depend on crop farming as the source of income. Majority of the communities who are farmers are from Nakuru, Nyandarua and Kiambu counties while the minority (2.6%) who depend solely on livestock keeping as a source of income are from Machakos County. This is explained by the fact that, the Nairobi-East –Konza section is a semi-arid areas and mainly Kamba and Masai people reside in this section.

Table 4.7: Source of Income

Income source	Percent (%)
Crop farming	26.9%
Livestock keeping	2.6%
Trading/Businessman	1.3%
Crop farming and Livestock keeping	62.8%
Crop farming and Employment	2.6%
Crop farming and Business/Trading	3.8%

4.3.2. Land use

Approximately 18% of the land in Kenya has high to medium agricultural potential and supports approximately 80% of the country's population. Agriculture is dominant in the Nakuru, Nyandarua and Kiambu counties, while in Machakos area are characterized by pastoralism.

Land along the proposed transmission line route is principally under farming, settlement and pastoralism. Most of the land use in Nyandarua, Kiambu and Nakuru Counties is for farming.

4.3.3 Ethnicity

The project traverses' areas inhabited by Kikuyu ethnic group in Nakuru, Nyandarua and Kiambu counties while in Machakos county there are Masai and Akamba (majority) ethnic groups.

4.3.4. Land tenure

Land ownership in the area is classified either as communal land or freehold land. 94% of the respondents said that they owned their land with all legal documents while 6% said that they either lived in the communal land. Discussions with stakeholders in Machakos County revealed that, along the proposed project route land ownership is mainly communal land influencing the current settlement trends.

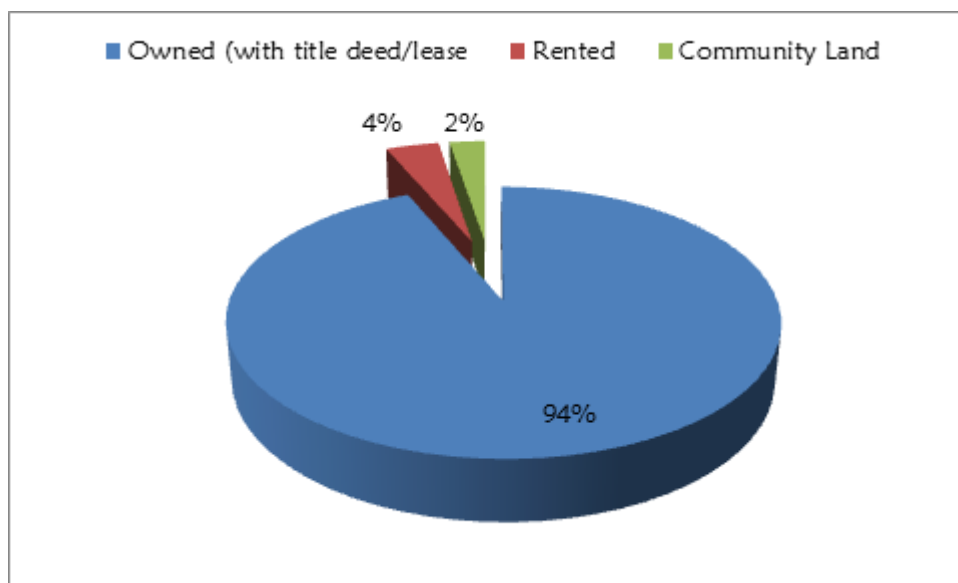


Figure 4.7: Land tenure

During wayleave acquisition and compensation, the process will be expedited since majority of the PAPs have title deeds hence, negotiation and verification process will be short.

4.3.5. Source of livelihood

A person's livelihood refers to their "means of securing the basic necessities -food, water, shelter and clothing- of life". Livelihood is defined as a set of activities involving securing water, food, fodder, medicine, shelter, clothing and the capacity to acquire above necessities working either individually or as a group by using endowments (both human and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity. The activities are usually carried out repeatedly. Livelihoods in the proposed project area were captured through data obtained through questionnaires, the transect walks, interviewing of the villagers and field visits.

Farming, business/investment and a little bit of livestock keeping activities are the most important livelihood strategies in the project area. Farming is the predominant economic activity in the area in terms of employment, food security, income generation and overall contribution to the socio-economic wellbeing of the people mainly practicing mixed farming

The income of the respondents varied from household to household due to the different economic activity they were involved in. 35.9% of the household reported to earn less than Ksh.10,000 per month as the most predominant amount while 25.6% earn between Ksh.10,000 to 20,000 per month. More than 37% of the respondents get an income of more than 30,000. Male headed households showed to be earning more income than the female headed households in the project area.

Generally, the respondents make enough money that can sustain their family for the month.

4.8: Respondent Monthly Income

Monthly income	Percent (%)
Less than 10,000	35.9%
10,001 to 20,000	25.6%
20,001 to 30,000	21.8%
Over 30,000	16.7%

The project is envisaged to have less impact on the source of livelihood of the community because farming and pastoralism will still be practiced under the transmission line during the operation phase.

4.3.6. Sources of energy

92% Of the respondents use firewood and 8% use charcoal as a source of energy for cooking. 30% of respondents confessed that they use electricity power as a source of lighting. This is because some areas are connected to power especially through the last mile power project. It is envisaged that, with the implementation of the proposed project, connectivity rate will increase significantly.

CHAPTER FIVE: PUBLIC CONSULTATION AND PARTICIPATION

5.1 Introduction

Stakeholders are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project. Stakeholder participation involves processes whereby all those with a stake in the outcome of a project can actively participate in decisions on planning and management. They share information and knowledge, and may contribute to the project, so as to enhance the success of the project and hence ultimately their own interests'. Different types of stakeholders can contribute to the ESIA process in different ways and, in most cases; inputs from a broad variety of stakeholders will complement the ESIA process. Stakeholder interests exist at different levels. For example, at the local project level, they might include land or connectivity to electricity, pollution or market opportunities.

Kenya has entered the era of participatory development in all matters of national life. Participation in this case is not just through elected representatives but also through direct action. The Environmental Management and Coordination Act (EMCA, 1999) and its subsequent Environmental (Impact Assessment and Audit) Regulations, 2003 underscore the need for stakeholder participation in the ESIA process. Neighbours of a proposed project have to live with the project if implemented. They have the most to gain if the project impacts are beneficial to them. Conversely, they have the most at stake if the project goes awry. Not just neighbours but for projects whose impacts have a wide geographical spread, distant communities need to be involved. Stakeholder input is thus vital at the earliest stage possible in project development and should continue throughout the project cycle.

5.2. Consultation Methodology

There is no single 'public'; instead there are a number of publics some of whom may emerge at any time during the process depending on their particular concerns and the issues involved. Strategies for involvement must be appropriate to the individual, the community or the region potentially being affected. A successful public involvement process must take the characteristics of the potential publics and their changing views of contentious issues into consideration. The public could be:

- a) Experienced in public involvement.
- b) Informed or uninformed about the issues.
- c) Hostile or apathetic.

d) United or divided.

The study made use of the following consultation strategies:

- ✓ Public Barazas;
- ✓ Key informant interview;
- ✓ Household interview.

Public consultation was extensively carried out in the entire project area to elicit concerns and compliments from the PAPs. The proposed transmission line traverses four (4) counties with a mix of socio-economic characteristics. Consequently, this meant “diverse publics”. Consultation meetings were convened in public areas to enable maximum attendance. These were organised in collaboration with respective area Chiefs and Assistant Chiefs.

That notwithstanding, it is worth noting that consultation is an on-going process throughout the ESIA study. After publication of the report in local dailies and Kenya Gazette, Publics will have another opportunity to comment on the proposed project. Consultation goes on even after license issuance to the implementation phase and audit.

5.3 Views of the public about the project

In this prospect, awareness of the regional inhabitants is accomplished and taking their views into stock is performed. Based on the study, the types of probable social reactions, arising from the implementation of the project is surveyed.

In line with the ESIA/EA regulations, face to face interviews with local people were accomplished. Their views are assumed to represent those of the entire community that will be affected by the project.

Date	Meeting Venue	Target Locations	County
10/11/2016	Assistant chief’s office - Munoru sublocation	– Turasha – Ririchua	Nyandarua
	Limuru Nyakinywa ACK church	– Murungaru – Nyakinywa	Nakuru
11/11/2016	Langa langa chief’s office	– Karunga – Langalanga – Merironi	Nakuru
	Gituru B ECD nursery school	Naivasha East	Nakuru
12/11/2016	Nyakio shopping centre	Nyakio	Nyandarua
	Karati primary school	Githabai	Nyandarua
11/11/2016	Kalusya market	Lukenya	Machakos

09/11/2016	Ituru Location,	Ituru	Kiambu
11/12/2016	Kiasa center	– Kyumbi – Mathatani – Kiasa	Machakos
12/11/2016	Malaa market	Malaa	Machakos



Figure 5.1: Public baraza at chief's office in Langalanga, Gilgil



Figure 5.2: Public baraza at Gituru B ECD nursery school, Nakuru county

The views of all the communities consulted are summarized in the table below:

No.	Community Concerns	Responses
1	Electricity connection to households direct from the transmission line	The EIA expert explained that since the line is high voltage, connection to the households is not possible. He informed the community that the power should be stepped down in a substation after- which it can be distributed for household use.
2	Compensation of the affected people	The EIA expert assured the locals affected of compensation of affected land, structures and crops/trees as well as being offered additional 15%

	Method of compensation of locals without titles	disturbance allowance. The EIA expert informed the community that National land commission will work with KETRACO to enhance compensation of individuals without titles.
3	Employment of locals not outsiders in the project implementation.	The EIA expert assured the locals of temporary employment such as unskilled labour as well as local contracts such as sand and ballast required for the project construction.
4	Corruption in compensation	The EIA team assured the locals of transparency in resettlement and compensation since KETRACO will be keen on that.
5	Removal of existing electricity line	The consultant explained that the existing electricity line will not be removed since the proposed transmission line will be around 30m above ground.
6	Corporate social responsibility activities by KETRACO	The locals suggested that KETRACO should build a school and a hospital in the area as part of the social corporate responsibility, as well as improving the roads and putting “Mulika Mwizi Taa” in the location. (flood lights)
7	Wayleave size and possibility of use of land after being compensated for the Wayleave	The EIA expert reported that the Wayleave width is 60 metres. He explained that structures under the transmission line is not allowed or planting trees going above 12feet under the same line. He explained that only short plants such as potatoes and beans can be planted on that land.

Awareness of the Project

Most (91%) of the community members interviewed are aware of the construction of the proposed Gilgil-Thika-Nairobi east-Konza high voltage power line. Majority of the people confirmed to have heard about the project during the household survey and other cited chief meetings and hearing from neighbors.

When asked about their opinion on the project, 76.9% agreed that the project implementation should go on and that they are ready to give the required way leave for the project while 23.1% had no comment yet on the project claiming that they have not heard of the project before hence needed more time to think about it.

CHAPTER SIX: PROJECT ALTERNATIVES

6.1. Transmission Line route selection

Following elements were considered in selecting transmission line route:

- a) Residence areas, national reserves, cultural relic's site and urban planned zones were avoided in selection;
- b) Path close to existing road is preferred for easy construction, operation and maintenance. In view of the existing line corridor, the existing line path is followed as much as possible as operation and maintenance corridor;
- c) Topography and landform along the line shall be reasonably used.

However, the line may need re-routing or change in design in some sections since it may cause adverse impacts. The main critical section is where the line intersects the proposed Kenya – Ethiopia 500HDC Transmission line in Turasha, Nyandarua county.

The Gilgil – Konza line is a 400kV AC (alternating current) transmission line and as such the two lines are not compatible due to induction forces of the different currents and for safety reasons need to be separated by at least 1.5km. We understand that this is an industry standard.

6.2. Materials selection

Given that the Project site is in highland of above 1500m asl and maximum 2200m asl, rated insulation tested voltage is higher than standard value at specific environmental elevation.

In selecting materials and top coat paint, it shall be taken into account that the project will be in operation under humid tropical conditions. It shall be further pointed out that many sites may be influenced by intensive dust and desertificated. Contractors shall submit their general methodology for the part of the works under the effect of tropical climate and prove that the methodology is reliable and propose their recommendation for the part of the Works. The materials and top coat paint to be incorporated into the

6.3. The “No Action” Alternative

The “No Action” alternative is often defined by the baseline information and is crucial in the assessment of impact because other alternatives are weighed with reference to it.

Qualitative analysis indicates that there will be no significant negative effect on either the bio-physical or the socio-cultural environment of the proposed project. Without the project, we cannot say the environmental situation will either improve nor can we say that it will necessarily deteriorate.

The “No Action” Alternative is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- 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
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
- Information flow and public education awareness through electronic media, especially the television will be hampered
- The economic status of the Kenyans and the local people would remain unchanged
- The local skills would remain under utilized

CHAPTER SEVEN: POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS AND MITIGATION MEASURES

7.1. Overview

Potential impacts regarding the environment are the permanent loss of vegetation (trees, shrubs and Crops) in the wayleave trace. Other impacts of temporary nature may also occur during construction works like dust emissions, noise, soil erosion, degradation of quality of water, soil contamination by poor waste management or accidental spill of hydrocarbons and displacement of wildlife.

For the household and communities affected the negative impacts are predominantly localised and short term and will occur during the construction period. The most important long term impacts are the permanent loss of arable land (access road and tower foundation) and restriction to tree planting to species that do not grow higher than 12 feet in the wayleave). Beside these impacts on agricultural activities many houses and some infrastructures will be relocated, in most cases, on another part of the same land or to an adjacent land plot.

Moreover, temporary employment during the construction phase, and income generated by the sale of food and other consumables to workers will help financially the communities along the transmission line.

The table below shows of summary of impacts.

No.	Impact	Construction activities			Operations phase
		Casting & foundation	Tower erection	Stringing	
1.	Soil	√	-	√	-
2.	Waste disposal	√	√	-	-
3.	Noise	√	√	√	√
4.	Air quality/emissions and dust	√	-	-	-
5.	Forest resource, flora and fauna	√	-	√	√
6.	Electromagnetic fields	-	-	-	√
7.	Land take	√	-	-	-
8.	Surface water	√	-	-	-
9.	Aesthetics and visual impact	√	√	-	-
10.	Traffic and transport	√	√	√	-
11.	Accident risks	√	√	√	√
12.	Hazards due to natural disaster	-	-	-	√
13.	Loss of land use	√	-	-	-
14.	Socio-economic	√	-	√	√

7.2 Positive impacts

7.2.1 Creation of employment

During the construction of the proposed Project, there will be employment opportunities for both professionals and unskilled workers. Several workers including casual labourers, plumbers and engineers are expected to work on the project during the construction period. Semi-skilled, unskilled labourers and formal employees are expected to obtain gainful employment during the period of construction. With labour intensive construction technologies, the project will provide employment for youths and provide support to the Government of Kenya initiatives on creation of jobs.

The creation of employment opportunities is beneficial both from the economic and social point of view. Economically, it means abundant unskilled labour will be used in site clearance, civil works, tower erection and transport of construction materials. Socially these people will be engaged in productive employment and minimize social ills like alcohol abuse which is rampant in the country. This positive social change in the social behavior will be one of the anticipated transformational indicators in the project area.

7.2.2 Injection of money into the local economy

A large sum of the project money shall be released into the local economy due to the construction activities. This money will be in form of payments for skilled and unskilled labour; Purchases of construction materials; and payments for local provisions including fuel, foods and accommodation.

7.2.3 Creation of market for construction materials

The project will require materials, some of which will be sourced locally within the project area. Some of this include sand and hardcore for the construction of the tower foundations. Local suppliers will be given priority in supply of construction materials.

7.2.4. Economic growth

The justification of the power line is based on the ambition of the Kenya Government to be a middle-income country by year 2030, and with that the reduction of poverty in the country which is responsible for serious environmental degradation. More importantly, availability of energy will improve the socio-economic status of Kenyans through creation of jobs in industry and availability of power in homes especially in rural areas.

7.2.5 Improved ICT Access

Kenya is developing rural-based ICT networks that are geared to benefit the local populations and supply local schools with ICT terminals as ICT is being integrated into

school curriculum in line with the country's' MDGs. The policy is to incorporate optical-fibre ground wire (OPGW) in all new lines. The OPGW will therefore be able to supply broad-band communication telecommunication hubs, mobile telephone networks and digital television to population centers and schools along the project affected area.

7.3 Negative impacts during construction

7.3.1. Soil erosion

The activities involved in the construction phase of the project may have a major negative short-term impact on soil. This is due to the change of soil structure due to vegetation clearance, compaction and excavation during tower foundation and access road which will leave considerable areas of soil exposed to the elements, which may result in soil erosion. Heavy machinery will be traversing the site due to the construction activities this may lead to soil compaction and erosion of the soil.

Mitigation Measures:

- Only remove vegetation from areas for the tower construction;
- Install appropriate drainage systems to direct water away from slopes;
- Avoid as far as possible the traversing of bare soil by vehicles to reduce soil compaction;
- Designate a main access route for heavy machinery;
- Avoid site Preparation in period when wind velocities are highest.

7.3.2. Waste disposal

Liquid and solid waste will be generated in the course of construction. The wastes range from general to hazardous categories. This impact is short term. However, the disposal mechanism of the wastes can have long term consequences.

Mitigation measures

- All solid waste will be collected at a central location at each site and will be stored temporarily until removal to an appropriately permitted disposal site.
- No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed off, a chain of custody document should be kept with the environmental register as proof of final disposal.
- Waste generated at the site should be segregated by the contractor and disposed of in recommended manner into different waste streams (including general and hazardous waste). Wherever possible recycling should be carried out.

7.3.4. Noise & vibration

The site preparation and construction phases of the project may likely have the most negative impact to the ambient noise and vibration in the project area. A number of measures may be undertaken by the Contractors to reduce the impact of noise on the existing and potential residents as well as the workers involved in the project. This is temporary, however, and the aim at this point is to make the increase in noise as small as possible until this phase is complete. The cumulative impact of the construction activities occurring simultaneously may increase the noise and vibration levels in the area significantly.

Mitigation Measures:

- Access roads should be exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible.
- Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.
- Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work or school.
- Ensure that construction activities for the project are staggered to decrease the levels of noise and vibration in the area;
- Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily.
- The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m. daily.

7.3.5. Air quality

a) Gaseous Emissions

Emissions associated with combustion of fuel from the construction vehicles and equipment. These emissions may be in the form of oxides of nitrogen as well as volatile organic carbons. Similar to other combustion processes, emissions from vehicles include CO, NO_x, SO₂, and VOCs. Emissions from the construction vehicles should comply with national or international standards.

Mitigation measures

- Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance plans;
- Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits;

- Contractors should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair plan.
- Recruit staff from the surrounding communities to decrease the travelling distance thus reducing emissions from vehicular traffic.
- Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.
- Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.

b) Particulate Matter

The most common pollutant involved in fugitive emissions is dust or Particulate Matter (PM). This is released during certain operations, such as transport and open storage of solid materials, and from exposed soil surfaces, including unpaved roads.

Mitigation measures

- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls;
- Ensure that all material (sand and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping.
- Ensure that all trucks carrying aggregate and sand are covered during delivery to the site.
- Care must be taken in the unloading construction materials (aggregate, sand and cement) to prevent spillage. If a spill occurs, this should be cleaned up as soon as possible thereafter.
- Extra care must be taken to reduce dust in periods when wind speed is greatest and the rainfall amounts are lowest. This will involve extra wetting of the construction area to suppress dust particles.
- All raw materials must be sourced as close as possible to the construction site thus reducing the emissions from vehicular traffic.
- All waste must be transported off-site for processing, not burnt or stored for any longer than is absolutely necessary.

7.3.6. Surface Water

The main surface water bodies along the proposed transmission lines are Rivers Malewa, Rwabura and some seasonal rivers and streams especially within Machakos County. Surface water Impacts of the project can therefore focus mainly on these rivers. The impacts will be related to the positioning of the towers in relation to the

water bodies. Unless the towers are located within the riparian zone, it seems to be unlikely that high sediment runoff from tower site works will occur and adversely effect the water quality in any nearby waterbodies.

However, the possibility of impacts on surface water resources still exist and if they occur, they would be caused by:

- oil spills resulting from fuelling or maintenance activities of construction machines or poorly maintained construction machines,
- dumping of waste at/near surface waters or temporary rivers,
- sediment runoff from tower site works or transmission line clearing,
- disturbance of bank vegetation.

The magnitude of this impact is likely to be very low considering the few water bodies and the relatively small works within the tower locations.

Mitigation Measures

If locating a tower within the riparian zone is unavoidable, and if construction is in progress during rainy periods, temporary catch basins or sediment traps could be prepared if excessive erosion occurs at any particular tower site or access track.

7.3.7. Occupational Health and safety

Use of heavy machinery during construction presents safety hazards to the workers and the community. Vehicular movements can cause accidents especially in dense settlement like Gatundu, Juja and Gilgil areas resulting in injuries and probably death.

Mitigation Measures:

- Ensuring that the drivers and machine operators hired to work on the site are qualified.
- Workers on site must be provided with appropriate PPE.
- Appropriate signs must be erected on the site to warn workers and visitors.
- There should be safety policy clearly displayed on the site.
- Machines should be properly maintained.
- A first aid kit should be provided and a trained first aider should always be on site.
- Fire extinguishers should be provided.
- Proper scheduling of activities to avoid workers being overworked.
- Machines/equipment for the intended purpose.
- No worker should be allowed on site while under the influence of alcohol or other inebriating substances.

- The abstract of the Occupational Safety & Health Act 2007 must be displayed at prominent places within the site.
- Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay.
- Ensure that all site personnel are provided with an adequate supply of safe drinking water, which should be at accessible points at all time.
- Provide conveniently accessible, clean, orderly, adequate and suitable washing facilities within the site.

7.3.8. Disturbance of Traffic

The main impact on roads traffic will be during transportation of materials which is expected to be minimal.

Mitigation measures

- Erect warning signs of on-going works.
- Expedite construction works so as to reduce the times where roads are blocked.
- Alternatives access ways should be communicated to the community.

7.3.9. Flora and Fauna

During construction of the transmission line, there will be localised disturbance of flora and fauna especially during excavations and doing access roads. There will be potential loss of habitats for small mammals and birds when forest is affected.

The proposed line traverse Kamae forest in Kiambu county and cypress and pine trees will be affected. Also, greater percentage of trees are found in the wetter highlands of Nyandarua, Nakuru and Kiambu Counties. Out of this category of trees, eucalyptus species constitutes the largest percentage. Eucalyptus is treated as a commercial tree crop often grown as monoculture.

Mitigation Measures

Trees taller than 5 m will be compensated and hence the commercial value of the tree will be restored to the owners. The impact on ground cover will be restricted to the initial construction period, after which the ground cover is expected to be restored by alternative land use by the landowners. This is very plausible in the highlands of Nyandarua and Kiambu Counties where dairy farming is a major activity, making it is easy to switch land use to pasture and still maintain or improve potential income foregone due to loss of trees.

To address losses associated with ecological functionality of the forest, such as habitat loss, carbon offset opportunities, biogeochemical functions and soil and water

conservation; compensatory planting is recommended in areas of Kamae forest. In addition, stringing should strive to minimize unnecessary cutting of trees along the line. It is recommended that KETRACO liaise with the Kenya Forest Service to explore the most appropriate compensatory planting areas and most appropriate tree species mix.

7.3.10. Land take

The proposed transmission line will need a wayleave corridor of 60m width. Parcels of land traversed are majorly private lands especially in Nakuru, Kiambu and Nyandarua counties. In Machakos county, there are areas where the line passes through trust land and group ranches. All the community assets affected by the project will therefore have to be displaced and compensation done accordingly. In all areas, the land owners will continue to own the affected parcels and will utilize the wayleave trace in a manner consistent with safe use of high voltage power transmission.

Mitigation Measures

All the affected assets will be compensated at rates commensurate with the loss. The proponent is will carry out a Resettlement Action Plan for the project and it is recommended that RAP should be implemented to the later.

7.3.11. Impact on public properties and common resources

The transmission line route has been selected in such a way that it avoids affecting public facilities as much as possible. However, some public facilities will be affected by the proposed project



Figure 7.1: Affected structures at Gituru secondary school, Nyandarua county

7.4 Negative impacts during operation

7.4.1. Soil

No impact on soil and vegetation is envisaged during operation of the transmission line. However, soil contamination by spillage of aluminium oxide paint is predicted when towers will be painted during maintenance period which is so minimal.

Mitigation measures

Low frequency painting is recommended as well as using experience personnel during when carrying out such an activity.

7.4.2. Waste disposal

No significant waste is anticipated to be generated during operation of the transmission line.

7.4.3. Aesthetic and visual impacts

The towers and lines along the terrain will be extrinsic element to the existing ambience. This manmade feature will lead to visual intrusion and loss of visual amenity. The cumulative impact due to the existing transmission line can hamper the aesthetic value of the area.

Mitigation measures

Selection of the line route has deliberately avoided proximity to eco-tourism areas and lodges of Turasha. However, visual intrusion will still persist across this landscape.

7.4.4 Exposure to Electromagnetic Field

Throughout the length of the transmission line, humans, plants, birds and animals will be exposed to the electromagnetic field at some stage. We find the impact of such exposure to be insignificant for a number of reasons. Exposure at a distance away from the wayleave is low due to the rapid decay of these waves (Bailey et al, 1997). People who are indoors are shielded by building materials from the intensity of electric field and ionized air, but not from the magnetic fields. The conductive tissues at the surface of the body serve to shield tissues below the surface from external electric fields and ionized air. Ionized air that is inhaled can access the mouth and upper respiratory tract, but most of the ions are retained in the nose and bronchi with none reaching the deep alveoli of the lung (Bailey et al, 1982). Thus, even those who may be exposed to the electromagnetic field of the transmission by virtue of cultivating crops under it are largely out of danger of adverse impacts.

Mitigation measures

The EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside of 30 m provided for the wayleave area

7.4.5. Impacts on Wildlife Habitats and Migratory Birds

Birds nesting in the towers pose a danger both to themselves and to the safe operation of the power line. Large nests eventually fill with droppings that can reach the conductors and cause electric shocks or burns to birds. These will need to be regularly removed as part of routine maintenance. Previous studies suggest that climbing animals, such as baboons and monkeys learn to keep away from conductors.

The impact of a transmission line on other fauna is limited as most areas are sparsely populated and the way-leave will be cleared manually of vegetation and as such the use of herbicides is not envisaged.

However, no areas along the line route were noted to have high densities of large birds, primates or colonies of migratory avifauna species, therefore fauna-related impacts will be marginal.

7.5 Decommissioning Phase

7.5.1. Concerns over Occupational Safety and Health

Hazards that the high voltage transmission line may pose to workers and residents during the decommissioning phase are similar to those discussed in the construction phase above

7.5.2. Vehicular and Human Traffic Impacts

Movement of heavy machinery and equipment during the decommissioning is expected. These machineries will be used for ferrying workers and materials from the active site while equipment will be used for dismantling of the transmission line

7.5.3. Impacts from Solid and Liquid Wastes

Decommissioning activities will generate both solid and liquid wastes such as: papers, cable drums, oil drums, spilt oil, planks of wood, glass, paints, adhesives, sealants, fasteners, and other domestic wastes. These wastes are hazardous to people, soil and water within the project area if adequate mitigation measures are not enforced during the decommissioning exercise.

7.5.4. Noise and Vibration Impacts

The decommissioning activities will be similar in nature as those during the construction phase. The impacts will be as a result of moving machines, communication of workers and outgoing vehicles transporting project materials and workers to and out of the proposed sites.

7.5.5. Emissions and air pollution

Decommissioning phase activities of the proposed line will give generation to dust and exhaust fumes from vehicles and machinery. Dust emissions will emanate from pit excavation activities and movement of machinery in the project area. This directly affects the air quality of the project area

7.5.6. Increase in Social Vices

Just as in the construction phase, population of the project area is expected to increase due to an influx of workers during the decommissioning phase. This will directly affect the normal social set up of communities living in the project area thereby possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour, petty thieves and increased HIV/AIDS incidence and communicable diseases

CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

The purpose of the following Environmental and Social Management Plan (ESMP) for the proposed project is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts and monitor the efficiency of these mitigation measures based on relevant environmental indicators. The ESMP identifies certain roles and responsibilities for different stakeholders for implementation, supervision and monitoring.

The objectives of the ESMP are:

- To provide evidence of practical and achievable plans for the management of the proposed project.
- To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations.
- To provide community with evidence of the management of the project in an environmentally acceptable manner.

Conversely, Environmental monitoring provides feedback about the actual environmental impacts of a project. Monitoring results help judge the success of mitigation measures in protecting the environment. They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes. A monitoring plan, backed up by powers to ensure corrective action when the monitoring results show it necessary, is a proven way to ensure effective implementation of mitigation measures. By tracking a project's actual impacts, monitoring reduces the environmental risks associated with that project, and allows for project modifications to be made where required.

This ESMP is prepared for the three project stages where potential significant negative impacts manifest.

These are:

- i. Construction Phase ESMP;
- ii. Operation Phase ESMP; and
- iii. Decommissioning Phase ESMP.

Table 8.1: ESMP

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
	Construction phase		
Soil erosion	<ul style="list-style-type: none"> - Compaction of loose material. - Diversion of runoff flows from construction sites. - Regular visits lead to the identifying of areas that have problems in regards to erosion and thus are given priority, so that corrective plans are implemented. - Soil excavation and embankment must be made for the immediate project area and unessential activities should be refrained from. - In order to compensate the damages incurred, due to the accelerated erosion, arising from construction activities, a control of natural erosion during the construction period must be taken under consideration. 	Contractor	100,000
Surface water and soil contamination	<ul style="list-style-type: none"> - Oil residuals including waste oil, lubricants, used filters, should be carefully collected and stored for safe disposal, in order to prevent spilling of contaminant hydrocarbons into runoff or groundwater. - Regular maintenance of site equipment and machinery should be carried out to ensure any leakages are detected and controlled. - Construction solid waste generated by activities can be disposed in areas approved by the county government that will be identified before commencement of construction activities. - Supervision of a representative from NEMA on the implementation of the above mentioned mitigation measures. 	Contractor	20,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
Air Quality and Dust emission	<ul style="list-style-type: none"> - Pave the main access road to the project area. - Sprinkle water on exposed dusty surfaces to reduce dust generation. - Trucks hauling soil should be covered with tarpaulins. - Checking, repairing and fixing the engines of vehicles and heavy machineries. All machineries and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of nitrogen and sulphur, as well as suspended particles. - Affixing filters on the exhausts. - Utilizing masks for workers who are directly in the location where dust is dispersed. - Supervision by a representative from NEMA on the implementation of the above mentioned mitigation measures. - Staff training before the commencement of construction activities. 	Contractor	200,000
Noise	<ul style="list-style-type: none"> - Measuring the intensity of noise by utilizing the noise meter. In the case that, the level measured is higher than the permissible amount, all the methods to conserve the mental health of workers must be utilized to lessen the level of noise and decrease it to the standard level and shortening the period of noise generated should be taken under consideration. - Lubricating and regular repair of equipment and machinery. - Insulating engines which create noise. - Eliminating worn out machinery. - Elevating the speed of work, so as to shorten the construction period as much as possible. - Selecting an appropriate period for construction activities and refraining from it being synchronous with sensitive period for wildlife, such as their pregnancy and 	contractor	50,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
	<p>giving birth duration.</p> <ul style="list-style-type: none"> - The Contractor should adopt the best practicable means of minimizing noise. - For any particular job, the quietest available machinery should be used. - All equipment should be maintained in good mechanical order and fitted with the appropriate silencers, mufflers, or acoustic covers where applicable. - Stationary noise sources should be sited as far away as possible from noise-sensitive areas, and where necessary acoustic barriers should be used to shield them. - Pneumatic drills and other noisy appliances should not be used after normal working hours. - Workers should be given noise protection equipment such as earmuffs and be taught how to use them and supervised to ensure such safety procedures are being adhered to. - The public should be informed that short periods of noise may be inevitable but prior warning of when noisy activities are to take place and the days and times noise of when they could be expected should be widely publicized before the activity takes place. - Fixing engines and exhausts of heavy machineries. - Use of portable acoustic barriers to shield compressors and other noisy equipment where necessary. - Observe and practice the recommended noise regulations. - Supervision of a representative from NEMA on the implementation of the above mentioned mitigation measures. - Staff training before the commencement of construction activities. 		

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
Loss of flora	<ul style="list-style-type: none"> - Minimize number of trees and other vegetation clearance. - Minimizing clearing and disruption to riparian vegetation. - Re-vegetation of disturbed areas with native plant species. - Protect all the ecologically critical areas such as riparian zones by clear delineation and planting of suitable indigenous plant species. - Staff training before the commencement of construction activities. - Selection a proper location to establish temporary camps and construction workshops (a land void of trees with sufficient distance from river) - Use of soils resulting from excavation in embankment, soil tabulation and reclamation through planting native trees 	Contractor	100,000
Fauna (Terrestrial & Aquatic)	<ul style="list-style-type: none"> - Implement all mitigation measures for noise and effort to maintain it at the permissible standard level. - Selecting an appropriate period/season for construction work and refraining from it being synchronous with sensitive period for wildlife, such as pregnancy duration and giving birth. - The performance of mitigation measures for noise pollution and efforts to maintain it at the permissible standard level shall be effective in decreasing this impact. - Regulating the time-table for the mobilization of vehicles so as to prevent stress arising from noise pollution. - A time-table regarding rock blasting, so as to prevent stress arising from noise pollution. - Prevention from spilling oil and grease compounds of vehicles and machinery on the ground so as to prevent soil pollution in the terrestrial ecosystem and its secondary impacts on wildlife through the food chain. 	Contractor	20,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
	<ul style="list-style-type: none"> - Prevention from the discharge of oil and grease compounds of vehicles and machinery, wastes and wastewaters into the river and streams so as to prevent the pollution of drinking water resources of wildlife. - Training of workers and staff about meaning and principals of environmental conservation, prevention methods relevant to polluting the terrestrial and aquatic environments, hunting prohibitions and the prevention of excessive disorder of wastes and debris. 		
Land take	<ul style="list-style-type: none"> - Timely information disclosure to the Project Affected Persons (PAPs). - Explanations to PAPs in relative to the plan objectives and its positive impacts, both national and throughout the region. - Implement the Resettlement Action Plan (RAP) to the latter. 	KETRACO	As per RAP report
Occupational Safety and Health (OSH)	<ul style="list-style-type: none"> - Workers shall be provided with appropriate personal protective equipment, such as coveralls, boots, mittens, gloves, dust and fume masks, all of which must be regularly replaced. - The abstract of the Occupational Safety & Health Act 2007 must be displayed at prominent places within the site. - Well stocked first aid box which is easily available and accessible should be provided within the construction site as well as at least an ambulance. - Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay. - Ensure that all site personnel are provided with an adequate supply of safe drinking water, which should be at accessible points at all times. - Provide conveniently accessible, clean, orderly, adequate and suitable washing 	Contractors	200,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
	facilities within the site.		
Aesthetic and visual impact	<ul style="list-style-type: none"> - Preventing unessential environmental destruction, particularly the severing of bushes, trees and small trees by the workers. - Avoiding building permanent infrastructure which will not be used after construction. - Selection of a proper location for construction materials and debris depot. - To allocate a place to park vehicles and heavy machinery to prevent their distribution and make a bad landscape in the region. - Preventing the dispersion of solid wastes and constructional materials in the environment. 	Contractor	None
Historical and cultural sites	<ul style="list-style-type: none"> - Training of the construction workers in identifying signs for materials of archaeological and historical value such as bones, shards, metal works, etc. - On suspicion of findings, the contractors to cease work, notify the supervising engineer of the find or disputes relating to archaeological relics or cultural religious sites. - Follow the chance find procedure. 	Contractor KETRACO Museums of Kenya	None
Operation phase			
Impacts on Wildlife Habitats and Migratory Birds	<ul style="list-style-type: none"> - Use reflective spheres on the conductors. - Build raptors platforms on top of pylons for roosting and nesting 	KETRACO	100,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Cost, (Ksh)
Noise from overhead line due to corona effect	Ensure that no settlements will be established in the wayleave trace.	KETRACO	None
Electrostatic and Magnetic field	<ul style="list-style-type: none"> - There should be no potential health risks for people living outside of 60 m provided for the wayleave area - KETRACO must ensure that no settlements will be established in the wayleave trace. 	KETRACO	None
Concerns over Occupational Safety and Health	<ul style="list-style-type: none"> - Ensuring physical integrity of structures is maintained - Deactivating and proper grounding of live power distribution lines before work is performed on, or in close proximity to the lines - Ensuring that live wire work is conducted by trained workers only - Ensuring the workers are properly isolated and insulated from any conductive object (live – line work) 	KETRACO	None

CHAPTER NINE: ENVIRONMENTAL & SOCIAL MONITORING

9.1 Introduction

The management of environment and social impacts and consequences of every proposed project is a regular, all purpose and continuous activity, which commences from the beginning of the project and the initial plan of its establishment, and until termination of the project life and thereafter. The performance of this management rests on an appropriate administrative structure, known as the environmental & social management unit, which is a section of the management and operation aggregate of the plan. Outlooks and the principals of environmental conservations must proceed in all the various angles of management.

The objectives of this plan are to render suitable methods and perform effective measures of acceptable costs, in order to reduce the destructive impacts arising from the establishment and operation of the proposed project in regards the regional environment and its accordance with the standard and desirable conditions, in rendering monitoring and control plans, public participation and environmental training. Hence, in this chapter, in addition to rendering the plan for each monitoring index, by specifying the responsible or relative organizations and estimating the organizational and implementation requirements, conditions for the execution of environmental plan are alleviated.

9.2 Internal Monitoring

The responsibility to conduct time to time internal monitoring of the proposed projects on ESMP implementation and HSE clauses provided in the contract lays with the proponent. The evaluation of compliance level to HSE management will be guided by a detailed ESMP programme approved by Contractor.

The objective of internal monitoring and audit will be:

- To identify gaps in implementation of the ESMP by the contractor
- Ensure compliance to legal requirements provided in EMCA 1999
- Guide the contractor's management of HSE requirements from time to time where unforeseen impacts are encountered

The proponent will continue the monitoring process during the operation and decommissioning phases of the projects ensuring that the minimum allowable Environmental parameters are maintained. These parameters include,

1. Workforce Training

The contractor shall monitor induction of workers to ensure they are adequately trained on HSE management on top of the specific skills required for their job description. The proponent should monitor induction training and tool box talks records regularly. The contractor shall also train site specific HSE supervisors to enforce the trainings.

2. Monitoring of Accidents Prevention/ Health Management

The Proponent will procure services of an independent environmental, health and safety (HSE) consultant to undertake frequent audits on the contractor during project implementation. The consultant will undertake regular site inspection visits (frequency shall be agreed upon with Contractor) to monitor how the contractor is managing his work force and activities with regard to accident prevention and health management.

The contractor's safety manager on the other hand shall ensure that appropriate safety signage and personal protective equipment is availed to the construction workers at all times.

Indicators that will be used in evaluation of accident prevention and health risks management includes;

- Provision of adequate personal protective equipment to workers at all phases of the project
- Presence of displayed safety warning signs and markings at active sites and on tower structures on completion
- Adequate human waste disposal and sanitation facilities are present at active sites
- Community awareness on safety risks associated with the project
- Compiled records of actual accidents/ incidences that have been encountered
- Report health cases that are related to the project

3. Soil Erosion and Conservation Monitoring

Construction activities such excavations and transportation of construction materials within the project areas may lead to loosen soil structure thereby resulting in erosion. The contractor will be responsible for ensuring that appropriate soil conservation and erosion prevention measures are practiced throughout the construction phase.

4. Noise Levels Monitoring

Emission of noise is expected during the construction phase. Major sources of noise will be from machinery such as excavators. However, the noise levels may not be an issue as emission is site specific and low Regular monitoring of these noise levels should be conducted to ensure that they recommended limits are not exceeded. Consultation with the PAPs will aid in establishing the extent of this impact

5. Air Quality Protection

Dust and emissions from machinery should be monitored by the contractor and adequate measures employed in ensuring air quality. This will include watering down of active sites/ roads and other areas generating the dust or maintenance of machinery with excessive smoke emissions. In addition, where excessive wind is observed, dust generating activities can be halted for some time.

6. Solid and Liquid Waste Management Monitoring

Monitoring of waste generated at both the site and workers campsite during the construction phase shall be done by the contractor's HSE manager. He will ensure that;

- Records of the type and waste amounts generated at the sites is kept
- Adequate and separate waste management facilities are provided at each site. The equipment shall be such that it aids in waste segregation
- All generated waste is bound to the specific sites boundary and littering of the environment is discouraged
- Human waste disposal facilities are provided at each site
- Collected waste is properly disposed away from site at dumping sites approved by the local county government

9.3. External Monitoring

The Kenyan government's environment management body NEMA shall issue approval for the implementation of the proposed project. Moreover, it shall ensure that the provided mitigation measures are implemented in implementation of the project. NEMA shall offer oversight of the implementing bodies through review of monitoring reports. The proponent shall therefore provide the agency with annual progress reports on environment, health and safety management

9.4. Environmental Audits (EA)

Environmental audits during all phases of the project implementation are key in ensuring full compliance to ESMP requirements. The goal of EA will be to establish if the proponent is complying with environmental requirements and enforcing the existing legislation. The purpose of EA is to determine the extent to which the activities and programs conform to the approved environmental management plan. The Consultant recommends that an independent consultant will be sourced to oversee environmental management throughout the construction phase and during

the operational phase and decommissioning phase. He will provide Environmental audits in line with NEMA's requirement.

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

10.1 Conclusions

The Project will directly contribute in achieving vision 2030 through increased power supply. It will improve the economic development in Kenya through the availability of a good quality power supply and creation of employment.

The Project's impact on the physical environment will be manageable, mostly short term construction-related impacts, which will be mitigated. The report has outlined mitigation measures in the EMP matrix in chapter 8 to be implemented during the various project phases.

Given that the Environmental Assessment undertaken under this Project, and considering the Project's strong economic justification, the Project satisfactorily meets environmental protection requirements provided that the mitigation, monitoring, and reporting plans are carried out.

Based on field work and consultations with local community, administration, and other stakeholders, it was concluded that:

- It is unlikely that the Project will have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.
- All the negative impacts will either be moderate or lesser in rating and could be easily mitigated.

10.2 Recommendations

The consultant recommends that the proposed project be implemented in compliance with all the relevant legislation and planning requirements of Kenya at all times. In line with this, the proponent and the contractor must take the legislative framework provided in this report into consideration, during and after the implementation of the project, as will be appropriate.

Also, KETRACO should implement RAP report to the latter so as to mitigate the loss of land, fixed assets and other private properties by timely compensation and restoration of livelihoods.

APPENDICES

Appendix I: Minutes of the public *barazas*

Appendix II: Attendance lists

Appendix III: Sample questionnaires

Appendix I: Minutes for Public Barazas

A. Meeting at Limuru Nyakinyua ACK Church, Limuru Nyakinywa Location, Kinangop Sub County

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 10TH NOVEMBER 2016 AT LIMURU NYAKINYUA ACK CHURCH, LIMURU NYAKINYWA LOCATION KINANGOP SUB COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The Chief Robert Macharia called the meeting to order at 2:0pm and after a word of prayer, the chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The assistant chief addressed the community member present and requested them to participate fully since that was the main aim of the meeting and then welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person’s opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

1. The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
2. The study will explore all the possible negative and positive impacts of the project.
3. The report shall present all mitigation measures for the impacts.
4. The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
5. Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi; ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community; local authority as well as the people who will affected by the project for awareness and avoid misleading information.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The members present in the meeting wanted to know if the transmission line can be relocated such that it goes along the road since their lands has been utilized by the other KETRACO transmission line.	The ESIA expert made it clear that the final design is not out yet and relocating the power line may not really happen since many aspects have been considered and relocating it so that the line can move along the line may be expensive and not viable
2	There are people who were affected by the KETRACO transmission line and as per the aerial image, the new	The ESIA expert made it clear that everyone who will be affected will be compensated as per the RFP and all the structured affected by

	transmission line will pass through their land again and probably affect the relocated structures. How will such a scenario be handled?	the new line will be compensated and a 15% of the compensation will be given to the project affected person as disturbance allowance.
3	The people attending the meeting also wanted to know how the negative impacts of the project be handled	There are mitigation measures to all the negative impacts well stated in the ESIA study report which will be put to place- ESIA expert
4	The attendees wanted to know if the high voltage power line is a cause of cancer	It was made clear that the high voltage power line has no cancerous effected and if it were, no one would dare bring it near people knowingly.
5	The meeting attendees wanted to know the valuation of the land and properties criteria used.	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy and anyone affected would be given a 15% of the compensation value as disturbance allowance
6	The attendees wanted clarifications on who keeps the title deed after compensation and does the land owner still have the access and ownership to the land	The ESIA expert clarified that after compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave
7	Risks of power line failure causing disaster	The transmission will be done by experts professionally to avoid such disaster
8	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
9	Project timelines.	The consulting team informed the locals that soon after the NEMA license is acquired on the project, the search of fund will start and the project will start as soon as funds are available
10	The people attending the meeting wanted to know if in a scenario where they are affected, if they can be compensated on land for land and property for property bases.	The ESIA expert explained to them the process of compensation and valuation and made it clear that at times its possible for that kind of compensation but not all the cases

Minute 06: Way forward.

The chief Robert Macharia appreciated the participation of all members present and assured the consulting team cooperation through out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members present promised to sensitize the rest of the community members that did not make it to the meeting and agreed to start sorting their land issues as well as acquiring title deeds so that if after the surveys are done, if anyone will be affected , it will be easier to compensate them

All members in attendance agreed that the project is more beneficial for economic development and thus a decision was made on a public consultation forum at Limuru Nyakinyua ACK Church, Limuru Nyakinywa Location; Kinangop Location that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 3:30 pm with a word of prayer.

Compiled by;
ENWAG CONSULTING LIMITED

B. Meeting at Turasha Chief's Office, Munoru Sub-Location in Nyandarua County.

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 10TH NOVEMBER 2016 AT TURASHA CHIEF'S OFFICE, MUNORU SUB-LOCATION IN NYANDARUA COUNTY.

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The assistant chief, Shadrack Kariuki called the meeting to order at 11:0am and after a word of prayer, the assistant chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The assistant chief addressed the community member present and welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person's opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

- The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
- The study will explore all the possible negative and positive impacts of the project.
- The report shall present all mitigation measures for the impacts.
- The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
- Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community, local authority as well as the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The distance the power line will cover as it traverses through to its destination	The final designs are not yet done hence at this early stage it is not possible to tell the exact place where the line will pass through
2	There are people who were affected by the KETRACO transmission line and as per the aerial image, the new transmission line will pass through their land again and probably affect the relocated structures. How will such a scenario be handled?	The ESIA expert made it clear that everyone who will be affected will be compensated as per the RFP and all the structured affected by the new line will be compensated and a 15% of the compensation will be given to the project affected person as disturbance allowance.
3	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA study report which will be put to place- ESIA expert

4	Some members were not fully compensated when their land was used for the ongoing transmission line and hence they wanted to know if they will be compensated first using the money of the new power line	It was made clear that the two power lines should be treated separately and the only people will be compensated are the ones that will be relocated to give way for the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line
5	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
6	Who keeps the title deed after compensation and does the land owner still have the access and ownership to the land	After compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave
7	Risks of power line failure causing disaster	The transmission will be done by experts professionally to avoid such disaster
8	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
9	Project timelines.	The consulting team informed the locals that soon after the NEMA license is acquired on the project, the search of fund will start and the project will start as soon as funds are available
10	What are the benefits of the project to the Nyandarua County people and what are some of the CSR?	One of the benefits is that jobs will be availed to the locals in time of operation phase. CSR will depend on the contractor and agreement with the locals as the project moves on

Minute 06: Way forward.

The assistant chief, Shadrack Kariuki appreciated the participation of all members present and assured the consulting team cooperation though out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance agreed that the project is more beneficial thus a decision was made on a public consultation forum at Turasha chief's office, Munoru Sub-Location in Nyandarua County that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 12:00 pm with a word of prayer.

Compiled by;
ENWAG CONSULTING LIMITED

C. Meeting at Langalanga Sub-Location Chief's Office, Karunga Location in Gilgil Sub County

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 11TH NOVEMBER 2016 AT LANGALANGA SUB-LOCATION CHIEF'S OFFICE, KARUNGA LOCATION IN GILGIL SUBCOUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The assistant chief, Patrick Osoro called the meeting to order at 11:0am and after a word of prayer, the assistant chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The assistant chief addressed the community member present and welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person's opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

- The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
- The study will explore all the possible negative and positive impacts of the project.
- The report shall present all mitigation measures for the impacts.
- The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
- This is the first consultation meeting therefore many more will meetings will follow for proper sensitization.
- Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community, local authority as well as the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The members present in the meeting wanted to know what would happen if the project affected person does not have a title deed for the land	The ESIA and RAP expert clarified that one has to have legal documents that show that they own the land legally
2	There are people who were affected by the KETRACO transmission line and as per the aerial image, the new transmission line will pass through their land again and probably affect the relocated structures. How will such a scenario be handled?	The ESIA expert made it clear that everyone who will be affected will be compensated as per the RFP and all the structured affected by the new line will be compensated and a 15% of the compensation will be given to the project affected person as disturbance allowance.
3	How will the negative impacts of	There are mitigation measures to all the negative

	the project be handled?	impacts well stated in the ESIA study report which will be put to place- ESIA expert
4	The community members requested that casual jobs be given to the community members	The community members were promised that casual jobs will be given to them in time of actual works
5	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
6	The members present wanted to know who keeps the title deed after compensation and does the land owner still have the access and ownership to the land, and whether the owner can still sell their land	The ESIA expert made it clear that; after compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave. Selling the land is allowed
7	The members present wanted to know if there were any chances of power line failure hence causing disaster	The members present were informed that the transmission line will be done by experts professionally to avoid such disaster hence no need to worry or live in fear.
8	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
9	Project timelines.	The consulting team informed the locals that soon after the NEMA license is acquired on the project, the search of fund will start and the project will start as soon as funds are available
10	the members present wanted to know if they will be given some power from the high voltage line	That was clarified by Vitalis Too that this is a high voltage power line hence can't be transmitted to the communities.

Minute 06: Way forward.

The assistant chief, Patrick Osoro appreciated the participation of all members present and assured the consulting team cooperation through out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance, having been well sensitized agreed to agree with the the project thus a decision was made on a public consultation forum at Langalanga chief's office, Karunga Location in Gilgil sub-county that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 12:30 pm with a word of prayer.

Compiled by;
ENWAG LIMITED

D. Nyakio Shopping Centre in Haraka Location, Nyandarua County

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 12TH NOVEMBER 2016 AT NYAKIO SHOPPING CENTRE IN HAKA LOCATION, NYANDARUA COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The Chief David Mathenge called the meeting to order at 12:30pm and after a word of prayer, the chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The chief addressed the community member present and welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person's opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

- The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
- The study will explore all the possible negative and positive impacts of the project.
- The report shall present all mitigation measures for the impacts.
- The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
- This is the first consultation meeting therefore many more will meetings will follow for proper sensitization.
- Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project will be made to the local community, local authority and the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The members present in the meeting wanted to know what would happen if the project affected person does not have a title deed for the land	The ESIA and RAP expert clarified that one has to have legal documents that show that they own the land legally
2	The community members wanted to know what would happen if the project affected person is not ready to relocate to any other place	The ESIA expert explained that no one is allowed to live in the way leave and hence everyone affected is supposed to move after well compensation.
3	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA study report which will be put to place-ESIA expert

4	The community members requested that casual jobs be given to the community members	The community members were promised that casual jobs will be given to them in time of actual works
5	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
6	The members present wanted to know who keeps the title deed after compensation and does the land owner still have the access and ownership to the land, and whether the owner can still sell their land	The ESIA expert made it clear that; after compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave. Selling the land is allowed
7	The members present in the meeting wanted to know why they are not allowed to keep tall trees in their farms once the line is passed through their farm	The ESIA expert made it clear that it's for their own safety since the tall trees can fall on the line and since it's a high voltage line it can cause havoc disasters.
8	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
9	Project timelines.	The consulting team informed the locals that soon after the NEMA license is acquired on the project, the search of fund will start and the project will start as soon as funds are available
10	The members presented requested that since they also do not have electricity power, a substation be constructed at their place as a CSR project	They were promised that their request would be aired through the ESIA report.

Minute 06: Way forward.

The chief, David Mathenge appreciated the participation of all members present and assured the consulting team cooperation through out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members present agreed to pass the information to the rest of the community who were not in attendance.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance, having been well sensitized agreed to agree with the project thus a decision was made on a public consultation forum at Nyakio shopping center, Haraka location that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 1:30 pm with a word of prayer.

Compiled by;
ENWAG CONSULTING LIMITED

E. Gituru B ECD Nursery School in Mununga Sub-Location, Naivasha East Location

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 11TH NOVEMBER 2016 AT GITURU B ECD NURSERY SCHOOL IN MUNUNGA SUB-LOCATION, NAIVASHA EAST LOCATION

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The Chief Michael Kiratu called the meeting to order at 3:00pm and after a word of prayer, the chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The chief addressed the community member present and welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person's opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

- The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
- The study will explore all the possible negative and positive impacts of the project.
- The report shall present all mitigation measures for the impacts.
- The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
- This is the first consultation meeting therefore many more will meetings will follow for proper sensitization.
- Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project will be made to the local community, local authority and the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The members present in the meeting wanted to know what would happen if the project affected person does not have a title deed for the land	The ESIA and RAP expert clarified that one has to have legal documents that show that they own the land legally
2	The community members wanted to know if the line can be relocated since it touches a school within the area.	The ESIA expert said that he will put that in the report as a recommendation.
3	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA study report which will be put to place- ESIA expert
4	The community members requested that casual jobs be given to the community members	The community members were promised that casual jobs will be given to them in time of actual works
5	Valuation of the land and	Land will be valued as per the current market rate

	properties	and properties will be valued according to the resettlement framework policy
6	The members present wanted to know who keeps the title deed after compensation and does the land owner still have the access and ownership to the land, and whether the owner can still sell their land	The ESIA expert made it clear that; after compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave. Selling the land is allowed
7	The members present wanted to know if there were any chances of power line failure hence causing disaster	The members present were informed that the transmission line will be done by experts professionally to avoid such disaster hence no need to worry or live in fear.
8	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
9	Project timelines.	The consulting team informed the locals that soon after the NEMA license is acquired on the project, the search of fund will start and the project will start as soon as funds are available
10	The members presented requested that their roads be tarmacked as a CSR project	They were promised that their request would be aired through the ESIA report.

Minute 06: Way forward.

The chief, Michael Kiratu appreciated the participation of all members present and assured the consulting team cooperation though out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members present agreed to pass the information to the rest of the community who were not in attendance.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance, having been well sensitized agreed to agree with the the project thus a decision was made on a public consultation forum at Gituru B ECD nursery school, Naivasha East location that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 4:30 pm with a word of prayer.

Compiled by; ENWAG LIMITED

F. Meeting at Karati Primary School in Githafai Location, Nyandarua County

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE HELD ON 12TH NOVEMBER 2016 AT KARATI PRIMARY SCHOOL IN GITHAFAI LOCATION, NYANDARUA COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Purpose of the meeting
3. Sensitization
4. Discussion, concerns and address
5. Way forward
6. Closing

Minute 01: Introduction.

The Chief Patrick Ndei called the meeting to order at 10:00am and after a word of prayer, the chief welcomed everyone to the meeting and had the Consultants introduce themselves.

The chief addressed the community member present and welcomed the consulting team to address the meeting attendees as per the schedule

Minute 02: Purpose of the meeting.

The ESIA consultant, Murigi Wa Mwangi explained to the community members attending the meeting that the purpose of the meeting was to engage the community members at the very early stage as per the requirement of NEMA and in line with the public participation act 2014.

Mwangi also explained the main aim of the meeting which was to get opinions from the members who would be affected directly or indirectly by the proposed Gilgil-Thika-Nairobi East-Konza 400KV transmission line which will be passing through this area.

He welcomed the community members present to be part of the development by contributing their views and feelings about it which will be included in the final ESIA study report for action and consideration.

Minute 03: Sensitization by the ESIA consultants.

The ESIA consulting team emphasized that the need to conduct such a meeting was to assess possible positive and negative impacts of such a project, from the affected person's opinion and the ESIA study report is then submitted to NEMA for licensing.

The ESIA expert, Vitalis Too informed the members present that:

- The power line will be environmental and healthy friendly and the negative impacts will be well mitigated.
- The study will explore all the possible negative and positive impacts of the project.
- The report shall present all mitigation measures for the impacts.
- The negative impacts of the project will include loss of biodiversity and relocation of people who are within the way leave which is 30 meters on each side of the power line.
- This is the first consultation meeting therefore many more will meetings will follow for proper sensitization.
- Relocated people will be well compensated.

The ESIA expert made it clear that the project affected persons may not be known as per now since survey work is not done yet and also made it clear that the projected affected persons after compensation they can continue doing their farming on the compensated land but should not plant trees which grow to the height higher than the power line to avoid dangers in times of thunderstorm.

The ESIA expert also pointed out that no house is allowed on the way leave for safety purpose hence any house within the way leave will be compensated and relocated.

Minute 04: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project will be made to the local community, local authority and the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The members present in the meeting wanted to know what would happen if the project affected person does not have a title deed for the land	The ESIA and RAP expert clarified that one has to have legal documents that show that they own the land legally
2	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA study report which will be put to place- ESIA expert
3	The community members requested that casual jobs be given to the community members	The community members were promised that casual jobs will be given to them in time of actual works
4	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy

5	The members present wanted to know who keeps the title deed after compensation and does the land owner still have the access and ownership to the land, and whether the owner can still sell their land	The ESIA expert made it clear that; after compensation, the owner of the land keeps the title but the way leave is registered and noted on the title deed. The land owner is allowed to continue farming in their land or any other activity although buildings are not allowed on the way leave. Selling the land is allowed
6	The members present wanted to know if there were any chances of power line failure hence causing disaster	The members present were informed that the transmission line will be done by experts professionally to avoid such disaster hence no need to worry or live in fear.
7	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project

Minute 06: Way forward.

The chief, Patrick Ndaui appreciated the participation of all members present and assured the consulting team cooperation through out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA study report for equal participation of the community.

The community members present agreed to pass the information to the rest of the community who were not in attendance.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance, having been well sensitized agreed to agree with the project thus a decision was made on a public consultation forum at Karati primary school, Githafai Location that the project should go on.

Minute 07: Adjournment.

There being no other business, the meeting was adjourned at 11:30 pm with a word of prayer.

Compiled by;
ENWAG CONSULTING LIMITED

G. Meeting at Kalusysa Market, Lukenya Location, Athi-River Sub-County.

MINUTES OF PUBLIC MEETING FOR THE PROPOSED GILGIL- THIKA- KONZA CITY ELECTRICITY TRANSMISSION LINE (400MW) HELD ON 11TH NOVEMBER, 2016 AT LUKENYA LOCATION, KALYUSI MARKET, ATHI-RIVER SUB-COUNTY.

AGENDA

1. Opening Remarks.
2. Project Description
3. Issues raised
4. Suggestions
5. A.O.B

Preliminary

The meeting was called to order at 11.00 am, chaired by the Area Chief, Mr. Tyrus Ndambuki. One of the residents gave a word of prayer, after which the chief requested for a self-introduction by the ESIA team to the locals. The Chief then briefed the community about the meeting agenda and called upon the locals to air their opinions and concerns about the project after-which he welcomed the ESIA consultants to take over the meeting.

Min 1: Opening Remarks

The ESIA Consultants gave a brief overview of the whole evolution of environmental concerns and law that led to the present situation .They explained that in the Environmental Impact Assessment process public consultation was a must, acknowledging that the public meeting was an important stage as is a requirement in the Environmental Management and Coordination Act (EMCA) 1999. They also stated that the purpose of the meeting was to create awareness of the proposed Gilgil- Thika- Konza city electricity transmission line project, to obtain views/ concerns of the stakeholders, and to clarify issues that are not clear about the project. The consultant also gave a breakdown of the procedures involved in the capturing the views, presentation in the report and the follow up to the resolutions thus formulated to the time when a decision is made by the authority (NEMA).

Min 2: Project Description

The consultant, Peter Kimani gave a brief description of the project to the community members in attendance on Project area, location and beneficiaries; Administration of the project; Need for the project; Project design; Components of the system and Layout of the electricity line. He added that the project will have power substations that are, Gilgil substation, Thika substation, Nairobi East substation and Kyumvi substation. The locals were made aware that the project proponent is KETRACO-Kenya Electricity Transmission Company with an aim of increasing electricity interconnection in the region and the neighbouring regions as well as to increase access to more local electricity supply. The ESIA consultant added that the energy source is geothermal power from Olkaria Naivasha which is renewable and reliable. He insisted that development of renewable energy projects its priority given to investors by the Kenyan government in order to curb the power crisis experienced country wide in order to help in achieving vision 2030. The ESIA consultant emphasized that the project is very friendly to the environment since it will promote access to more and reliable electricity which will improve the living standards of the locals as well as attract more investments and encourage efficiency in industrial activities among others.

Min 3: Issues Raised

The Consultant invited the members to give their views regarding the project as they wished, and the following concerns were raised:

Positive impacts

The community applauded the project construction, with each of them giving a go ahead of the Project. Some of the reasons for the project appraisal were as follows:-

1. Job creation for the community: the community felt that the project development would create job vacancies at all levels of the construction and implementation process, hence improving means of livelihood of the people.
2. Increased electricity power supply source at the neighborhood thus reducing electricity disruption such as blackouts.
3. Enhanced Security due to lighting in the neighborhood at night.
4. Increased business in the locality.
5. Attract more foreign investments and promote industrial activity in the region.
6. Contribution to the national economy growth.
7. Increase in land value.

	Community Concerns	Responses
1	Electricity connection to households direct from the transmission line	The ESIA expert explained that since the line is high voltage, connection to the households is not possible. He insisted that the power must first reach a substation after- which it is supplied to the local electricity line to power household
2	Compensation of the affected people	The ESIA expert assured the locals affected of compensation of the land, structures and plants as well as being offered additional 15% disturbance allowance.
3	Employment of locals not outsiders in the project implementation.	The ESIA expert assured the locals of temporary employment such as unskilled labour as well as local contracts such as sand and ballast required for the project construction.
4	Delay of full compensation fee	Those affected were assured of timely compensation by the ESIA expert
5	Method of compensation of locals without titles	The ESIA expert insisted that Kenya land commission will work with KETRACO to enhance compensation of individuals without titles.
6	Corporate social responsibility activities by KETRACO	The community members suggested that Ketraco should help the locals in powering their homes at a subsidized fee through partnering with KPLC.
7	Wayleave size and possibility of use of land after being compensated for the Wayleave	The ESIA expert reported that the Wayleave size is 30 by 30 metres thus 60 metres. He also insisted that building under the transmission line is illegal or planting trees under the same line. He explained that only short plants such as potatoes and beans can be planted on that land.

Min 4: Way Forward.

The Consultants requested the people present to follow-up on any communications and Memorandum issued so that the final Environmental Impact Assessment Study Report put in their comments for further action, and that NEMA will also request for Public comments through the Newspapers. It was also said that the report would be available at the County Environment office in Machakos, where the residents and other stakeholders may go to review it and give their comments.

The Consultant assured the residents that recommendations for the project will be made accordingly.

Min 5: Adjournment

There being no other business for discussion the meeting was adjourned at 2.30 pm with prayer from the one of the locals

Complied by
ENWAG Company

H. Meeting at Ituru Location, Gatundu South Sub-County

MINUTES OF PUBLIC MEETING FOR THE PROPOSED GILGIL- THIKA- KONZA CITY ELECTRICITY TRANSMISSION LINE (400MW) HELD ON 9TH NOVEMBER, 2016 AT ITURU LOCATION, GATUNDU SOUTH SUB-COUNTY .

AGENDA

1. Opening Remarks.
2. Project Description
3. Issues and concerns.
4. Suggestions
5. A.O.B

Preliminary

The meeting was called to order at 2.00 pm, chaired by the Area Chief, Mr. Njagi . One of the residents gave a word of prayer, after which the chief requested for introduction by the ESIA team to the locals. The Chief then briefed the community about the meeting agenda and called upon the locals to air their opinions and concerns about the project after-which he welcomed the ESIA consultants to take over the meeting.

Min 1: Opening Remarks

The ESIA Consultants gave a brief overview of the whole evolution of environmental concerns and law that led to the present situation .They explained that in the Environmental Impact

Assessment process public consultation was a must, acknowledging that the public meeting was an important stage as is a requirement in the Environmental Management and Coordination Act (EMCA) 1999. They also stated that the purpose of the meeting was to create awareness of the proposed Gilgil- Thika- Konza city electricity transmission line project, to obtain views/ concerns of the stakeholders, and to clarify issues that are not clear about the project. The consultant also gave a breakdown of the procedures involved in the capturing the views, presentation in the report and the follow up to the resolutions thus formulated to the time when a decision is made by the authority (NEMA).

Min 2: Project Description

The ESIA expert, Vincent Ng'eno gave a brief description of the project to the community members in attendance on Project area, location and beneficiaries; Administration of the project; Need for the project; Project design; Components of the system and Layout of the electricity line. He added that the project will have power substations that are, Gilgil substation, Thika substation, Nairobi East substation and Kyumvi substation. The locals were made aware that the project proponent is KETRACO-Kenya Electricity Transmission Company with an aim of increasing electricity interconnection in the region and the neighbouring regions as well as to increase access to more local electricity supply. The ESIA consultant added that the energy source is geothermal power from Olkaria Naivasha which is renewable and reliable. He insisted that development of renewable energy projects its priority given to investors by the Kenyan government in order to curb the power crisis experienced country wide in order to help in achieving vision 2030.

The ESIA consultant emphasized that the project is very friendly to the environment since it will promote access to more and reliable electricity which will improve the living standards of

the locals as well as attract more investments and encourage efficiency in industrial activities among others.

Min 3: Issues/ Concerns Raised

The Consultant invited the members to give their views regarding the project as they wished, and the following concerns were raised:

Positive impacts

The community applauded the project construction, with each of them giving a go ahead of the Project. Some of the reasons for the project appraisal were as follows:-

1. Job creation for the community.
2. Increased electricity power supply source at the neighborhood thus reducing electricity disruption such as blackouts.
3. Increased business in the locality.
4. Attract more foreign investments and promote industrial activity in the region.
5. Contribution to the national economy growth.
6. Increase in land value.

	Community Concerns	Responses
1	Electricity connection to households direct from the transmission line	The ESIA expert explained that since the line is high voltage, connection to the households is not possible. He insisted that the power must first reach a substation after- which it is supplied to the local electricity line to power household
2	Compensation of the affected people Method of compensation of locals without titles	The ESIA expert assured the locals affected of compensation of the land, structures and plants as well as being offered additional 15% disturbance allowance. The ESIA expert explained that Kenya land commission will work with KETRACO to enhance compensation of individuals without titles.
3	Employment of locals not outsiders in the project implementation.	The ESIA expert assured the locals of temporary employment such as unskilled labour as well as local contracts such as sand and ballast required for the project construction.
4	Corruption in compensation	The ESIA team assured the locals of transparency in resettlement and compensation since KETRACO will be keen on that.
5	Removal of existing electricity line	The ESIA consultant explained that the existing electricity line will not be removed since the proposed transmission line is supposed to support and provide more power the existing line.
6	Corporate social responsibility activities by KETRACO	The locals suggested that KETRACO should build a school and a hospital in the area as part of the social responsibility, as well as improving the roads and putting “Murika Mwiza Taa” in the location

7	Wayleave size and possibility of use of land after being compensated for the Wayleave	<p>The ESIA expert reported that the Wayleave size is 30 by 30 metres thus 60 metres.</p> <p>He also insisted that building under the transmission line is illegal or planting trees under the same line.</p> <p>He explained that only short plants such as potatoes and beans can be planted on that land.</p>
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Min 4: Way Forward.

The Consultants requested the people present to follow-up on any communications and Memorandum issued so that the final Environmental Impact Assessment Study Report put in their comments for further action.

The Consultant assured the residents that recommendations for the project will be made accordingly.

Min 5: Adjournment

There being no other business for discussion the meeting was adjourned at 5 pm with prayer from the one of the locals.

Complied by
ENWAG Company

I. Meeting at Kiasa Centre in Machakos County

MINUTES OF PUBLIC CONSULTATION MEETING FOR THE PROPOSED GILGIL-KONZA 400KV TRANSMISSION LINE WITH KINANIE LOCATION PAPS HELD AT KIASA CENTRE IN MACHAKOS COUNTY ON NOVEMBER 11TH 2016 AT 1400 HOURS EAT.

PRESENT

See attached lists.

AGENDA

1. Project description and briefing by the ENWAG team on the 400 kV transmission line.
2. Observations, contributions and discussions with the attendants.
3. A.O.B

PRELIMINARIES

The area assistant chief Mr. Benson Musyoka called the meeting to order and requested a volunteer to pray. He then made the opening remarks and did the introduction of the village elders. He then allowed the ENWAG team to introduce themselves to the attendants.

A background of the region was given as being a settlement area, cosmopolitan and that all residents bought land in the region.

MINUTE 1: BRIEFING

The audience was made aware of the details of the project as follows;

- The line starts at Gilgil through Thika to Nairobi east and ends at Konza.
- Probable impacts of the project were listed to the PAPS, both positive and negative.
- The entry points of KETRACO, NEMA, ENWAG and KPLC among others were explained.
- The concepts of right of way of the proposed line and resettlement action plan were explained.
- The idea of land acquisition and compensation was explained.
- The structures expected to be put up so as to come with the lines like pylons were explained and the measures to be put in place to ensure the construction is safe.

MINUTE 2: DISCUSSIONS; QUESTIONS AND ANSWERS

The ENWAG team then invited the area chief to initiate the discussions. The following issues were discussed.

- **Compensation**

Mr. Benson Kioko requested to know how much the amount of money in compensation would be for land and related structures in case the project acquires them. Madam Angeline too needed to know whether the compensation rate is flat for land pieces along the line from

Gilgil to Konza. The consultants explained to them the process of acquisition and the principles upon which the payments are done. The concept of Open market value and Replacement costs were used to their satisfaction.

- **Affected plot owners.**

Mr. Newton needed to know the precise plot numbers that the project would affect. The area chief further wanted to know the fate of the land lying below the proposed transmission line and requested that the compensation be in time for convenient change of lifestyle. They were told the whole process is organized in a smooth way such that every step involves all stakeholders and that the laws of Kenya would guide the process. They were told the subsequent stages would help identify plot numbers affected. They were further advised that the line has a 30 meters right of way on either side of the line.

- **Subsequent meetings.**

The area assistant chief requested for subsequent meetings to make the resident more aware of the impending plans and to prepare them well for eventualities. He also requested for hard copy maps detailing the project. The procedure was laid to them once again and they were assured they would meet other related professionals concerning the same before they are moved.

- **Survey.**

Mr. Samuel Mumo needed to know if there would be fresh land survey in the region before project commences. Mr. Benson Kioko further asked who would be compensated incase the registered land owner is dead. The professional explained to them that every action that follows our visit would respect the laws of Kenya including the EMCA act 1999 and related laws including the laws on inheritance.

- **The attendance list.**

Mr. Samuel wanted to know the exact reason their signatures were collected in the meeting, whether it would be used to assume they had given up their portions of land. He was told that the signatures are merely proof of them being consulted and that any proof of acquisition would come later.

- **Project Benefits to the community.**

Madam Angeline Wambua needed to know how the community being consulted would benefit from the proposed project. The consultant listed some of the benefits to Mrs. Wambua to include employment especially unskilled labour, Cooperate social responsibility of the proponent, stable and uninterrupted power supply to the region and use of local materials.

Min 3: A.O.B

The chief requested that the government through the proponent should consider the locals for all the jobs that would not require highly specialized labour. Members further requested that they be helped to identify alternative land pieces elsewhere in case they are displaced.

The community in conclusion agreed that if the due process of the law would be followed with their displacement and that the compensation would be done satisfactorily then they

were okay with the line passing through their plots. They were urged to cooperate with subsequent consultants when the time comes for identification of rightful land owners that would be displaced.

















MIN 4: ADJOURNMENT

Being there no other business, the meeting came to a close at 1700 hours after the chief gave a vote of thanks and a prayer was heard from a volunteer.

Complied by
ENWAG Company

Appendix II: Public participation list

A. Meeting at Ituru chief's office attendance List

PUBLIC PARTICIPATION LIST						
Venue: ITURU		APR CHIEF'S OFFICE		Date: 9/11/2016	Time: 3 pm	
NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE	
1.	JOHN KIHU NJANE	ITURU	10229569	0723850561		CHIEF
2.	JAMES UGURU MATHIA	ITURU	1023268	0722397986		
3.	JUSTINA Wanjiru Maramba	ITURU	10573671	0726247578		
4.	Benson Kieni Wamere	ITURU	10344425	0727801664		
5.	Pelet Kabutera Wamere	ITURU		0712028891		
6.	John Njangu Setten	ITURU	1020251	0706703784		
7.	Isagera mwatta	ITURU	1023319	0729931313		
8.	Gabriel Mucuku Kahiro	ITURU	1019548	0702219892		
9.	LAMIAH KAMAU NGANGA	ITURU	6258137	0720928910		
10.	ELIZABETH WANSIKU NIANGA	ITURU	1020956	0720783545		
11.	ELIODE NIARIE CHEGE	ITURU	1022200	0722178672		
12.	MARY WANSARI KANVA	ITURU		072737301		
13.	LUCY WANSIKU KIANGA	ITURU	7320966	0727595737		
14.	Margaret Kariuki	R.A	29872468	0706189770		
15.	SPENCER KIRANA	ENWAG	27800466	0714476691		
16.	Vincent Nyleno	enwag	2770460	07443455		
17.						
18.						
19.						
20.						

JOHN KIHU NJANE
CHIEF
ITURU LOCATION
9/11/2016

B. Meeting at Kalusya attendance list

PUBLIC PARTICIPATION LIST

Venue: KALUSYA MARKET

Date: 11/01/2016

Time: 1200 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	PATRICK MUTINDA		21952557	0729622694	
2.	PENDINAE NAIROSO MWIKALI		30723685	0711484968	
3.	SILVIAH MUISIA			07040611176	
4.	JOSEPH S. KIVIKU		20027681	0704947954	
5.	NICHOLAS MBATHA		20867903	0733766852	
6.	MUTUA MUTSYA		21722465	0710670904	
7.	Harou Kieti		10041419	0716854201	
8.	IRINE PETER		24283144	0729784339	
9.	DAMARIS MUKHI MATILY		25558992	0706129411	
10.	ALFRED KATAMU		658321	0710797393	
11.	BENARD MUYAKA		13224287	0713861453	
12.	SAMUEL KAKAI		13768352	0712737349	
13.	MUSYOKI MBOMO			0711537223	
14.	RONFACE NZIOKA		26217025	0702002287	
15.	AMOS MUKILO		26724651	07155518049	
16.	JACKSON MUTUKU	LUKENTA	11315783	0713390436	J. Muisia
17.	Geoffrey Kahhu M.		21399385	0703160782	
18.					
19.					
20.					

TIRUS N. MUSYOKA
CHIEF
LUKENYA LOCATION
Date: 11/01/2016

PUBLIC PARTICIPATION LIST

Venue: Kalusya Market

Date: 11/11/2016

Time: 12.00

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Margaret Mwangi		1186 0262	0715575000	Margaret
2.	Francis Musyoki		20364967	0705601060	
3.	STELLAHINE NJOIA		11110667	0712593988	JS
4.	Johannes Madi				
5.	LWISA SYOMBURU			0704273577	
6.	VIOLA MUIA		21915005	0720011720	
7.	Joram Chege		31225914	0718753396	
8.	Moses Wambua			0715467777	
9.	Daniric Kioko		31369761	0715885713	
10.	TIMOTHY MUTUA		28424915	0705762277	
11.	ELIZABETH MUMBI		13932579	0714458992	
12.	Steve Wambua		25622294	0724354373	
13.	Andrew Njau		22811413	0795164103	
14.	Emmaculate Muthili		26774445	070884420	
15.	Mutua Ndambuki		2591395	0703737366	
16.	Morris Mburu Peter		27933503	0712462835	
17.	Jacobson Wanjala			070746609	
18.	Euneloh Nafrah		33655797		
19.	Esther Mascheria		21212903		
20.	Janet Njineh		854752	0726230596	

TIRUS N. MUSYOKA
CHIEF

LUKENYA LOCATION
Date: 11/11/16

PUBLIC PARTICIPATION LIST

Venue: KALUSYA MARKET

Date: 11/11/2016

Time: 12:00

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	Daniel MUKAU			072350399	
2.	Duncan Keli			0726124848	
3.	Sara Mutinda			072499283	
4.	BEATRICE MUTISO			0700480574	
5.	ESTHER N. MATHI			0724618992	
6.	Ngannwa Mwangi			0724758150	
7.	JOHN MURISOKIICU			0712230964	
8.	Henry Selys			0723573663	
9.	TIMOTHY MWAMBI			0701734306	<i>[Signature]</i>
10.	MURICA KIUENDO			0728148790	<i>[Signature]</i>
11.	PATRICK MWAMBI			0713549747	<i>[Signature]</i>
12.	<i>[Signature]</i>				
13.	Mary Njandja			0713733743	
14.	JOSEPH MUMO			0701364187	<i>[Signature]</i>
15.	Ibanus Mway			072235520	<i>[Signature]</i>
16.	Alayne Kibani			0701305013	<i>[Signature]</i>
17.	James MUMANGI			0791023551	<i>[Signature]</i>
18.	MUSOLI KIMANI			0700735045	<i>[Signature]</i>
19.	Philip Makora			0706795073	<i>[Signature]</i>
20.	BONIFACE MWAMBI			0721172753	

TIRUS N. MUSYO
CHIEF
LUKENYA LOCAL
Date: *[Signature]*

PUBLIC PARTICIPATION LIST

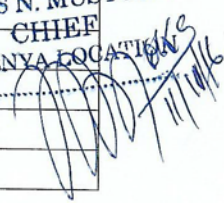
Venue: Kalusya Market

Date: 11th Nov. 2016

Time: 1200 HRS

NO	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Pius Mungu		23004950	073677284	
2.	Mwanje Mutuu				
3.	Jim Wambua			07442711	
4.	John Kagwi		21722211	0725483540	
5.	Leith Nziye			0726654626	
6.	Joseph Ndungu			072092151	
7.	Richard Mwangi				
8.	Mary Wangiku				
9.	Regina Musyoka			075353922	
10.	Mwikali Kabira			0727313507	
11.	Patrick Kasyoka			0770277163	
12.	Xzani			072074042	
13.	Simon Ngatu			0704257554	
14.	John Ng'au			0726428384	
15.	Francois Kyalo			0728233411	
16.	Stanley Musyoka				
17.	Julius Wambua			0790235311	
18.	Mungao Nakan				
19.	Daniel Ndungu			0736340737	
20.	Stella Mwangi			0703722675	

TIRUS N. MUSYOKA
CHIEF
LUKENYA LOCATION
Date:.....



PUBLIC PARTICIPATION LIST

Venue: Kalusya Market

Date: 11th Nov. 2016

Time: 1200 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	BENSON NDUVA		28024347	0717209199	
2.	BENDETA MUTUKU		9782337	0724540997	
3.	CAROLINE MUTUA		33870155	070487256	
4.	MIRIAM SENGA		20895615	0715030587	
5.	LILIAM KHANYELELE			070492663	
6.	DORCAS MUMO		33106200	0714941856	
7.	MARY MUI		—	—	
8.	FAITH MUTINDA		31379164	072665583	
9.	LILIAN NDUKO MUMYAKA		28336600	0702764012	
10.	ZIPPORAH MUSTOICI		31240906	0700190191	
11.	MERCY MGENI		0708021921	0708021921	
12.	MUTHONI		—	—	
13.	ESTHER NDUNGE		—	—	
14.	ANASTASIA KIMEY		—	0737391552	
15.	WINIFRED NDUKO		—	—	
16.	ANASTASIA MBULA		—	0718957457	
17.	CONCEPTER KILUNDA		27966390	0710200064	
18.	WINIFRED WANZA		—	070364647	
19.	ELIZABETH KAMENE		31684186	0723050423	
20.	JAINICE REBECCA			0705744597	

TIRUS N. MUSYOKA
CHIEF
LUKENYA LOCATION
Date:.....



PUBLIC PARTICIPATION LIST

Venue: Kalunya Market

Date: 11th Nov. 2016

Time: 1200 Hrs

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	JOSEPH OTIENO		11548852	0729532444	
2.	JACKLINE NDAMU		—	—	
3.	VICTOR DAVID		—	—	
4.	KENEDY JAMES		332-7784	—	
5.	FESTAS MUTHOKA		22322456	0724778832	
6.	JOEL MWANGI		64304461	0797799915	
7.	ALOIS PAMBA		21445179	—	
8.	ESTER ROBI		27914771	0728643726	
9.	ROSE WANJIKU			0718769607	
10.	JENIFA MUTUA		27081923	0716844621	
11.	CATHERINE JACKSON		13025842	0707578287	
12.	BONFACE WAMBUI		31039941	0728720134	
13.	SPORA MWIKALI		21353518 2145	0726390092	
14.	ALICE MUSYOKI		20666830	0708645631	
15.	SARA MUNYIVA		31241244	0723816046	
16.	SALOME WANYAMBA		27436677	0703195256	
17.	MAGDALENE WAYUA		—	—	
18.	Pst-VERONICA NGINA		21753451	072-442345	
19.	WILLIAM MAINSI		10680132	0707225788	
20.	Onesmus Mairidu		6267875	071049190	

TIRUS N. MUSYOKA
CHIEF
LUKENYA LOCATION
Date:

PUBLIC PARTICIPATION LIST

Venue: Kalasya Market

Date: 11/11/2016

Time: 1200 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Elizabeth Nkurub			0719179465	<i>[Signature]</i>
2.	Jackson Mwirde		1327515	0716621027	
3.	Paul Matheka Musyoka			072091580	
4.	James Kimani			0720865759	
5.	Mary Kubitiko		8967710	0719766842	
6.	Mutasya Julius		21663999	0717888420	
7.					
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20.					

TIRUS N. MUSYOKA
 CHIEF
 LUKENYA LOCATION
 Date: 11/11/16

C. Meeting at Kiasa trading centre attendance list

PUBLIC PARTICIPATION LIST

Venue: Kahawa Kiasa Centre Date: 11/11/2016 Time: 1500 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	Newton Juma KIWANI	MATHETANI	02171444 0754793925	0754793925	<i>[Signature]</i>
2.	MUKU KIKO	MATHETANI	27475346	0701186715	<i>[Signature]</i>
3.	PHILIP Makusa	MATHETANI	7710529	0713955094	<i>[Signature]</i>
4.	Refer Muna Wambua	Mathetani	0097675	0725695114	<i>[Signature]</i>
5.	John Muki	Mathetani	8967167	0712741154	<i>[Signature]</i>
6.	Joachim KIRO	mathetani	12357113	0710272979	<i>[Signature]</i>
7.	Catherine Kikoro	mathetani	11403383	0728344021	<i>[Signature]</i>
8.	MARY NZAU	Mathetani	21935966	0711549848	<i>[Signature]</i>
9.	DOMINIC KATUNGU	KIASA	1736949	0704469904	<i>[Signature]</i>
10.	ANTHONY M. NSOKU	Mathetani	16071221	0728249708	<i>[Signature]</i>
11.	PATRICK MUKU	mathetani	7406272	0720744433	<i>[Signature]</i>
12.	PATRICK MUNYAO	Mathetani	11A3157 1137	0724009203	<i>[Signature]</i>
13.	ESTHER ONGERI	KIASA	26464904	0710180746	<i>[Signature]</i>
14.	Lizaheta Mure	KIOSA	20073302	0721505826	<i>[Signature]</i>
15.	Yvonne Mure	KIASA	34540975	0707439751	<i>[Signature]</i>
16.	ALIMA MUSA	KIASA	1496724	070720477	<i>[Signature]</i>
17.	SAMUEL SOO	KIASA	4938463	0729813467	<i>[Signature]</i>
18.	Annah Mungira	Kiasa	—	—	<i>[Signature]</i>
19.	Margaret mbingo	"	6050566	0701622810	<i>[Signature]</i>
20.	STELAMUNIS KIWANI	"	10890843	0717069415	<i>[Signature]</i>

BENSON M. MUSEMBI
ASST. CHIEF
MATHETANI/SUB-LOCATION
Date: *[Signature]*

PUBLIC PARTICIPATION LIST

Venue: Kiasa Center

Date: 11TH NOVEMBER 2016 Time: 3:00pm

NO	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	BENSON M. MUSYOKA	KINANI'E	13311406	0710810380	
2.	DISHON MATOLO	KYUMBI	2318968	0720832003	
3.	RACHEL MUMBARA MATHOKA	KYUMBI	1122911	0720287769	
4.	RODRA MNIKALI MUEMA	KYUMBI		0727662796	Rodah
5.	ROSE M. MATINGI	KYUMBI	11017910	0721-930855	
6.	DOROTHY NZISA	KYUMBI	13523181	0708301441	
7.	Angelina Muthoka	Kyumbi	8967855	0720098946	Ndunge.
8.	Agnes Nthambi	"			
9.	Gladys Kwirig	Kyumbi			
10.	JOHN NTHEMBWA	"			Rar
11.	Mary Kanini				
12.	JUDITH MBITHI	KYUMBI	11203734	0723945941	
13.	MONICAH MONYI	KYUMBI			monicah
14.	RAPHAEL Raphael Mbithi	Kyumbi	8966456	0711800559	
15.	BENSON WAMBUA	Kyumbi		0725344508	
16.	MUTUA NG'UJI	KYUMBI		0712766300	
17.	PATRICK MULHGE	KYUMBI	8626001	071270868	
18.	Isaac MULI	KYUMBI		0729179040	
19.	DANCAN Muliwa	Kyumbi	23342423	0721273818	
20.	James Nandi	Kyumbi	24864467	0717353262	

BENSON M. MUSEA
ASST. CHIEF
MATHOKA SUB-LOCATI

Date:

PUBLIC PARTICIPATION LIST

Venue: Mahasa Kiasa centre Date: 11TH NOVEMBER 2016 Time: 3:00 pm

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	BENSON JOLY		11111111	2016	B. JOLY
2.	TIMOTHY MUKYAO	MATHATHANI	13882725	0745039186	T. MUKYAO
3.	PAUL K. MATHEKA	MATHATHANI	14424933	071143044	P. K. MATHEKA
4.	ALFONCE MUGMA	MATHATHANI	30448039	072351076	A. MUGMA
5.	PATRICK M. NYALI	MATHATHANI	13616357	0729532114	P. M. NYALI
6.	MBITI MATHEKA	MATHATHANI	18913694	0723155331	M. MATHEKA
7.	SUSAN NIDAMBURI	MATHATHANI	13098812	0715775183	S. NIDAMBURI
8.	SARAH MUKYAO	MATHATHANI	14424933	0709518209	S. MUKYAO
9.	AJERIDAH MAINI	MATHATHANI	20369347	0726929162	A. MAINI
10.	SAMUEL MUMBO	MATHATHANI	8056026	0721642009	S. MUMBO
11.	SIMON MBITI	MATHATHANI	11677726	0919164516	S. MBITI
12.	JAMES MUKYAO	KYUMBI	25591220	0717121341	J. MUKYAO
13.	CHRISTINE MAKAU	KYUMBI	31172407	0719788711	C. MAKAU
14.	ALICE MATHI	KYUMBI	32717177	0190760174	A. MATHI
15.	FAITH MUTHENI	KYUMBI	30845395		F. MUTHENI
16.	ELIZABETH MBINTA	KYUMBI	33106137	0796191848	E. MBINTA
17.	LUCIA KITHIA	KYUMBI	0455208		L. KITHIA
18.	AGNES KILONZO	KYUMBI	5091803	0723586532	A. KILONZO
19.	ALICIA MWINZI	KYUMBI	2528419	070695046	A. MWINZI
20.	HELLEN SYOMBE			0712706435	H. SYOMBE

DEP. CHIEF

BENSON M. MUSEMBI
ASST. CHIEF
MATHATHANI SUB-LOCATION
Date: _____

PUBLIC PARTICIPATION LIST

Venue: KIASA CENTRE

Date: 11/11/2016

Time: 1500 HRS

NO	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Angela Kioko		24326547	0723680716	<i>[Signature]</i>
2.	Alice MASYOKA		2168 5797	0735316359	<i>[Signature]</i>
3.	Teresia Naitoa		21148522	0711706827	<i>[Signature]</i>
4.	Anastacia Mwikali			0724208567	<i>[Signature]</i>
5.	Berenjena Mungao		7562055	0722769253	<i>[Signature]</i>
6.	ADINAH K. MUIA		010040646	0722705889	<i>[Signature]</i>
7.	JOEL WAMBVA		2564678	0707540822	<i>[Signature]</i>
8.	PETER JONGA		0560410	0717140129	<i>[Signature]</i>
9.	Autony Mumo		3542473	0788386222	MUMO
10.	Benson MUMESI		23642476	0718270993	<i>[Signature]</i>
11.	Jane Mutinda		23151269	0714787154	<i>[Signature]</i>
12.	BONIFACE KIKU NDOLU		180 4942	0728007737	<i>[Signature]</i>
13.	Douglas Kinyungu	KIASA	—	0726553621	<i>[Signature]</i>
14.	Pauline Wanywa	KIASA	5047486	0704003901	<i>[Signature]</i>
15.	Catherine Kimani		0711793655	07117 93655	<i>[Signature]</i>
16.					
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BENSON M. MUSEI
ASST. CHIEF
MATHATANI SUB. LOCAL
Date: *[Signature]*

A.

PUBLIC PARTICIPATION LIST

Venue: KIASA CENTRE

Date: 11/11/2016

Time: 1500 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	CATHERINE KITHAKA	KIASA	2722003	071916981	<i>Cather</i>
2.	DANSON MBOLO	KIASA	0726628228 12722773	0726628228	<i>Mbo</i>
3.	Simo Muthua Kaboke	KIASA	0719480144	2979272	<i>Simo</i>
4.	ISABEL MUI	KIASA	2451883	0729179012	<i>I</i>
5.	Jacqueline Peter	KIASA	27478299	0700093186	<i>J</i>
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BENSON M. MUSEMBI
ASST. CHIEF
MATHATANI SUB-LOCATION
Date: *[Signature]*

D. Meeting at Malaa market attendance list

PUBLIC PARTICIPATION LIST

Venue: Malaa market Date: 12/11/2016 Time: 4 PM

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	Timothy OsoRo	Chief Malaa	11245524	0722359921	[Signature]
2.	GERISHOM OMIDO		1870565	0710738937	
3.	CHARLES EGESA		1088041	0723-681001	[Signature]
4.	HEART GUSEMBE		22229474	0727-7150 68	[Signature]
5.	Joseph KARIUKI		0562996	0725495929	[Signature]
6.	Thomas Mutua	Komarakoa	20621304	0726170428	[Signature]
7.	Inosent W. NZUKI	Malaa	14429542	0724502004	[Signature]
8.	Isaias M. Kithunga	Malaa	26592338	0714746311	[Signature]
9.	Amos Kureu	Malaa	21749032	0722325170	[Signature]
10.	Raymond Muli	Malaa	1816207	0722325170	[Signature]
11.	ABDIRAHMAN DAHIYE	Malaa	2451156	0722724242	[Signature]
12.	Kennedy Musay	Malaa	10275175	0727899338	[Signature]
13.	Alexander Mutini	Malaa	24059373	0703495028	[Signature]
14.	Peter Karanja	Malaa	32879050	0727674513	[Signature]
15.	Musembi Mwangi	Malaa	22721178	0723095222	[Signature]
16.	Samson Kavits	Malaa	10891388	0728959325	[Signature]
17.	Jaacob Kilianzo	Malaa	28608398	0723329637	[Signature]
18.	MICHAEL CIACHUCI	Malaa	27990195	0713955855	[Signature]
19.	MARTIN MWANZA	Malaa	2507845	0714638417	[Signature]
20.	Kelly	Malaa	2500		[Signature]

CHIEF KOMAROKO LOC
 P.O. Box 5520131 MALAA
 Date: 12/11/2016
 Sign: [Signature]

PUBLIC PARTICIPATION LIST

Venue: Malaa market

Date: 12/11/2016

Time: 4:00 pm

NO.	NAME	LOCATION	ID NO.	MOBILE NO.	SIGNATURE
1.	DAREEN NZIOKA	MALAA	22340872	0725235570	[Signature]
2.	Atthannus Muthazi	MALAA	26922090	0718691216	[Signature]
3.	BENSON Musyoka	Malaa	26724097	0718481846	[Signature]
4.	Jones Kishu	Malaa	B523148	075340813	[Signature]
5.	JOHN MURUGO	malaa	Beuu	0735868756	[Signature]
6.	Daniel wambui	malaa	31482936	0723916401	[Signature]
7.	Mutua Musembi	Ndovoni	27790125	0703661098	[Signature]
8.	Fred KITHUNGA	MALAA	28289450	0712741100	[Signature]
9.	Benson mutuku	malaa	31837255	0700349101	[Signature]
10.	JOSEPH MUSYOKA	Malaa	113399	071509378	[Signature]
11.	Patricia Kendo	Malaa	210167	0726723570	[Signature]
12.	Lydia MOKI	malaa	4942737	0726637271	[Signature]
13.	PAUL Katitu	malaa	4867602	072010557	[Signature]
14.	Josphine Kio	malaa	13310746	0723911392	[Signature]
15.	Kenis MUKI	malaa	30031364	071049456	[Signature]
16.	Joyce Michenje	Malaa	1894049	0116354816	[Signature]
17.	BONIFACE MABUKO	MALAA	32829233	0706801241	[Signature]
18.	SAMSON PARANJIA	malaa	23876080	0713414249	[Signature]
19.	BENSON MOSE	MALAA	22939553	0723939662	[Signature]
20.	THOMAS NDOYE	MALAA	22034220	0727956955	[Signature]

CHIEF COMAROCK LOC
P.O. BOX 11111 MALAA
Date: 12/11/2016
Sign: [Signature]

PUBLIC PARTICIPATION LIST

Venue: Malaa Market Date: 12/11/2016 Time: 1600 HRS

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	FRANCIS K. MUNIY	MALAA	5190167	0720928466	<i>[Signature]</i>
2.	SUSAN WANGUI K	MALAA		0717236635	<i>[Signature]</i>
3.	Alice Mwikali	MALAA	5694175	0701398743	<i>[Signature]</i>
4.	PETER KYALO	MALAA	10421833	0713114422	<i>[Signature]</i>
5.	CEMENI MUGUMU	"	7246376	0700166531	<i>[Signature]</i>
6.	Stephen KIRO	"	12857351	0727208616	<i>[Signature]</i>
7.					
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CHIEF KOMAROCK
P.O. Box 55
Date: 12/11/2016
Sign: *[Signature]*


E. Meeting at asst. chief's office at Munoru B Attendance Lists

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: *Asst. Chief's office - MUNORU* ^{SUB-LOCATION} Date: *10/10/2016* Time: *11.00 AM.*

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	ANTHONY NDIRANSU MUGWE	MWANGAZA	9010336	0726724751	<i>[Signature]</i>
2.	John Ndiritu K.	MWANGAZA	21769007	0721758634	<i>[Signature]</i>
3.	Peter Chege Kamau	Mwangaza	2321484	0727653871	<i>[Signature]</i>
4.	Francis Mwangaza K.	Mwangaza	4691345		<i>[Signature]</i>
5.	Francis N. Karaga	Ririchua	9377108	0729211196	<i>[Signature]</i>
6.	Daniel Kimani	Ririchua	4690409	0727556931	<i>[Signature]</i>
7.	Peter Wanjohi	Ririchua	14568151	0718834474	<i>[Signature]</i>
8.	CHARLES NJUNWA	RIRICHUA	12949619	0714289051	<i>[Signature]</i>
9.	PAUL KIPRIT T	RIRICHUA	1385918	-	<i>[Signature]</i>
10.	ANTHONY MAINIX	Ririchua	20028294	0722421947	<i>[Signature]</i>
11.	Joseph Mburu	Ririchua	20952464	0720356722	<i>[Signature]</i>
12.	Amos Mwangi	Ririchua	9137854	0719456447	<i>[Signature]</i>
13.	JOSEPH NDEGWA	WATHAKA	24010204	077969552	<i>[Signature]</i>
14.	Samuel Tifeng	Ririchua	2126085	0711217693	<i>[Signature]</i>
15.	SHADRACK W. KARIMU	TURASHA	11729317	0724839578	<i>[Signature]</i>
16.	NANCY W. NJOROGE	TURASHA	11341754	0720050637	<i>[Signature]</i>
17.	ALICE WANJIKU WANJIKI	TURASHA	.	0728202870	<i>[Signature]</i>
18.	NGUZU MARINA	TURASHA	0970704	072595243	<i>[Signature]</i>
19.	Vitalis Too	Consultant	2721851	0720233797	<i>[Signature]</i>
20.	STEPHEN NJENGA MUGO	TURASHA	3649649	0716259554	<i>[Signature]</i>
21.	WANJA NJERU	CONSULTANT	3059462	0718518224	<i>[Signature]</i>
22.	LEDDY NJERU WANGI	CONSULTANT	27328866	0721865063	<i>[Signature]</i>



SHADRACK W. KARIMU

F. Meeting at Limuru Nyakinyua ACK church attendance list

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: Limuru Nyakinyua ACK Church Date: 10/11/2016 Time: 2:00 PM

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Beth Njorji	Nyakinyua	9027646	0708369717	[Signature]
2.	Rose Mumbi	Nyakinyua	26292042	0713307711	[Signature]
3.	James Ngari Kiria	Kirangop	1232236	0723363206	[Signature]
4.	Kamau Muchiri	Nyakinyua	.	0722557704	HANNATH
5.	Monica Wangi	Kirangop	0198075	0928222970	[Signature]
6.	Harrison Karani Njorji	Nyakinyua	22362219	0725211406	[Signature]
7.	Julia Mathari	Nyakinyua	4690976	0720125882	Sula
8.	Susan Wamukoi	Nyakinyua	2337177		SUSA
9.	Ann Wanjiku Kureia	Nyakinyua	12417726	0727960710	[Signature]
10.	MACHARIA KIMON NGURE	Nyakinyua	12417679	0729157196	MACHARIA
11.	MARGRET WANGARI MUGWANA	Githunguri			
12.	PETER KARIUKI KIKKABA	NYAKINYUA	724820	0727235006	[Signature]
13.	STEPHAN GICHIRI KARUKI	Nyakinyua	0705080262	07	
14.	RUTH WAIRIMU	KIRAGU	11639726	0728091016	[Signature]
15.	Geoffrey Mwireri	Kuria			
16.	Zakaria Mwarira	Nyandarua		0723423826	Zakaria
17.	NGOLOGIS MUCHIRI	KIRANGOP		+12679343361	HANNATH
18.	GIDEON MURITHI	Mat	7226468	0716463656	[Signature]
19.	MARGRET NANGARI	Kirangop	4000294		[Signature]
20.	Ishu Kamal Nyugun	Kirangop	384510	072479464	[Signature]

DATE 10/11/2016
SIGN [Signature]

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: LIMURU NYAKINYUA ACK CHURCH

Date: 10/11/2016

Time: 2PM

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	SIMON NJOROGE NYAKINYUA	NYAKINYUA	15702511	0725509342	Simon
2.	JAMES KIROGWA WATIUA	"	4272566	07238481053	James
3.	Joseph Murithi Njoroge	KINANGOP ROAD	0710032	0725234852	Joseph
4.	John Gichuki Gitau	KINANGOP RD	9394000	0774260165	
5.	Joseph Karinge	NYAKINYUA	3134763	0719849139	
6.	Peter Kang'ethe	NYAKINYUA	23075416	0724314250	Peter Kang'ethe
7.	Simon Gichuki	NYAKINYUA	11340264	0795144872	Simon
8.	Karunja Mwangi	NYAKINYUA	07	0706415625	
9.	Joseph Mbugua	NYAKINYUA	22018631	0715940637	
10.	Chris G. Mwangi	NYAKINYUA	23595877	0701166311	Chris
11.	Daniel Njoroge Mutuku	NYAKINYUA	13606080	078794454	Daniel
12.	Patrick Mutitu Kanuku	NYAKINYUA	6714332	0722778921	Patrick
13.	Jackson Mwanja	NYAKINYUA	9342120	072238019	
14.	Virginia Ngingeci	NYAKINYUA	2956661	0728353725	V. Wanjera
15.	FRANCIS KIMANI TAMAU	KINANGOP	8706573	07226573971	Francis
16.	STEPHEN KIRANDE MURARI	KINANGOP	10881535	0725542339	Bob
17.	MAINA THIU NJOROGE	KINANGOP	11617540	0704013561	Maina
18.	Peter N. Murithi	KINANGOP	4689924	0722640103	Peter
19.	MONICA WAIRIMU KOK	NYAKINYUA	0894071	0720774670	Monica
20.	Barnabas Ndunira Njoroge	NYAKINYUA	7084172	0728388039	Barnabas
21.	Jilios Gichigo	NYAKINYUA	5595621	0727704892	Jilios

DATE: 10/11/2016
 SIGNATURE: [Signature]
 TITLE: [Signature]

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: LIMURU NYAMONYA.

Date: 10/11/2016

Time: 2.00PM.

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	PETER W. MUGISI	SATAMAKU		0729674311	
2.	MARY MUTHONI N.	"	3079085	0703531338	
3.	AREN NYOKI KINYARU	"	8686427	072613875	
4.	LUSK NDIRA NJUGUNA	"	0711499	0705228241	
5.	Peter MURACI MURANSI	"	11826840	0714534721	
6.	DAVID GITHUKU MWANGI	"	0568505	0712881878	<i>[Signature]</i>
7.	SAROME MARIKA	"		0714134185	
8.	Agatha Nyambura	"	11647002	072960714	
9.	Mercy Githu	"	9671692	0910602126	
10.	Philip Kariuki	"	4690566	072379727	<i>[Signature]</i>
11.	Mary Muthoni Githu	Olmagogo	4691460	0715653949	<i>[Signature]</i>
12.	Peter Njuguna M	Almagogo	21473983	0703773640	<i>[Signature]</i>
13.	Vitelis Too	Consultant	22218521	0720283792	<i>[Signature]</i>
14.	WANDA NIERU	CONSULTANT	30599642	0718518224	<i>[Signature]</i>
15.	<i>[Signature]</i>	Consultant	2732804	0921865065	<i>[Signature]</i>
16.					
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DATE 10TH Nov 2016
 SIGN *[Signature]*
 ASSIGNED

G. Meeting at Langa langa chiefs office attendance list

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: Langa Langa Chiefs Office Date: 11-11-16 Time: 10:00 am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Vitalis To	Consultant	22218521	0720283797	<i>[Signature]</i>
2.	PATRICK OSORO	LANGALANGA	9110232	0736490612	<i>[Signature]</i>
3.	ERASTUS N. NGATIYA	SUB LANGALANGA	0478159	0713248898	<i>[Signature]</i>
4.	SAMUEL M. KARUMU	SUB LANGALANGA	4437722	0796221928	<i>[Signature]</i>
5.	FRANCIS KIUKI	MW. TUMBURIA	1843719	9710210624	<i>[Signature]</i>
6.	PATRICIA NJOROGE KAMAU	LANGALANGA	5376880	0720469754	<i>[Signature]</i>
7.	JOSEPH KARURI NDIRO	Langalanga	0995856	0722523182	<i>[Signature]</i>
8.	JOHN W. MUGI	---	7106341	0710804944	<i>[Signature]</i>
9.	DANSON MURILIKI	---	2942915	0726970246	<i>[Signature]</i>
10.	Elizabeth Wathira	L-L	9555140	0710175994	ELI
11.	Mary Wambui	Mw. Tumbura	6668684		
12.	MIRIAM NJAKI		1901984		
13.	Mary Wambui Wanjau	Merindani	7095655	0717244440	<i>[Signature]</i>
14.	Mary Wanjau	Langalang	24768998	0737136331	<i>[Signature]</i>
15.	GRACE WANGUI MUIRE	Langalang	3105317		<i>[Signature]</i>
16.	Mary Wanjau Njeri	Langalang	7060178	0704922766	M W N
17.	PETER MURUGA THIRAZI	Mw. Tumbura	03326761	0722241129	<i>[Signature]</i>
18.	LEONARD MBUGUA	Mw. Tumbura	2946186	0722228770	<i>[Signature]</i>
19.	PETER K. HRILUKI	Mw. Tumbura	0358545		<i>[Signature]</i>
20.	LAWRENCE M. KARIVER	MERINDANI	0322207	0721526274	<i>[Signature]</i>

ASSISTANT
LANGALANGA
P.O.
11/11/2016

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: LANGA LANGA CHIEF OFFICE Date: 11-11-16 Time: 10:00 am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	GRACE WANJIRU CICHURU	KARUNGA	1392057	0722958478	
2.	ROSE WAMATHA NDUNGU	KARUNGA	11249198	0724797628	
3.	VERONICA WAMARAI MUGO	KARUNGA	8771589	0711946208	vw
4.	ESTER MUMBI KIYAOKI	KARUNGA	11114966	0712224745	
5.	LUCY WAGUI KIMBUTHU	KARUNGA	24082829	0720741643	
6.	FRANCIS WAGUYA	Karunga		0726128604	
7.	ESTER NYAMBURA	Karunga		0722689200	
8.	SALOME WAGUYA NYENGE	Karunga		0708752964	
9.	JAMES KARUKI	Karunga		071546780	
10.	BEATRICE WAGUYA			0720935870	
11.	JENNIFER W KIMARI	KARUNGA	14570753	0723774611	
12.	STEPHEN MWANGI	KARUNGA	29327264	0725315183	
13.	DAVID NDIRANGU	Karunga		0711395312	
14.	PURILI NYABUNDA	KARUNGA	1033815	0701462166	
15.	ALICE WANJIRU	KARUNGA	13459354	0710565915	
16.	RAHUEL CATHANI	KARUNGA	82561700		
17.	MARI NDIRANGU	KARUNGA	29343457	0736054242	
18.	ELIZABETH MUGO	Karunga		0723115663	
19.					
20.					

ASSISTANT CHIEF
LANGA LANGA SUBLOCATION
P.O. BOX 1 GILGIL
DATE: 11/11/2016

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: Langa Langa Chief Office Date: 11-11-16 Time: 10:00 am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Samuel Karanja	Marirani	0710262	0726687235	SK
2.	Michael K. Kamau	Mwitumbere	0724818	0702318131	M.K.
3.	Peter M Gitau	Mwitumbere	0926245	0716985133	P.M.G.
4.	Purity W. G. G. G.	Langa	3646042	072621824	Purity
5.	STEPHEN K. M. DUKU	Mwitumbere	2975432	0728735383	Stephen
6.	Samuel G. G. G.	Mwitumbere	0726554576	0726534576	Samuel
7.	CLEMENT S. WATHINGO	Mwitumbere	0727201	0727201700	C.S.W.
8.	Elias M. M. M.	Mwitumbere	104317	0734140548	Elias
9.	John Mwangi K.	Mwitumbere	5514263	0728173986	John
10.	Muchiri Mwangi	Mbegi	2231958	0725200215	Muchiri
11.	James Nambugh G.	Mbegi	0095198	0721767459	James
12.	Michael K. Kungu	Langa	1019853	0722327371	Michael
13.	PETER MATHIA	Langa	6715335	070674763	Peter
14.	FRAM GITHUNGI	Langa	8366009	0724804409	Fram
15.	MWATHA KIFUNGI	Mbegi	5979850	0727305380	Mwatha
16.	WILSON M. M.	Langa	1336512	0710661636	Wilson
17.	Joseph M. M.	Marirani	610719	072593126	Joseph
18.	Benson N. N.	Marirani	83354906	0710497305	Benson
19.	WANDA NTERU	ENWAG	30599642	0718518224	Wanda
20.	ESOP	Enwag	07323546	0721865065	ESOP

ASSISTANT CHIEF
LANGA LANGA SUBLOCATION
P.O. BOX 1 GILGIL
11/11/2016

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: LAPKA LAPKA CHIEF OFFICE Date: 11-11-16 Time: 10:00am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	ELUD NDUJAN	KARUNGA	6240943	0715770625	<i>[Signature]</i>
2.	Peter Wamwaga	Karungu	9127893	0721998937	<i>[Signature]</i>
3.	Duncan Kamuyu	Karungu	4820710	072889827	<i>[Signature]</i>
4.	ELISHA KAGORANE	KARUNGA	0922600	0708143621	<i>[Signature]</i>
5.	FRANCIS NUTHU	KARUNGA		0720445970	<i>[Signature]</i>
6.	PETER KARIUKI	KARUNGA	29452807	0718232108	<i>[Signature]</i>
7.	JESSE MUKUNA	KARUNGA	5251365	0706080600	<i>[Signature]</i>
8.	JOHN MWANGI MUIBI	KARUNGA	0804290		
9.	FRANCIS NJOGI MACHU	KARUNGA	2311464	0714626110	<i>[Signature]</i>
10.	GEORGET I. GATONGO	KARUNGA	03712839	0724056556	<i>[Signature]</i>
11.	Anna Njoki	Karungu	4276225	0725512341	<i>[Signature]</i>
12.	LUCY WANJIKU MAINA	Karungu	11461785	0710345432	<i>[Signature]</i>
13.	LUCY NYAWIRA PABET	Karungu	10888049	0705831676	<i>[Signature]</i>
14.	SANE WANJIKU	Karungu	2316365	0712093176	
15.	TABITHA WAMBUI	KARUNGA	5714639	0704597007	<i>[Signature]</i>
16.	WAMBUI MACHARIA	KARUNGA	2333034	0727226652	<i>[Signature]</i>
17.	John Ndunge Kabage	KARUNGA	10218046	0721458454	<i>[Signature]</i>
18.					
19.					
20.					

ASSISTANT CHIEF
LANGALANGA SUBLOCATION
P.O. BOX 71 GILGIL
11/11/2016

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: LANGA LANGA CHIEF OFFICE Date: 11-11-16 Time: 10:00 am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	MWAUSA MUNGA	KARUNGA	1124249	0727178752	<i>[Signature]</i>
2.	CASPETER NOUNG'U	KARUNGA	5194248		<i>[Signature]</i>
3.	Beatrice Njoki Mwacharia	KARUNGA	1382362	0716766083	<i>[Signature]</i>
4.	Raise Khasuku Kimani	KARUNGA	20900992	0722962810	<i>[Signature]</i>
5.	Mary Kambui Njoroge	KARUNGA	1029560	0710335339	MARY
6.	Rachel Wambui	Karungu		0713206325	Wambui
7.	MARGRET WACERA	Karungu		0723430020	MWK
8.	Eza Maina	KARUNGA		0704500402	EMAINA
9.	ROBERT IGAMU NJOROGE	KARUNGA		0724567684	MWK
10.	Betrice wanjiku M	Karungu		0718937514	MB
11.	CHRISTINE WANGICHI	Langai	7437139	0706595393	<i>[Signature]</i>
12.	Naomi Njambiki	Karungu	4307792	0723822736	Klavani
13.	Simon MUNGA	KARUNGA	3068029	0724272148	Simon
14.	Kipiri Gichuon	Karungu	5515749	0723847705	<i>[Signature]</i>
15.	Timothy wanjohi	Karungu	22827437	0713802212	<i>[Signature]</i>
16.					
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ASSISTANT CHIEF
LANGA LANGA SUBLOCATION
P.O. BOX 1 GILGIL
11/11/2016

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: Lapha Lang'a Chief's Office Date: 11/11/2016 Time: 01:04

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	MARY NJERI NGATHA	KARUNGA	0523842	0726707104	<i>[Signature]</i>
2.	HANNAH WANGARI MEEGI	KARUNGA	12831540	0724322791	<i>[Signature]</i>
3.	ANASTERSIA Njambi Njenge	KARUNGA	5196873		<i>[Signature]</i>
4.	Teresiah Muthoni Mucina	KARUNGA	0966922		<i>[Signature]</i>
5.	Ester Wangiri Mucina	KARUNGA	0900928	0717751242	<i>[Signature]</i>
6.	Margret Wangiri Gacanja	KARUNGA	3135150	0720771574	<i>[Signature]</i>
7.	ELIZABETH NGENDO NGURE	KARUNGA	2312742	0711157109	<i>[Signature]</i>
8.	Mary Wangiku Mwangi	KARUNGA	06482512		<i>[Signature]</i>
9.	Mary Wangiri Njenge	KARUNGA	3284417		<i>[Signature]</i>
10.	Lucy waithira Kimani	KARUNGA			<i>[Signature]</i>
11.	Fred Karuki	Karunga	6259689	072308773	<i>[Signature]</i>
12.	Peter Mwangi Waithaka				<i>[Signature]</i>
13.					
14.					
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20.					

ASSISTANT CHIEF
LANGALANGA SUBLOCATION
P.O. BOX 1 GILGIL
-DATE-
[Signature]
11/11/2016

H. Meeting at Gituru B ECD attendance list

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE




(NAIVASHA EAST.) PUBLIC PARTICIPATION LIST
 Venue: GITURU B ECD NURSERY CLUB. Date: 11/11/2016 Time: 3:00PM.

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	CHIEF MICHAEL KIRATH	NAIVASHA EAST	3072001	0720728406	
2.	JOHN MURIU KARITHI	NDARUGU	3643776	0724497236	
3.	PETER MWANGI	MARAKUSHU	12948562	072440894	
4.	JOSEPH KABIRU KIBUKU	MARAKUSHU	0481299	0721480434	
5.	SAMUEL KYOIKE	MARAKUSHU	20142473	0727313694	
6.	EMMANUEL NDUNGU	MARAKUSHU	11226323	07224844	
7.	PETER MURUGU MURUGU	MURUGU	101511973	0728826969	
8.	JAMES MURUGU MURUGU	MUNUNGA	2320236	0720140790	
9.	LUCY W. KURUYIA	NAIVASHA EAST	0998863	0721437185	
10.	SAMUEL GITHE NJ	MUNUNGA	21195957	0724980881	
11.	ANNAH WAMBUI	KIRIMA		0706535313	
12.	PETER HUMBUI GHEI	NAIVASHA EAST	13122120	0715821173	
13.	KEZIA WAMBUI MWANGI	MUNUNGA	11618362	0726964561	
14.	SUSAN WAMBUI	MUNUNGA	11065442	0728548497	S. Wambui
15.	MARI WANGI MWANGI	MUNUNGA	7226488	0712588122	MARI
16.	MILCA WANGARI	MUNUNGA		0706760576	
17.	DAVID NG'ANG'A KIBUI	MUNUNGA	0372704	0727475108	
18.	ANN MUTHONI MURITH	MUNUNGA		0713345438	
19.	ISAAC M. KIRIRI	MUNUNGA	7467029	0729313169	
20.					

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: NAIVASHA EAST. GITURU B ECD NURSERY SCHOOL Date: 11/11/2016 Time: 3.00 PM.

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	AGNES WAMBUI GATHERU	NAIVASHA EAST		0792189582	
2.	MARY MUTEMU NGUGI	NAIVASHA EAST		0729148319	
3.	JOHN MAINA MWANGI	NAIVASHA EAST	9945153	0700099721	
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I. Meeting at Karati primary school attendance list

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-K
400KV TRANSMISSION LINE**

PUBLIC PARTICIPATION LIST

Venue: KARATI PR. SCHOOL Date: 12/11/2016 Time: _____

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	STEPHEN MUKIA NJOROKE	GI THABAI	3295452	0724498051	<i>[Signature]</i>
2.	JOSEPH NJUKUNA NJOROKE	GI THABAI	2886330	0710638458	<i>[Signature]</i>
3.	ANTHONY KITHARA NJOROKE	GI THABAI	4666357	0716257592	<i>[Signature]</i>
4.	JOHN KIMEMIAN NJOROKE	GI THABAI	5783901	0710510096	<i>[Signature]</i>
5.	AMIB ISSA NJOROKE	GI THABAI			
6.	JOSEPH KIRITU KATHI	GI THABAI	6101680	07208421934	<i>[Signature]</i>
7.	SAMUEL THUKU MUCHARI	GI THABAI	4666318 0726125380	0726125380 4666318	<i>[Signature]</i>
8.	JAMES KABUKI MUCHARI	GI THABAI		0720771145	<i>[Signature]</i>
9.	MARY WAIRIKI CHEBE	GI THABAI	-	-	<i>[Signature]</i>
10.	PETER KAMAU WAGAYA	GI THABAI	-	076872380	<i>[Signature]</i>
11.	MARY WAIRIKI KINYOI	GI THABAI	-	-	<i>[Signature]</i>
12.	KANYANJUA NJUKUNA	GI THABAI	-	-	<i>[Signature]</i>
13.	BENSON MWANGI	GI THABAI	-	-	<i>[Signature]</i>
14.	JAMES MUTUKU MUKUNA	GI THABAI	1338591	0725208754	<i>[Signature]</i>
15.	JOHN GATHARA	GI THABAI	25992445	0725201965	<i>[Signature]</i>
16.	PETER MUKUNU KAMAU	GI THABAI	2951141	0725609303	<i>[Signature]</i>
17.	SIMON MUGO MUKUNU	GI THABAI	-	-	<i>[Signature]</i>
18.	GRACE NJERI KUMAMU	GI THABAI	2950865	0724125953	<i>[Signature]</i>
19.	PETER MWANGI K.	GI THABAI	5787892	0722956612	<i>[Signature]</i>
20.	KARIUKI KICHINA MENDI	GI THABAI	4666382	-	<i>[Signature]</i>


J. Meeting at Nyakio shopping centre attendance list

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: NYAKIO SHOPPING CENTER Date: 12/11/2016 Time: 2:00 PM

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	WANDA NTERU	ENWAGO CONSULTING	30299642	0718219224	Kate
2.	Joseph Wanjiru Wajir	" "	27328298	0721865265	Joseph
3.	Joseph Wanjiru Wajir	Nyakio	46644448	07228753290	Joseph
4.	Mwangi Tiaga	Nyakio	16029087	0721936042	Mwangi
5.	Charles Gathuo	Nyakio	2887732	0724619007	Charles
* 6.	David K. Mathenge	Chief Haraka	11707801	0727331673	David K. Mathenge
7.	MARTIN WAMUTI	NYAKIO	4667488	0714302324	Martin
8.	Mwangi Karanja	NYAKIO	7198652	0711459368	Mwangi
9.	DAVID K. MBURUA	NYAKIO	1842850	0728878579	David
10.	PETER Gichina	Nyakio	26656819	0725243767	Peter
11.	Alice Wanjiru	Nyakio	11547304	0725875422	Alice
12.	OBADIAH WAMBURA	NYAKIO	4443736	0724470143	Obadiah
13.	MARGARET WONGA	NYAKIO	9293419	076664131	Margaret
14.	Joselyn Mwangi	nyakio	10643714	072887864	Joselyn
15.	Vernice Mwangi	Nyakio	11707787	07116857363	Vernice
16.	EUNICE Muthoni	Nyakio	21227105	0711647453	Eunice
17.	Ruth Wanjiru	nyakio	11083813	07176007	Ruth
18.					
19.					
20.					


 DAVID K. MATHENGE
 SUB-LOCATION
 DATE: 12/11/2016
 AREA 14

Appendix III: Sample questionnaires

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date: 11/11/2016		Sub location	LANGA-LANGA
Name of Respondent:	PAUL NGAU TURUTHA	Location	KARUNGA
Mobile No.	0720360819	Sub-county	Gilgil
ID No.	1033371	County	NAKURU

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent	How old are you (yrs)?	What is your marital status?	What is the highest level of education you attained?	How many years have you been residing here?	How many Household members do you have?	Do you have any member of your household who is disabled or orphaned?
1. Male ✓ 2.. Female	1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs ✓	1. Married ✓ 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	1. Primary ✓ 2. Secondary 3. Post-secondary 4. University 5. Never Attended (99) Others (Specify)	1. Less than 1year 2. 1-5years ✓ 3. 6-10years 4. Over 10years	1. Less than 3 2. 4-6 3. 7 and above ✓	1. Yes 2. No ✓

SECTION BINCOME & LIVELIHOOD

B1	B2	B3	B4	B5
Do you own any land? 1. Yes ✓ 2. No	If Yes, how many acres? 1. Less than 2 acres ✓ 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. Above 10 acres	Land ownership 1. Owned (with title deed/lease) ✓ 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming ✓ 2. Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate? 1. Maize ✓ 2. Beans ✓ 3. Tea 4. Potatoes ✓ 5. Cassava 6. Vegetables ✓ 99. Others (Specify)

B6	B7	B8	B9
If 2 in B4, which animals do you keep? 1. Goats ✓ 2. Sheep ✓ 3. Cattle ✓ 4. Camels 99. Others	What is your average monthly income? (Ksh.) 1. Less than 10,000 ✓ 2. 10,001 – 20,000 3. 20,001 – 30,000 4. Over 30,000	Is there any cultural heritage or historic monument near the village? 1. Yes 2. No ✓ If yes, specify	Is your house connected to the following: 1. Electricity 2. Water

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No ✓	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment ✓	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment ✓

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

There is benefits to some of our people in our Area. Still young Tenage will Benefits to work to the new project. We will benefits the project in Future.

THE END

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	10/11/2016	Sub location	MUNARU
Name of Respondent:		Location	KIRIKO TURASHA
Mobile No.		Sub-county	KIPIKI
ID No.		County	NYANDARUA

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent	How old are you (yrs)?	What is your marital status?	What is the highest level of education you attained?	How many years have you been residing here?	How many Household members do you have?	Do you have any member of your household who is disabled or orphaned?
1. Male 2. Female	1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	1. Married 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	1. Primary 2. Secondary 3. Post-secondary 4. University 5. Never Attended (99) Others (Specify)	1. Less than 1year 2. 1-5years 3. 6-10years 4. Over 10years	1. Less than 3 2. 4-6 3. 7 and above	1. Yes 2. No

SECTION B INCOME & LIVELIHOOD

B1	B2	B3	B4	B5
Do you own any land? 1. <input checked="" type="checkbox"/> Yes 2. <input type="checkbox"/> No	If Yes, how many acres? 1. <input checked="" type="checkbox"/> Less than 2 acres 2. <input type="checkbox"/> 2.1 – 3.0 3. <input type="checkbox"/> 3.1 – 5.0 4. <input type="checkbox"/> 5.0 – 10.0 5. <input type="checkbox"/> Above 10 acres	Land ownership 1. Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming 2. Livestock keeping <input checked="" type="checkbox"/> 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate? 1. <input type="checkbox"/> Maize 2. <input checked="" type="checkbox"/> Beans 3. <input type="checkbox"/> Tea 4. <input type="checkbox"/> Potatoes 5. <input type="checkbox"/> Cassava 6. <input type="checkbox"/> Vegetables 99. <input type="checkbox"/> Others (Specify)

B6	B7	B8	B9
If 2 in B4, which animals do you keep? 1. <input type="checkbox"/> Goats 2. <input type="checkbox"/> Sheep 3. <input checked="" type="checkbox"/> Cattle 4. <input type="checkbox"/> Camels 99. <input type="checkbox"/> Others	What is your average monthly income? (Ksh.) 1. <input type="checkbox"/> Less than 10,000 2. <input type="checkbox"/> 10,001 – 20,000 3. <input type="checkbox"/> 20,001 – 30,000 4. <input type="checkbox"/> Over 30,000	Is there any cultural heritage or historic monument near the village? 1. <input type="checkbox"/> Yes 2. <input checked="" type="checkbox"/> No If yes, specify	Is your house connected to the following: 1. <input type="checkbox"/> Electricity 2. <input checked="" type="checkbox"/> Water

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

If the transmission pass along here the government will own alot of income - but if the resident will not be compensated property they will be squatters.

THE END

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	10/11/2016	Sub location	MUNORU
Name of Respondent:	FRANCIS MUNYAGA	Location	TURASHA
Mobile No.		Sub-county	KIPIPILI
ID No.		County	KYANDARUA

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent	How old are you (yrs)?	What is your marital status?	What is the highest level of education you attained?	How many years have you been residing here?	How many Household members do you have?	Do you have any member of your household who is disabled or orphaned?
1. <input checked="" type="checkbox"/> Male 2. <input type="checkbox"/> Female	1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	1. <input checked="" type="checkbox"/> Married 2. <input type="checkbox"/> Widowed 3. <input type="checkbox"/> Divorced 4. <input type="checkbox"/> Separated 5. <input type="checkbox"/> Never Married (99) Other (Specify)	1. <input checked="" type="checkbox"/> Primary 2. <input type="checkbox"/> Secondary 3. <input type="checkbox"/> Post-secondary 4. <input type="checkbox"/> University 5. <input type="checkbox"/> Never Attended (99) Others (Specify)	1. Less than 1year 2. 1-5years 3. 6-10years 4. <input checked="" type="checkbox"/> Over 10years	1. Less than 3 2. 4-6 3. <input checked="" type="checkbox"/> 7 and above	1. <input checked="" type="checkbox"/> Yes 2. <input type="checkbox"/> No

SECTION BINCOME & LIVELIHOOD

B1	B2	B3	B4	B5
Do you own any land? 1. <input checked="" type="checkbox"/> Yes 2. No	If Yes, how many acres? 1. Less than 2 acres 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. <input checked="" type="checkbox"/> Above 10 acres <i>127 Acres</i>	Land ownership 1. <input checked="" type="checkbox"/> Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. <input checked="" type="checkbox"/> Farming 2. <input checked="" type="checkbox"/> Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate? 1. Maize <input checked="" type="checkbox"/> 2. Beans <input checked="" type="checkbox"/> 3. Tea 4. Potatoes <input checked="" type="checkbox"/> 5. Cassava 6. Vegetables 99. Others (Specify)

B6	B7	B8	B9
If 2 in B4, which animals do you keep? 1. Goats <input checked="" type="checkbox"/> 2. Sheep 3. Cattle <input checked="" type="checkbox"/> 4. Camels 99. Others <input checked="" type="checkbox"/> <i>h.m</i>	What is your average monthly income? (Ksh.) 1. <input checked="" type="checkbox"/> Less than 10,000 2. 10,001 – 20,000 3. 20,001 – 30,000 4. Over 30,000	Is there any cultural heritage or historic monument near the village? 1. <input checked="" type="checkbox"/> Yes 2. No If yes, specify <i>century</i>	Is your house connected to the following: 1. <input checked="" type="checkbox"/> Electricity 2. Water

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. <input checked="" type="checkbox"/> No	Will you agree to allow the power transmission line pass through your land? 1. <input checked="" type="checkbox"/> Yes 2. No 3. No comment	What is your opinion about implementation of the project? 1. <input checked="" type="checkbox"/> Agree 2. Disagree 3. No comment

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

- i) Destruction of vegetation and forests.
- ii) Compensation should be done appropriately.

THE END

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED GILGIL-THIKA-NAIROBI EAST-KONZA 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment Study** for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	10/11/2016	Sub location	OLEGOMA GOGO
Name of Respondent:	FRANCIS KIMANI KAMAU	Location	MURUNGARU
Mobile No.	0726514971	Sub-county	KINANGOR
ID No.	8706513	County	NYANDARUA

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent	How old are you (yrs)?	What is your marital status?	What is the highest level of education you attained?	How many years have you been residing here?	How many Household members do you have?	Do you have any member of your household who is disabled or orphaned?
1. Male 2. Female	1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	1. Married 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	1. Primary 2. Secondary 3. Post-secondary 4. University 5. Never Attended (99) Others (Specify)	1. Less than 1year 2. 1-5years 3. 6-10years 4. Over 10years	1. Less than 3 2. 4-6 3. 7 and above	1. Yes 2. No

SECTION B INCOME & LIVELIHOOD

B1	B2	B3	B4	B5														
Do you own any land? <input checked="" type="checkbox"/> Yes 2. No	If Yes, how many acres? <input checked="" type="checkbox"/> Less than 2 acres 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. Above 10 acres	Land ownership <input checked="" type="checkbox"/> Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming <input checked="" type="checkbox"/> 2. Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate? <table border="1"> <tr> <td>1</td> <td>Maize <input checked="" type="checkbox"/></td> </tr> <tr> <td>2</td> <td>Beans <input checked="" type="checkbox"/></td> </tr> <tr> <td>3</td> <td>Tea</td> </tr> <tr> <td>4</td> <td>Potatoes <input checked="" type="checkbox"/></td> </tr> <tr> <td>5</td> <td>Cassava</td> </tr> <tr> <td>6</td> <td>Vegetables <input checked="" type="checkbox"/></td> </tr> <tr> <td>99</td> <td>Others (Specify)</td> </tr> </table>	1	Maize <input checked="" type="checkbox"/>	2	Beans <input checked="" type="checkbox"/>	3	Tea	4	Potatoes <input checked="" type="checkbox"/>	5	Cassava	6	Vegetables <input checked="" type="checkbox"/>	99	Others (Specify)
1	Maize <input checked="" type="checkbox"/>																	
2	Beans <input checked="" type="checkbox"/>																	
3	Tea																	
4	Potatoes <input checked="" type="checkbox"/>																	
5	Cassava																	
6	Vegetables <input checked="" type="checkbox"/>																	
99	Others (Specify)																	

B6	B7	B8	B9										
If 2 in B4, which animals do you keep? <table border="1"> <tr> <td>1. Goats</td> <td></td> </tr> <tr> <td>2. Sheep</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>3. Cattle</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>4. Camels</td> <td></td> </tr> <tr> <td>99. Others</td> <td>CATS</td> </tr> </table>	1. Goats		2. Sheep	<input checked="" type="checkbox"/>	3. Cattle	<input checked="" type="checkbox"/>	4. Camels		99. Others	CATS	What is your average monthly income? (Ksh.) <input checked="" type="checkbox"/> Less than 10,000 2. 10,001 – 20,000 3. 20,001 – 30,000 4. Over 30,000	Is there any cultural heritage or historic monument near the village? 1. Yes <input checked="" type="checkbox"/> No If yes, specify	Is your house connected to the following: 1. Electricity 2. Water N/A
1. Goats													
2. Sheep	<input checked="" type="checkbox"/>												
3. Cattle	<input checked="" type="checkbox"/>												
4. Camels													
99. Others	CATS												

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No <input checked="" type="checkbox"/>	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment <input checked="" type="checkbox"/>	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment <input checked="" type="checkbox"/>

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

THE END