



ENVIRONMENTAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED NEW BAMBURI 33/11KV SUBSTATION.



PROJECT LOCATION:
KISAUNI, MOMBASA
COUNTY.

Site GPS coordinates-(3° 59'01,35"S; 39° 41'25,21"E")

NOVEMBER

2013



Environmental Impact Assessment Project Report

CERTIFICATION:

Client: The Kenya Power & Lighting Company Limited

Assignment: To carry out an Environmental Impact Assessment of the proposed New Bamburi 33/11kV Substation in Kisauni, Mombasa county.

Project Cost: The project cost is One hundred and forty million shilling only (KES 140,000,000)

Report Prepared by:

Simon Mwangangi-Environmental & Social specialist-Lead Expert, NEMA Reg. No. 2046
Roseline Njeru-Socio-Economist-Associate Expert Reg. No. 2548
Wilfred Koech- Environmental & Social Specialist-Lead Expert, NEMA Reg. No. 0259
Pius Ngari- Environmental & Social Specialist-Associate Expert Reg. No. 1862
Samuel Abaya- Socio-Economist-Lead Expert, NEMA Reg.1245

Signed : **Date:**
Simon Mwangangi (Team Leader)
Lead EIA/Audit Expert,
NEMA Reg. No. 2046

For:
The Kenya Power & Lighting Company Ltd
P. O. Box 30099 – 00100,
NAIROBI,
KENYA

Signed : **Date :**
John Guda-Manager; Safety, Health & Environment

EXECUTIVE SUMMARY

Introduction

Kenya Power & Lighting Company Limited (KPLC) plans to construct a 33/11kV substation at Kiasuni location, Kisauni division of Kisauni Sub-County in Mombasa County. The Substation will be sited within the compound housing existing Bamburi 132/33kV Substation and central GPS Coordinates for the site are (3°59'01,35"S; 39°41'25,21E"). The substation will help step down the power from 33kV to 11 kV for distribution within the area. This will enhance reliability, stabilization of power as well as expansion of the electrical infrastructure in the county. The substation will have one 7.5 MVA transformer to step down power from 33kV to 11kV for distribution.

The project is in response to high power demand, poor and unreliable supply and technical losses associated with supplying the area with long distance distribution lines. Population access to electricity was 32% for financial year 2011/2012 with a customer base of 2,256,688 as at 24th May 2013. By the year 2015/16, the targeted population access is over 40% and the number of customers is expected to rise to over 3,000,000. The national economic growth for Kenya is on an upward trajectory trend and according to the 2009 census the country's population is approximately increasing by one million every year. Considering that electricity demand is derived demand that is heavily influenced by the economic performance of a country, there is need to plan for sufficient electricity capacity additions and distribution to meet the growth aspirations of vision 2030.

The national planning stakeholders, who include amongst others; the Ministry of energy, Kenya Power, Kenya Electricity Transmission Company (KETRACO), Kenya Energy Generating Company (KenGen) and the Energy Regulatory Commission (ERC), have carried out power load studies and demand projections for the medium term. The results indicate a need for capacity enhancement to satisfy the projected demand.

Prior to the construction of the proposed project; Kenya's law (EMCA 1999) requires that the proponent carries out an Environmental and social impact assessment study with an intention of identifying environmental impacts associated with such a development and to develop an Environmental Management Plan (EMP) to mitigate the negative impacts while enhancing the positive impacts from the development.

Objectives of the EIA Study

- ❖ Conduct an Environmental & Social Impact Assessment to identify both positive and negative impacts of the proposed project and propose most appropriate interventions during construction, operation and decommissioning of the project;
- ❖ Collect baseline socio-economic data of the project area and potential impacts expected from project during construction, implementation, operation and decommissioning;
- ❖ Identify and contact stakeholders to seek their views on the proposed project;
- ❖ Develop an Environmental Management Plan;

- ❖ Develop an Environmental Monitoring Program during construction and operation and present plans to minimize, mitigate, or eliminate negative effects and impacts.

Scope and Criteria of the Environmental Impact Assessment

The Government of Kenya policy on all new projects requires that an Environmental Impact Assessment is carried out at the planning stages of any proposed undertaking. The scope of this Environmental Impact Assessment, therefore, covers:

- ❖ The baseline environmental and Socio-economic conditions of the area,
- ❖ Description of the proposed project,
- ❖ Provisions of the relevant environmental laws,
- ❖ Public participation
- ❖ Identification and discussion of any adverse impacts to the environment anticipated from the proposed project,
- ❖ Appropriate mitigation measures,
- ❖ Development of an Environmental Management Plan.
- ❖ Development of an Environmental and Social monitoring plan.

The scope of assessment covers various activities related to; construction works of the proposed development which includes all works of civil, mechanical, electrical or other nature necessary for construction, commissioning and decommissioning of the project.

Terms of reference:

- ❖ Establish the suitability of the proposed location to construct a substation
- ❖ A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- ❖ A description of the technology, procedures and processes to be used, in the implementation of the project.
- ❖ A description of materials to be used in the construction and implementation of the project, the products, by-products and wastes to be generated by the project.
- ❖ A description of the potentially affected environment.
- ❖ A description of environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- ❖ To recommend a specific environmentally sound and affordable wastes' management system.
- ❖ Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.
- ❖ Analysis of alternatives including project site, design and technologies.
- ❖ Development of Environmental Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- ❖ Provide an action plan for the prevention and management of the foreseeable hazardous activities in the cause of the project cycle.
- ❖ Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management of emergencies.

- ❖ An identification of gaps in knowledge and uncertainties which were encountered in compiling the report.

Study Methodology

This study was carried out through desk studies and field investigations. The experts conducted extensive literature review relevant to this project. During the field investigation, a reconnaissance survey was conducted to gather information on biophysical and socio-economic aspects of the area and its environs.

In order to address these issues the study team adopted a participatory approach where the client and the immediate surrounding communities were consulted in addition to reviews and references to sources of information including legal statutes and relevant project documents. Among the key activities undertaken during the assessment were:

- (i) Interviews and consultations with stakeholders and the immediate neighboring land users. Questionnaires were administered to obtain their honest and objective opinion regarding the project (samples have been annexed to this report).
- (ii) Review of documents with necessary information on the proposed project, the site planning and implementation plan as well as the desired structural design.
- (iii) Physical inspections of the proposed site and photography.
- (iv) Evaluation of the activities around the site and the environmental setting of the wider area, through review of existing information, literature and physical observations.

The Environmental considerations evaluated for the proposed development include: Ecological considerations (biological diversity, sustainable use of ecological resources and ecosystem maintenance), social considerations (economic impacts, social cohesion or disruption, effects on human health, immigration or emigration, communication and effects on culture and objects of cultural value), Landscape considerations, visual impacts, compatibility with surrounding areas and amenity and land use considerations (water sources, effects of proposal on surrounding land use potentials and possibility of multiple uses) among other aspects.

Project Description

The proposed substation will step down incoming power from 33 kV to 11 kV using a 7.5 MVA transformer for distribution. The proposed substation will have one incoming 33kV line and several 11 kV outgoing feeders. Current within the substation will mainly be transported through busbars and other Substation installations will include one 0.415 KV local transformer, circuit breakers, switches, earthings, and a control room housing control panels and a battery room. The development is a Turnkey type of project where the contractor will come up with the final design and construct the substation to the approvals and satisfaction of the proponent.

Project Justification

Current and future demand for power calls for urgent responses in expanding the power infrastructure capacity. The proposed project is a response to ensure stable and quality power

supply alongside meeting increasing power demand. The substation project is justifiable in that it will stabilize power supply, improve on distribution line security hence cushioning against losses occasioned by power failures and blackouts in Kisauni and Mombasa County in general. Consequently, the proposed substation comes hardy in meeting the highlighted challenge in power supply. Other benefits will accrue to the national economy in different aspects.

Legal and Regulatory Framework

Kenya has several statutes which relate to environmental matters. Most of these statutes are sector specific covering issues such as occupational health and safety, land use, public health, water quality, soil erosion, wildlife, air quality etc. Previously, environmental management activities were implemented through a variety of instruments such as policy statements, permits and licenses and sectoral laws.

There was however need for stronger enforcement machinery to achieve better standards in environmental management. The enactment of the environmental Management and Coordination Act in 1999 provided for the establishment of an appropriate legal and institutional framework for the management and protection of the environment.

Laws of particular concern to this project are:

-  The Environment Management and Co-ordination Act, 1999
-  The Environmental Impact Assessment/ Audit regulations 2003
-  Physical Planning Act, 1996
-  Local Government Act (Rev. 1998)
-  Public Health Act (Cap. 242)
-  Energy Act of 2006
-  The Standards Act Cap 496
-  Land Planning Act (Cap. 303)
-  Water Act, 2002
-  Penal Code Act (Cap.63)
-  The Wildlife Conservation and Management Act, Cap 376
-  The Lakes and Rivers Act Chapter 409 Laws of Kenya:
-  The Forestry Services Act, 2005
-  Occupational Safety and Health Act, 2007
-  Work Injury and Benefits Act, 2007
-  Occupiers Liability Act (Cap. 34)
-  The Traffic Act Chapter 295 Laws of Kenya
-  The Public Roads and Roads of Access Act (Cap 22 Laws of Kenya)
-  The Agriculture Act, Cap 318 of 1980 (revised 1986)
-  Antiquities and Monuments Act, 1983 (Cap 215)
-  The Registration of Titles Act Cap 281
-  The Radiation Protection Act (Cap 243 Laws of Kenya)
-  The Traffic Act Chapter 295 Laws of Kenya

Public Consultation

Public participation is emphasized in the Kenya Constitution, EMCA 1999 and in the EIA/EA regulations 2003 in carrying out environmental impact assessment. The purpose of public participation is to identify potentially affected persons and allow them an opportunity to provide input and comment on the EIA process. Various stakeholders were engaged by the EIA team so that they could offer their opinion on alternatives that are to be investigated, impacts and any other information that is necessary at project planning level hence facilitating informed decision-making. In complying with the public participation process (PPP) for the EIA; a Public Baraza and one on one interviews with stakeholders was conducted.

Project Potential Environmental and Social Impacts

Through consultations, literature review and the EIA experts knowledge and inference about the proposed project; the following impacts were anticipated;

Anticipated Positive Impacts

- ✚ Creation of employment opportunities
- ✚ Improved Electricity Supply
- ✚ Provision of Market for Supply of Building Materials
- ✚ Boosting of the informal sector
- ✚ Improved Security
- ✚ Optimal use of land
- ✚ Improvement of local and national economy
- ✚ Increased protection from possible lightning strikes

Anticipated Negative Impacts

- ✚ Soil erosion
- ✚ Contamination of soil
- ✚ Decreased air quality due to dust emission
- ✚ Solid waste
- ✚ Noise and vibration
- ✚ Visual Intrusion and aesthetic impacts
- ✚ Work related and possible traffic accidents.
- ✚ Occupational Health and safety Impacts
- ✚ Impacts on Public Health
- ✚ Influx of People
- ✚ Social Vices

Proposed Mitigation measures

- ✚ Holding of the construction area
- ✚ During construction, any stockpiles of earth should be enclosed /covered /watered during dry or windy conditions to reduce dust emissions;
- ✚ Construction trucks removing soil from the site, delivering dusty construction materials to the site should be covered to prevent material dust
- ✚ During construction, where water is available, sprinkle the construction area with water to keep dust levels down.

- ✚ Dust masks should be provided to all personnel in areas prone to dust emissions throughout the period of construction.
- ✚ Drivers of construction vehicles must be supervised so that they do not leave vehicles idling and they limit the vehicular speeds so that dust levels are lowered.
- ✚ No burning of any waste materials whatsoever should be permitted within the site
- ✚ Areas cleared of vegetation at the substation site, and where no substation structures are, shall be rehabilitated with grass to prevent soil erosion. Drainages shall be constructed to control storm water and rain water harvesting from control room roof top.
- ✚ Noise pollution shall be mitigated by ensuring that noisy operations are done during the day only and also by properly maintaining construction machinery.
- ✚ HIV/AIDS awareness campaigns shall be carried out for employees and the surrounding members of public.
- ✚ Solid wastes generated, shall be carted away as soon as possible for appropriate disposal.
- ✚ Occupational safety measures shall be put in place, including provision of suitable and adequate personal protective clothing and equipment to construction employees.
- ✚ Scaffolding to be placed to protect the public from dust.
- ✚ Emergency response measures shall be put in place
- ✚ Only qualified authorized operational staff shall work at the substation
- ✚ Danger/Caution warning notices shall be placed appropriately
- ✚ The site shall be rehabilitated to its original state as far as is reasonably practical after decommissioning the project.
- ✚ Ensure minimum clearance distances between conductors and ground, waterways, road crossings, buildings, communication systems etc. are incorporated into design and observed during implementation and operation.

Conclusion and Recommendations

Conclusion

The analysis of the EIA has pointed out that the construction and operation of the proposed substation would have positive as well as negative impacts economically, socially and environmentally. An Environmental and Social Management Plan (E&SMP) outline has been developed to ensure sustainability of the project activities from construction through operation to decommissioning. The plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitorable indicators.

A monitoring plan has been developed and highlights some of the environmental performance indicators that should be monitored. Monitoring creates possibilities to call to attention changes and problems in environmental quality.

From the findings of this study, the following conclusions are made:

- ✚ The proposed project will generate socio-economic benefits which would not be realized if the no development option is considered.
- ✚ Successful implementation of the proposed EMP will ensure environmental sustainability.

- ✚ The project will be designed, constructed, and operated according to the acceptable industry norms and standards.

Recommendations

It is evident from this study that the construction and operation of the proposed project will bring positive effects in the project area. However, the project will also bring various negative impacts hence the need for sustainable mitigation measures.

It is strongly recommended that a concerted effort is made by the site management in particular, to implement the Environmental Management and Monitoring Plan provided herein. Diligence on the part of the contractor and proper supervision by the proponent is crucial for mitigating the predicted impacts and ensuring structural strength, safety, and efficient operation of the project. Following the commissioning of the project, annual statutory Environmental and Safety Audits must be carried out.

TABLE OF CONTENTS

CERTIFICATION: i

EXECUTIVE SUMMARY..... ii

TABLE OF CONTENTS ix

LIST OF TABLESxii

LIST OF FIGURESxii

LIST OF ABBREVIATIONSxiii

1 CHAPTER ONE: INTRODUCTION..... 1

1.1 Justification of the Proposed Project.....2

1.2 Scope and Objectives of the Study2

1.3 Terms of Reference (ToR) for the EIA Process4

1.4 EIA Approach4

1.5 EIA Methodology5

2 CHAPTER TWO: PROJECT DESCRIPTION 8

2.1 Site Location Characteristics8

2.2 Introduction.....8

2.3 Project Location and Land Ownership8

2.4 Description of the proposed site8

2.5 Description of the project10

2.6 Technical aspects of a substation11

2.6.1 Substation Grounding:15

2.7 Project Activities16

2.7.1 Construction activities16

2.7.2 Operation Phase Activities:17

2.8 Input Materials17

2.9 Cost of Proposed Project18

2.10 Target Group for the EIA Report18

3 CHAPTER THREE: BASELINE INFORMATION OF THE STUDY AREA 19

3.1 Introduction.....19

3.1.1 Kisauni District Profile19

3.2 Administrative Boundaries19

3.3 Population and Settlement Patterns20

3.4 Poverty21

3.5 Topography and Climate.....21

3.6	Wild Life:	22
3.7	SOCIO ECONOMIC SETTING OF THE PROJECT AREA	22
4	CHAPTER FOUR: RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORKS	25
4.1	Introduction	25
4.2	Environmental Policy Framework	25
4.3	Institutional Framework	25
4.3.1	National Environment Management Authority (NEMA)	25
4.3.2	Provincial and District Environment Committees	26
4.3.3	Public Complaints Committee	26
4.3.4	National Environment Action Plan Committee	26
4.3.5	Standards and Enforcement Review Committee.....	27
4.3.6	National Environment Tribunal	27
4.3.7	National Environment Council (NEC).....	27
4.4	Kenyan Environmental Legal Framework	27
4.4.1	The Environment Management and Co-ordination Act, 1999	27
4.4.2	Public Health Act (Cap. 242).....	32
4.4.3	Local Government Act (Rev. 1998).....	33
4.4.4	Physical Planning Act, 1996.....	35
4.4.5	Land Planning Act (Cap. 303)	35
4.4.6	Water Act, 2002.....	36
4.4.7	Energy Act of 2006.....	37
4.4.8	The Standards Act Cap 496	38
4.4.9	Penal Code Act (Cap.63)	38
4.4.10	The Wildlife Conservation and Management Act, Cap 376.....	38
4.4.11	The Lakes and Rivers Act Chapter 409 Laws of Kenya:	39
4.4.12	The Forestry Services Act, 2005	39
4.4.13	Occupational Safety and Health Act, 2007.....	39
4.4.14	Work Injury and Benefits Act,(WIBA) 2007	41
4.4.15	Occupiers Liability Act (Cap. 34)	41
4.4.16	The Radiation Protection Act (Cap 243 Laws of Kenya).....	41
4.4.17	The Traffic Act Chapter 295 Laws of Kenya	41
4.4.18	The Public Roads and Roads of Access Act (Cap 22 Laws of Kenya)	41
4.4.19	The Way leaves Act Cap 292	42
4.4.20	The Agriculture Act, Cap 318 of 1980 (revised 1986).....	42
4.4.21	Antiquities and Monuments Act, 1983 (Cap 215).....	42
4.4.22	The Registration of Titles Act Cap 281	43
4.4.23	The Land Titles Act Cap 282	43
4.4.24	The Land Acquisition Act Chapter 295 Laws of Kenya	43
4.4.25	The Civil Aviation Act Cap 394.....	44
4.5	International Environmental Guidelines	44
4.6	World Bank Environment and Social Safeguards Policies	46
4.6.1	Environment Assessment (Operational Policy, OP/BP 4.01)	46
4.6.2	Natural Habitats (Operational Policy, OP/BP 4.04).....	46
4.6.3	Indigenous Peoples (Operational Policy 4.10).....	47
4.6.4	Physical Cultural Resources (Operational Policy 4.11)	47

4.6.5	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	47
4.6.6	Forests (Operational Policy, OP/BP 4.36)	47
5	CHAPTER FIVE: PUBLIC PARTICIPATION	48
5.1	Public Stakeholder Consultation	48
5.2	Sources of Information	48
5.3	Objective of Public Stakeholder Consultation	48
5.4	Meeting with deputy commissioner’s team (HODs)	48
5.5	Local community consultation	49
5.6	Comments and Responses from the Stakeholders	49
6	CHAPTER SIX: IDENTIFICATION OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS OF THE PROPOSED SUBSTATION:	51
6.1	Potential Impacts during Construction Phase	53
6.1.1	Positive Impacts during Construction Phase	53
6.1.2	Negative Impacts during Construction Phase	54
6.2	Potential Impacts during Operation Phase	56
6.2.1	Positive Impacts during Operation Phase	56
6.2.2	Negative Impacts during Operation Phase	57
6.3	Potential Impacts during Decommissioning phase	59
6.3.1	Positive Impacts during Decommissioning Phase	59
6.3.2	Negative Impacts during Decommissioning Phase	59
7	CHAPTER SEVEN: MITIGATION MEASURES AND MONITORING PROGRAMMES	61
7.1	Mitigation of Construction Related Negative Impacts	61
7.2	Mitigation of Operation Phase Negative Impacts	64
7.3	Mitigation of Decommissioning Phase Impacts	65
8	CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES	67
8.1	Alternative Sources of Energy	67
8.2	Alternative Site	67
8.3	Analysis of Alternative Construction Materials and Technology	67
8.4	No Project Alternative	68
9	CHAPTER NINE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)	69
10	CHAPTER TEN: ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMP):	73
11	CHAPTER ELEVEN: ASSUMPTIONS, PROJECT UNCERTAINTIES AND GAPS IN KNOWLEDGE:	75
11.1	Assumptions:	75
11.2	Uncertainties and difficulties in Compiling information	75

11.3	Gaps in Knowledge:.....	76
12	CONCLUSIONS AND RECOMMENDATIONS	77
12.1	Conclusion	77
12.2	Recommendations	77
13	REFERENCES	79
14	ANNEXES	80
14.1	Annex 1: Land Documents	80
14.2	Annex 11: Minutes for Public consultations:.....	82
14.3	Sample Questionnaires.....	88
14.4	Annex 1v: Lead Experts NEMA Certificate and Practicing License	110

LIST OF TABLES

TABLE 1:	LIST OF ABBREVIATIONS.....	XIII
TABLE 2:	SUBSTATION SPECIFICATIONS	10
TABLE 3:	ADMINISTRATIVE AND POLITICAL UNITS.....	20
TABLE 4:	POPULATION BY DIVISION AND SEX	20
TABLE 5:	NEMA WASTE WATER DISCHARGE GUIDELINES	30
TABLE 6:	SUMMARY OF PROJECT POTENTIAL IMPACTS	51
TABLE 7:	MAXIMUM PERMISSIBLE LEVELS (SOURCE: WWW.KENYALAW.ORG).....	58
TABLE 8:	MAXIMUM PERMISSIBLE LEVELS FOR CONSTRUCTION SITES (SOURCE: WWW.KENYALAW.ORG)	58
TABLE 9:	ENVIRONMENTAL MANAGEMENT PLAN (EMP):	70
TABLE 10:	ENVIRONMENTAL AND SOCIAL MONITORING PLAN (<i>ESMP</i>).....	73

LIST OF FIGURES

FIGURE 1.:	SUMMARY OF EIA PROCEDURE.....	7
FIGURE 2:	SITE GPS COORDINATES (3°59'01,35"S, 39°41'25,21E")	8
FIGURE 3:	THE PROJECT SITE AND SORROUNDINGS.....	9
FIGURE 4:	OPEN SPACE WHERE PROPOSED SUBSTATION WILL BE SITED	9
FIGURE 5:	TYPICAL SUBSTATION LAYOUT	12
FIGURE 6:	<i>TYPICAL LAYOUT OF THE SUBSTATION CONTROL ROOM</i>	13
FIGURE 7:	<i>TYPICAL LAYOUT OF THE SUBSTATION CARPARK BAY</i>	14
FIGURE 8:	<i>TYPICAL LAYOUT OF THE SUBSTATION SECURITY FENCE</i>	15

LIST OF ABBREVIATIONS

Table 1: List of Abbreviations

CBD	Convention on Biological Diversity
CO ₂	Carbon Dioxide
CSR	Corporate Social Responsibility
DELDO	District Environment & Land Development Officer
CC	County Commissioner
DCC	Deputy County Commissioner
EA	Environmental Audit
EIA	Environmental Impact Assessment
ERC	Electricity Regulatory Commission
ESIA	Environmental & Socio-economic Impact Assessment
EIS	Environmental Impact Statement
EMCA	Environmental Management and Coordination Act, 1999
EMP	Environmental Management Plan
<i>ESMP</i>	Environmental and Social Monitoring Plan
<i>GDC</i>	Geothermal Development Company
GHGs	Green House Gases
KenGen	Kenya Energy Generating Company
KPLC	Kenya Power & Lighting Company Limited
KETRACO	Kenya Electricity Transmission Company
kV	Kilo Volt
KVA	Kilo Volt Amperes
KWS	Kenya Wildlife Service
L.R	Land Registration
MOA	Ministry of Agriculture
MVA	Mega Volt Amperes
NEMA	National Environment Management Authority
OSHA	Occupation Safety and Health Act
PM	Particulate Matter
PPE	Personal Protective Equipment
SEM	Sustainable Environmental Management
SHE	Safety, Health and Environment
STD	Sexually Transmitted Diseases
WIBA	Work Injury Benefits Act

1 CHAPTER ONE: INTRODUCTION

This chapter gives a brief of the project in terms of background, justification, objectives of the EIA and methodology.

Kenya is working towards being a newly industrialized, middle income country providing a high quality of life to all its citizens in a clean and secure environment”. To achieve this, several development projects have and will be commissioned to push and sustain economic growth. These projects will increase demand for energy.

Kenya Power and Lighting Company plans to construct and commission a 33/11kV substation in Magogoni sub location, Kisauni location of Kisauni district. This is one among many similar projects being implemented throughout the country to expand electrical power distribution network in the national grid.

It is important to note that most development projects come with a cost to the environment with potential to cause environmental damage if measures are not put in place to protect the environment. It is globally accepted that sustainable development is the way to go. For the ecosystem to be sustainable there is need for a balance between human settlement, development projects and the natural ecosystem. This can be achieved through careful planning and the establishment of appropriate management systems.

Environmental planning has become a component of other planning processes such as physical planning, economic planning, and development planning to ensure sustainability. Environmental Impact Assessment (EIA) is a planning tool that is mainly used in Kenya. EIAs are undertaken for proposed projects that are likely to have significant adverse impact on the environment. The EIA report identifies both positive and negative impacts of a new project and gives mitigation measures against the negative impacts among other issues. The EIA report is then subjected to a decision of a competent national authority i.e National Environment Management Authority (NEMA)-Kenya. NEMA issues a go ahead for the project once they are satisfied that all negative impacts are identified and can be mitigated.

The project is in response to high power demand, poor and unreliable supply and technical losses associated with supplying the area with long distance distribution lines. Population access to electricity was 32% for financial year 2011/2012 with a customer base of 2,256,688 as at 24th May 2013. By the year 2015/16, the targeted population access is over 40% and the number of customers is expected to rise to over 3,000,000. The national economic growth for Kenya is on an upward trajectory trend and according to the 2009 census the country’s population is approximately increasing by one million every year. Considering that electricity demand is derived demand that is heavily influenced by the economic performance of a

country, there is need to plan for sufficient electricity capacity additions and distribution to meet the growth aspirations of vision 2030.

Prior to construction of this project the proponent (KPLC) has to undertake an Environmental Impact Assessment (EIA) to ensure that the above project is implemented in an environmentally and socially sustainable manner. Therefore, KPLC engaged the services of environmental experts registered by NEMA to conduct an Environmental Impact Assessment (EIA) for the proposed project. This EIA was conducted in line with the Environmental Management and Coordination Act 1999, and the subsequent Kenya Gazette Supplement No. 56 of 1st June 2003.

1.1 Justification of the Proposed Project

The national energy key stakeholders, who include amongst others, the Ministry of Energy, Kenya Power, Kenya Electricity Transmission Company (KETRACO), Kenya Energy Generating Company (KenGen) and Energy Regulation Commission (ERC) carried out the country's power-demand projections for the medium term. The results indicated a need for capacity enhancement to satisfy the projected demand.

Power load studies have shown the need for capacity enhancement to ensure stable and quality power supply to meet the increasing power demand. The area where the substation will be put up has also been experiencing power outages and unreliable power supply.

The construction of New Bamburi 33/11kV substation project is justifiable in that it will stabilize power supply; ensure quality supply, guard against losses due to minimal power failures and blackouts. A Substation needs to be as close as possible to the area it will serve to minimize on technical losses associated with long distances of distribution. The proposed substation will help in meeting the highlighted challenges in power supply.

Benefits from the proposed project include; the economy will benefit both directly and indirectly as better power supply is a key ingredient of economic growth. Supply of quality power will boost and promote small businesses; there will be incomes to the government coming from Value Added Taxes (VAT) imposed on construction materials and various fees charged by different government institutions. There will be employment opportunities for the locals and other people during construction. Last but not least, the planning and design of the project is well thought out and has taken into consideration all the necessary interventions needed to mitigate negative impacts on the environment and safeguard safety of workers throughout the project cycle.

1.2 Scope and Objectives of the Study

National Environment Management Authority policy on all new projects requires that an Environmental Impact Assessment (EIA) at the planning stages is done . This is to ensure that potential environmental and social impacts are addressed during the design, construction, operation and decommissioning of the project.

Scope

The main objective of this assessment was to identify potential environmental and social impacts of the project. Further, it sought to formulate appropriate mitigation measures and recommendations to ensure that the identified negative impacts do not harm the environment through all phases of its implementation. The assessment was carried out in line with EMCA 1999 and the Environmental Impact Assessment and Audit Regulations, 2003. Reference to relevant sectoral legal provisions has been made to ensure compliance with them during all the project phases.

The EIA scope largely covered the following areas:

- (1) **Baseline Conditions:**
 - Environmental setting (climate, topography, geology, hydrology, ecology, water resources, sensitive areas evaluation).
 - Socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.),
 - Infrastructural issues (roads, water supplies, drainage systems, electricity distribution system, etc.).
- (2) **Legal and policy framework:**

The assessment reviewed relevant national environmental laws, regulations and by-laws and other laws and policies to ensure the project complies.
- (3) **A participatory approach was adopted for the immediate neighbourhood in discussing project relevant issues such as:**
 - Nature of project
 - Project ownership and acceptability
 - Land use aspects
 - Social, cultural and economic impacts of the project
- (4) **Environmental impacts**
 - Physical impacts
 - Biological impacts
 - Legal Compliance.

Specific objectives of the assessment:

The specific objectives of the assessment were;

- To present an outline of the project background,
- Establish environmental baseline conditions of the project area and review all available information and data related to the project,
- Identify key areas for environmental, health and safety concerns as well as the anticipated impacts associated with the proposed project.
- Establish a comprehensive environmental management plan covering the construction, operation and decommissioning phases of the project,

- Preparation of a comprehensive project report in accordance with the local environmental legislation and submission to NEMA for further instructions and/or approval.

1.3 Terms of Reference (ToR) for the EIA Process

The EIA Experts were tasked with carrying out Environmental Impact Assessment for the proposed 33/11kV substation. The scope covered various activities related to; construction works (civil works), mechanical, electrical or other nature necessary to construct, commission and decommissioning of the project. The output of the assessment is an Environmental Impact Assessment Report which will aid NEMA in making a decision on whether to license the project or not.

The EIA experts were guided by the following terms of reference in conducting the assessment;

- ✓ Assess the suitability of the proposed location to construct New Bamburi 33/11kV substation.
- ✓ A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- ✓ A description of the technology, procedures and processes to be used, in the implementation of the project.
- ✓ A description of materials to be used in the construction and implementation of the project, the products, by-products and waste to be generated by the project.
- ✓ A description of the potentially affected environment.
- ✓ A description of environmental effects of the project including the biological, physical, social and cultural impact and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- ✓ Analysis of alternatives including project site, design and technologies.
- ✓ Development of an Environmental Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- ✓ Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the course of project construction, operation and decommissioning.
- ✓ Propose measures to prevent health hazards and to ensure safety in the working environment for the employees and the neighbouring community.
- ✓ An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.

1.4 EIA Approach

The experts paid attention to EMCA, 1999 requirements as well as the Environmental Impact Assessment and Audit Regulations, 2003. It involved largely an understanding of the project

background, the preliminary designs and the implementation plan. The approach and methodology applied enabled collection of quality data needed for the report.

Project screening was the first stage of this assessment. Screening of the project sought to ascertain whether or not this project falls within second schedule (58(1),(4)) of EMCA that requires EIA prior to commencement. Other considerations made during this stage included a preliminary assessment of the environmental sensitivity of the proposed project site. Project scoping was the next stage which was done to delineate project issues that required detailed analysis.

1.5 EIA Methodology

Various methods were used in collection data to ensure relevant and adequate data was collected. The methods included;

Desk study/literature review

Available data relevant to the proposed project was gathered. The secondary data included designs, various legislations and regulations and district development plan among others. A critical literature review of the secondary data was done to establish the following:

- ✓ Required licenses and permits
- ✓ Legislations and institutional framework governing the proposed project
- ✓ Nature of the project
- ✓ Baseline information of the project area
- ✓ Types of waste likely to be generated.

Site assessments

A physical visit to the proposed site was done. This allowed a deeper understanding of the project area and the surrounding environment. It also provided an opportunity to identify potentially affected persons not to mention the affected environment. The site visit allowed for physical assessment of the area through observations.

Data collection procedures

Qualitative methods of data collection were largely employed. Secondary data was obtained through literature reviews. Primary data was obtained through physical observations, interviews, discussions, photography and consultations.

Public Consultations

In conducting EIAs, the experts are expected to widely consult with the public who are within the environs of the project site. It is a requirement under Section 17 of the Environmental (Impact Assessment and Audit) Regulations of 2003, that all EIA assessment undertake Public Consultation as part of the study. The aim of public participation is to identify all stakeholders in a proposed project such as project beneficiaries and the general public and provide them an opportunity to air their opinions which should be considered during project

planning, design, construction, operation and decommissioning phase. Therefore, consultations were carried out in the project area in a bid to inform the public and other interested parties on the proposed project and obtain their views on the same. The consultations also presented an opportunity for the EIA team to educate the public on environmental and safety issues related to the substation.

Public consultations were conducted through; presentations, discussions and administering of questionnaires.

Below is an outline of the basic EIA steps that were followed during this assessment:

Step 1: Project Concepts

The project details, scope, design, implementation were first analyzed.

Step 2: Terms of Reference (ToR)

The terms of Reference were developed guided by EMCA 1999 and The Environmental Impact Assessment/ Audit regulations 2003. Any new developments out of character with their surrounding must have an EIA undertaken; for review, approval and licensing by NEMA.

Step 3: Project Screening

Details about baseline conditions and potential environmental and social impacts were collected through desktop study, consultations, site visits, photography, and inductive methods.

Step 4: Identification of Potential Environmental and Social Impacts

The Potential Environmental impacts were identified, classified and magnitude determined.

Step 5: Impact Assessment and Consultations

The Environmental and Social Impacts were analyzed, assessed and discussed in details involving consultations with the Proponent and other stakeholders.

Step 6: Formulation of Mitigation measures

Mitigation measures to ameliorate or minimize the potential Environmental and Socio – economic impacts were formulated for the entire project life.

Step 7: Development of an Environmental & Social Management and Monitoring Plan:

An E&SMMP for the project life was developed indicating parameters to be monitored, persons responsible, timing and costs involved.

Specific topics covered in the project report include but are not limited to:

- ✓ Name of the proponent, address and contact person
- ✓ Title of the project
- ✓ Objectives and scope of the project
- ✓ Nature of the project;
- ✓ Location of the proposed project, including the physical area that may be affected by the project's activities;
- ✓ Types of activities that will be undertaken during the project construction, operation and decommissioning phases;
- ✓ Design of the project;
- ✓ Proposed Project budget;
- ✓ Materials to be used, products and by-products, including waste to be generated by the project and the method(s) of their disposal;
- ✓ Potential environmental impacts of the project;
- ✓ Economic and social impacts to the local community and the nation in general;
- ✓ Views of the public/potentially affected people about the project; and
- ✓ An Environmental and Social Management Plan (E&SMP) for the entire project cycle to include mitigation measures to be taken during and after implementation of the project and an action plan for the prevention and management of foreseeable accidents during the project cycle.
- ✓ An Environmental and Social Monitoring Plan (*ESMP*)

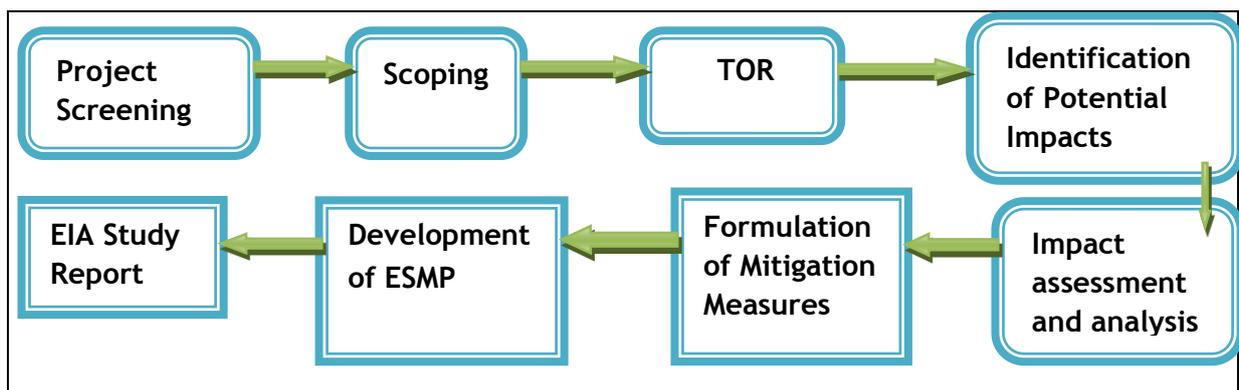


Figure 1.: Summary of EIA procedure

2 CHAPTER TWO: PROJECT DESCRIPTION

2.1 Site Location Characteristics

2.2 Introduction

This chapter presents a detailed description of the proposed project in terms of the location, nature and the technical aspects. In addition, project activities and materials to be used are discussed.

2.3 Project Location and Land Ownership

The proposed substation will be constructed on a piece of Kenya Power's land which currently houses New Bamburi 132/33 kV Substation. Administratively, the site is in Magogoni sub location, Kisauni location, Mombasa district.



Figure 2: Site GPS coordinates (3°59'01,35\"S, 39°41'25,21E\"))

2.4 Description of the proposed site

The site is relatively flat. The soil is mixed clay sandy and due to the flatness of the area, the site is prone to flooding and therefore proper elevation of the foundations and a sound drainage system will need to be done. The land is currently housing New Bamburi 132/33 KV substation and the site where proposed 33/11KV Substation will be constructed has scattered thorny shrubs. Bordering the site is a quarry on the lower side, Kiembeni estate

Proposed New Bamburi 33/11 kV Substation in Mombasa County

about 1.5 kilometers to the East and Mshomoroni/Vikwatani about 1.5 Kilometers to the West. There is an existing access road and there are no settlements proximal to the site.

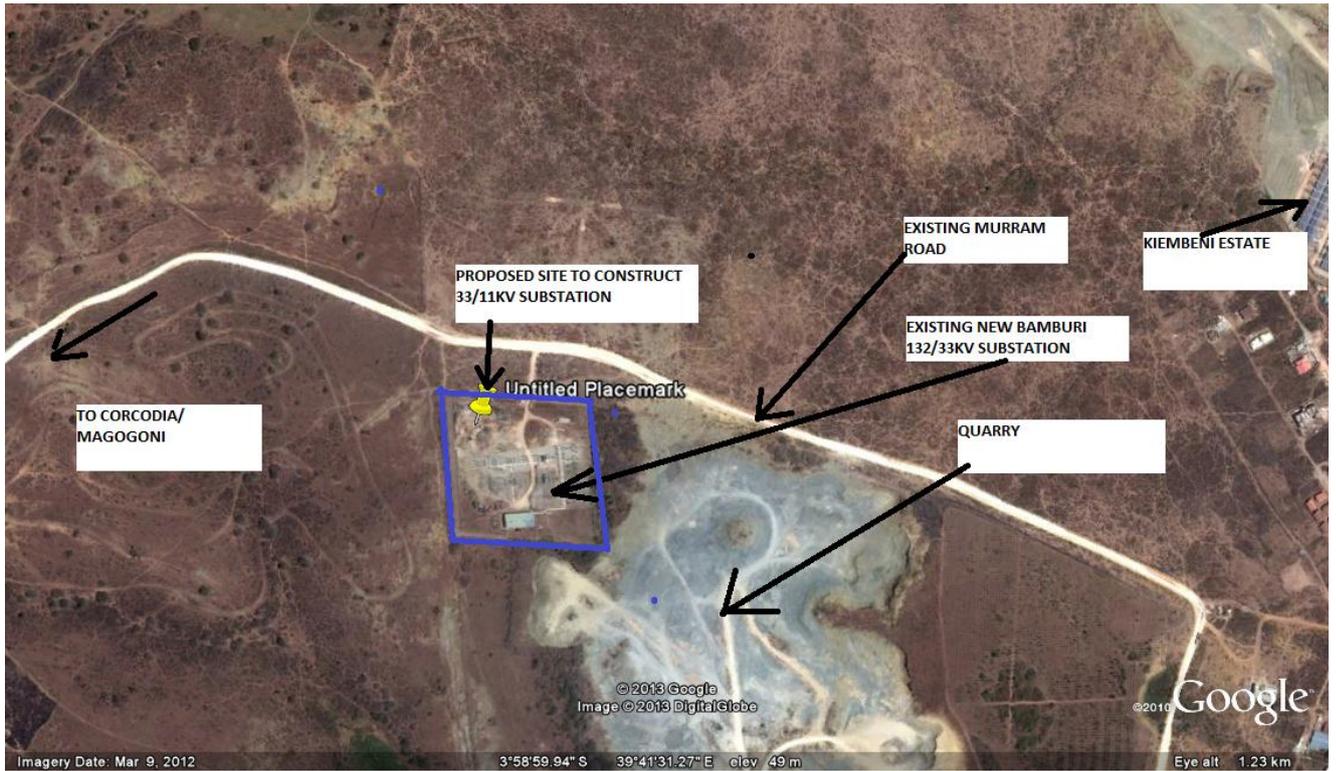


Figure 3: The project site and surroundings



Figure 4: Open Space where proposed Substation will be sited

2.5 Description of the project

A sub-station is a vital component of electricity generation, transmission and distribution system. The main role of a substation is to transform voltages from high to low and vice versa, using transformers and other heavy-duty electrical switchgear. The project is a step down substation i.e. from 33kV to 11kV for distribution to customers.

The proposed project will have the following specifications;

Table 2: Substation Specifications

Substation	Proposed New Bamburi Substation	
Voltage levels	33/11 kV	1 X 33 kV Incoming feeder
		3 X 11 kV Outgoing feeders with bays for future expansion
Transformer ratings	1 x 7.5 MVA	

As earlier noted, the project is on a “Turnkey” basis where KPLC will float tenders for the design and construction of the specified substation and the associated incoming and outgoing feeders (lines). The winning contractor will provide the substation designs which will be submitted to KPLC for approval. Once the designs are approved, the contractor will be required to construct the substation and hand over the completed substation to KPLC for operation.

2.6 Technical aspects of a substation

Typical Substation Design

- a) Substation yard with: – incoming 1 X 33 kV line, outgoing 3 X 11 kV lines, switch gear, steel structures, protection equipment, 1 X 7.5 MVA transformers mounted on a concrete plinth, with oil containment pits, an oil separator at the edge point from which drainage channels connect to storm water drainage system, a vehicle drive way & parking bay and cable trenches
- b) One local 11/0.415 kVA transformers
- c) Control room this is a house with: - control panels' room, switch gear room, communication room, battery room, office, toilet, pantry and cable trenches
- d) Guard house with toilet both secluded from the main substation area
- e) Stone perimeter wall with a gate
- f) Access road to the substation

The substation will use modern distribution and control equipment. The works shall conform to current best practice in the international Energy industry in all respects.

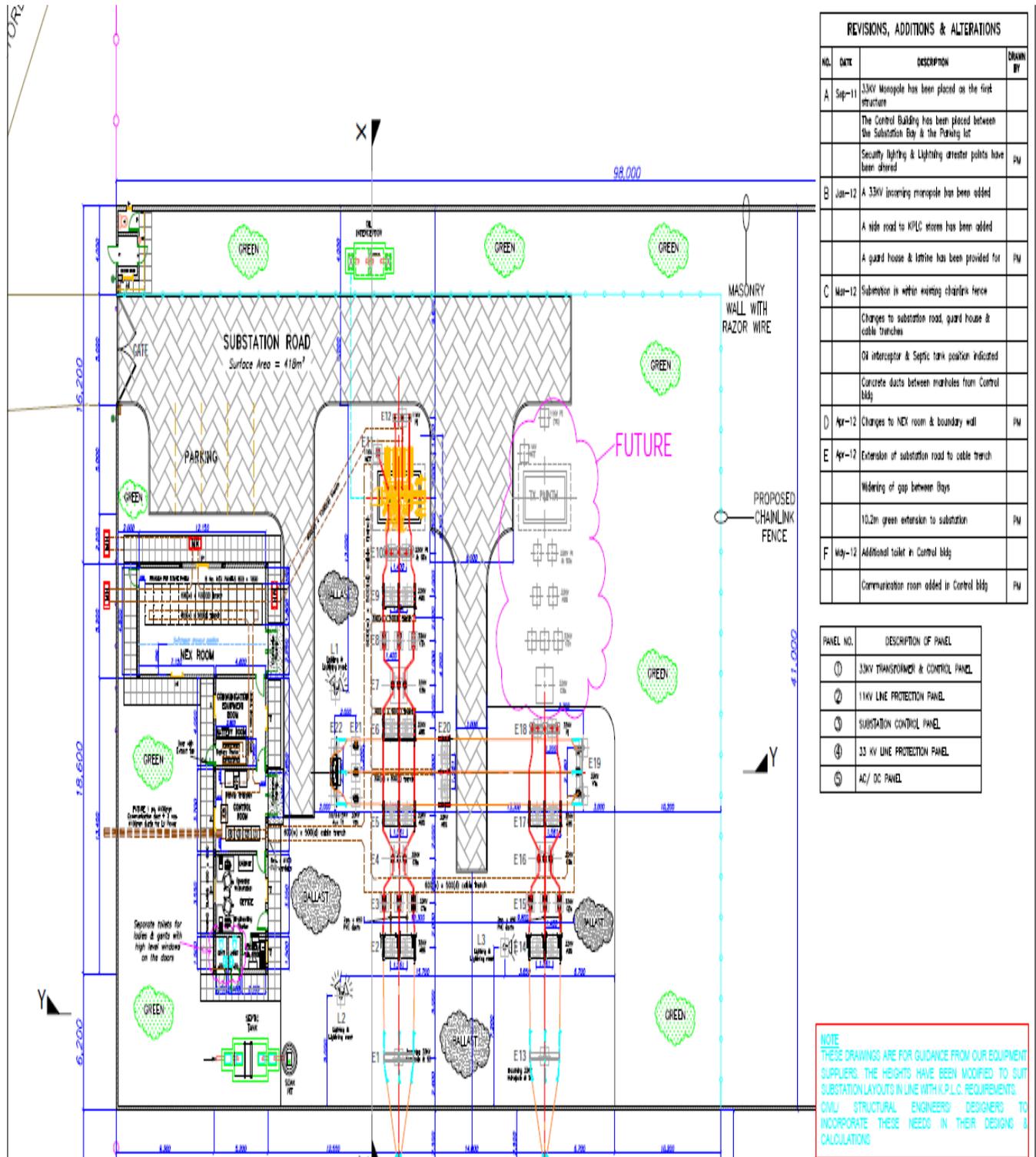


Figure 5: Typical Substation Layout

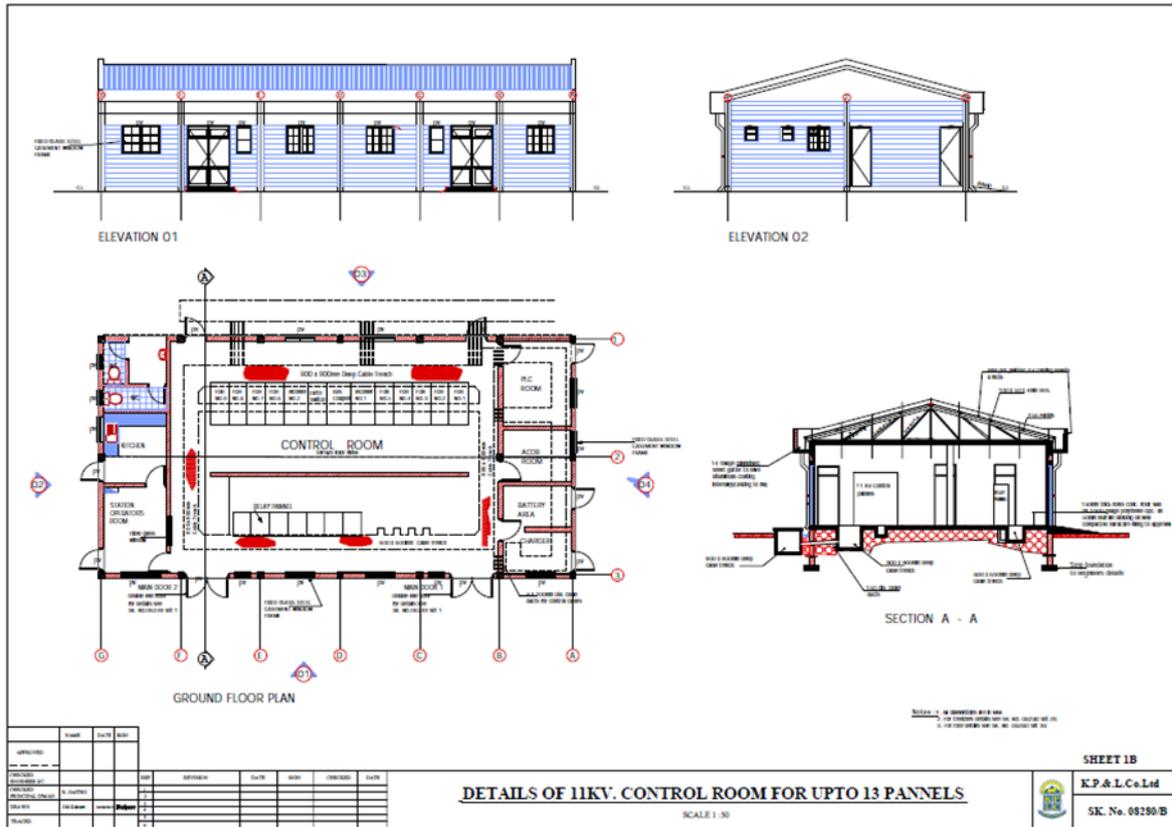


Figure 6: Typical layout of the Substation control room

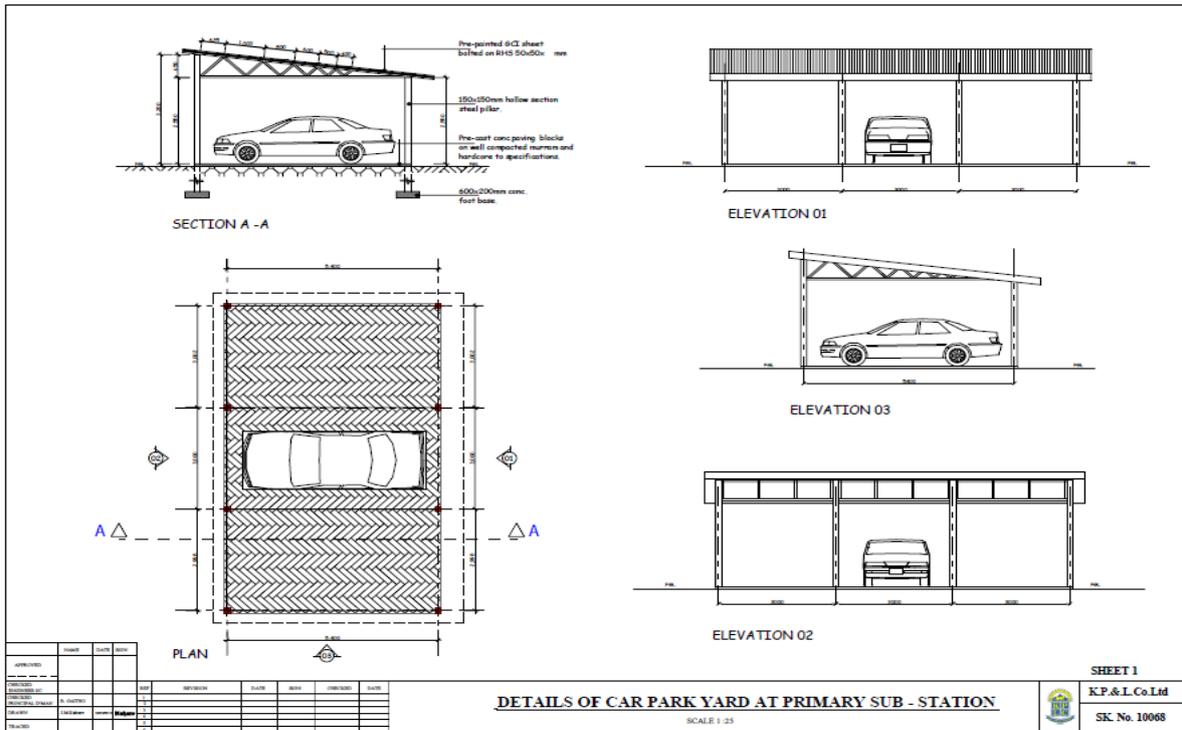


Figure 7: Typical layout of the Substation carpark bay

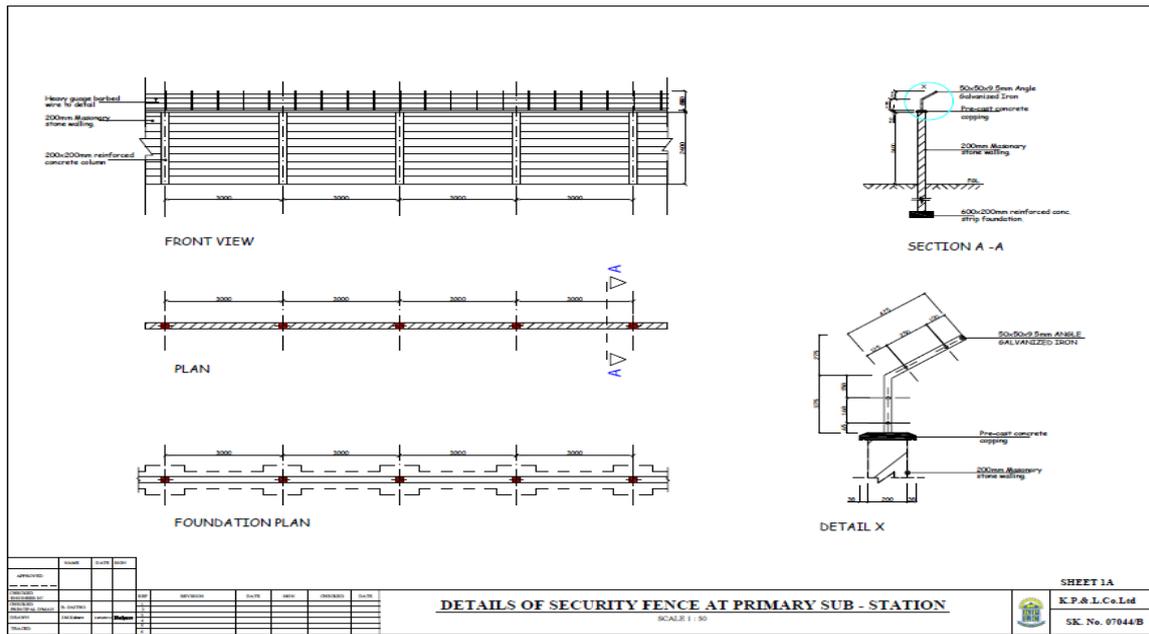


Figure 8: Typical layout of the Substation security fence

2.6.1 Substation Grounding:

Where a substation has a metallic fence, e.g. razor wire or electric fence on top of perimeter wall it must be properly grounded to protect people from high voltages that may occur during a fault in the network. Earth faults at a substation can cause a ground potential rise. Currents flowing in the Earth's surface during a fault can cause metal objects to have a significantly different voltage than the ground under a person's feet; this touch potential presents a hazard of electrocution

2.7 Project Activities

The design and construction of the substation will be undertaken by a contractor selected through a competitive bidding process. Construction will be supervised by KPLC to make sure works are undertaken according to specifications and adherence to safety health and environmental provisions. This is to ensure quality work is achieved.

2.7.1 Construction activities

Construction activities will involve the following:

- ✓ Site investigations such as soil samples to determine the nature of foundations to be laid and ensure design and construction are done on a sound engineering basis.
- ✓ Holding of the site with iron sheet and a stone perimeter wall will be constructed
- ✓ Ground breaking and removal of vegetation
- ✓ Leveling the ground.
- ✓ Storm water drainage construction
- ✓ Civil works on site including construction of access road, digging foundations and concrete works
- ✓ Compaction and filling with gravel of the areas to form foundations
- ✓ Delivery of civil work construction materials, transformer, tools, electrical equipment to project site.
- ✓ Construction of bund walls at the base of the transformer to hold oil in case of accidental leakage or spill
- ✓ Installation of transformers and erecting of the steel poles to support the incoming and outgoing feeders.
- ✓ Post construction clean-up, restoration and landscaping of site
- ✓ Ballasting the substation yard
- ✓ Connection of power from the incoming 33kV line to the substation
- ✓ Connection of power to outgoing 11kV feeders.
- ✓ Load testing
- ✓ Remedying of defects after functional tests

Safety measures shall be observed at all times and warning signs erected to warn on any potential hazards, ensure proper and efficient use of Personal Protective Equipment (PPE) for all on site and observe safe work procedures.

Construction Supervision

The proponent will ensure close supervision of the project during construction phase to achieve the following:

- ✓ Use of personal protective equipment (such as hand gloves, helmets, safety shoes, ear muffs, overalls and dust coats) by workers at all times.

- ✓ Motorized equipment are checked to ensure that they are in good working condition, safe to use and produce minimal noise levels and reduced smoke emission.
- ✓ Proper disposal of waste
- ✓ Provision of sanitary/toilet facilities for workers
- ✓ Provision of first aid kit and firefighting equipment (portable cylinders) which must be placed at strategic positions for access
- ✓ Emergency response procedures are in place and all workers are trained in effecting them.
- ✓ Any work involving deep excavations, elevated heights and lifting heavy loads, poses a number of risks to personnel. The Contractor shall ensure that personnel are equipped with the correct protective clothing and equipment and are ready to work safely while safeguarding the environment.

The contractor shall adhere to all requirements set by the proponent and National Environmental Management Authority (NEMA) and any other applicable legislation regarding environmental and social impacts

2.7.2 Operation Phase Activities:

The operation phase of the project will be distribution of power. A substation is a high risk area and no unauthorized person shall be allowed to access the substation. This is in line with company policy to ensure safety of staff and the public. Activities undertaken during operation phase include;

- ✓ Periodical maintenance works by authorized staff
- ✓ Switching by authorized staff
- ✓ Inspections
- ✓ Annual environmental and safety audits

2.8 Input Materials

Construction of the substation will entail quality materials and procedures to ensure quality work, occupational and public safety and environmental sustainability. Where possible locally sourced material are preferred to uplift the area economy:

- ✓ Raw Construction materials e.g. sand, cement, natural building stone blocks, hard core, gravel, ballast, timber, nails among others.
- ✓ Timber (e.g. doors and frames, fixed furniture, etc.),
- ✓ Paints, solvents, white wash, etc.,
- ✓ Labour force (of both skilled and unskilled workers).
- ✓ Water

Other substation associated facilities

- ✓ One 7.5 MVA transformers.
- ✓ Busbars, switch gears, circuit breakers and capacitors
- ✓ Lightning arrestors and steel structures

2.9 Cost of Proposed Project

The estimated cost of installing the substation and associated structures is KES 140,000,000.

2.10 Target Group for the EIA Report

This EIA report will be used by different stakeholders that are involved at different phases of the project. The report presents vital information on procedures and plans to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of the project. The information will be useful in planning, implementation, management and maintenance of the substation.

Specifically, the report will be useful to the following stakeholders:

- ✓ Interested government ministries and agencies
- ✓ The public
- ✓ Engineers to be involved in supervision of the construction works.
- ✓ Contractors to be engaged in the construction works for the substation;
- ✓ Staff that will be involved in the management and operation of the substation.
- ✓ Government regulatory agencies such as NEMA and Energy Regulatory Commission (ERC).

3 CHAPTER THREE: BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction

This chapter gives the physical description of the project area in terms of position and size, topography, climate and soils. The substation will be within Kisauni district, County of Mombasa.

3.1.1 Kisauni District Profile

Kisauni District is one of the four districts constituting Mombasa County. It is also among the twenty-two districts constituting Coast Province. It is situated in the Southern Eastern part of Coast Province between Latitudes 30-80' and South of the Equator.

The District was carved from Mombasa district and Gazetted in May 2008 as a new district complete with a district commissioner and other relevant departmental heads. Historically, the district existed as a division of Mombasa district and boasts of sharing in the Mombasa city's fame of ancient settlement. Specifically, Frere Town which is within the district and Kengeleni area is of great historical importance having been centre of slave trades.

The district host a majority of star rated hotels and is a major attraction of both domestic and foreign tourists due to the sandy beaches and calm sea waters throughout the year.

3.2 Administrative Boundaries

The district is divided into two divisions namely Kisauni and Bamburi. These are further sub-divided into three locations and further into seven sub-locations. The district also makes up Kisauni Constituency and consequently sub-divided into four electoral wards.

The district covers an area of 109Km² and border Kilifi to the North, Chagamwe to the South, Mvita to the West and the Indian Ocean to the East.

Table 3: Administrative and Political Units

Division	Land Area (Sq Km)	No. of Location	No. of Sub-Location	Electoral wards
Kisauni	38.6	2	5	3
Bamburi	71.1	1	5	1
Total	109.7	3	7	4

The District is also part of Mombasa Municipality and wholly covered by the Municipal Council of Mombasa. Thus, a majority of Social Services within the district such as garbage collection and disposal, water supply, drainage and sewerage services and social amenities and supposed to be provided for by the Council.

The district has a stretch of the sandy beaches extending to the sea and by Law the 10Km hinterland inside the ocean forms part of this district.

3.3 Population and Settlement Patterns

According to the Kenya National Bureau of Statistics National Population Censuses of 2009 the district has a population of 405,930 made up of 209,293 male and 196,637 females. The population density in the district is estimated at 3,545 which is the least in the Mombasa County. The growth rate in the district is estimated at xxx% per annum. Population distribution per division and location is as hereunder. There are 112,331 households in the district.

Table 4: Population by Division and sex

Constituency/ District	Division	Area Km ²	1999		2009		2012*	
			Pop.	Density	Pop	Densit y	Pop.	Density
Kisauni	Kisauni	38.6	199,625	5,172	653,930	16,914	315,101	8163
	Bamburi	71.1	44,199	622	414,321	5,827.3	69,768	981
Total		109.7	386,632	3,524.4	1,068,251	9,737	610,288	4,930

Population distribution patterns in the district are varied ranging to high and almost congested areas of Mishomoroni to vastly populated rural areas of Mwakirunge and Nguu Tatu. The distribution is highly influenced by infrastructure net work such as roads, water, electricity, availability and accessibility of areas of gainful employment, cheap housing, security and land tenure systems. This is evidenced by high population densities along the major highway (Mombasa – Malindi) while areas of underdeveloped physical infrastructure such as Mwakirunge registering low population densities. Additionally, sparsely populated areas of Mwakirunge, Mangunja, Mwangala exhibit underdeveloped water supply systems, electricity and other basic infrastructural amenities.

3.4 Poverty

Kisauni District has a poverty incidence of 46% with many persons living below the poverty line. The main economic activity in the district is trade, employment, tourism and small scale farming and fishing.

3.5 Topography and Climate

The district is made up of diversified topographical features and a consistent climatic pattern. The coastal lowland with expansive flat areas rises from 8m above sea level to the high-test point at Nguu Tatu which is 132m above sea level. The district receives rainfall (annual) ranging from lows of 1112mm to a high of 1234mm.

The Coastal plain physiographic belt stretches from Nyali to Shanzu and mostly comprised of areas adjacent to the sea. The district also experiences an undulating plateau sand stones found in the Northern West part of the district comprising of Nguu tatu and Mwakirunge areas.

Closer to the sea, coral reefs are found near ground level and provides excellent base for building stones and has good drainage patterns. In some parts, the coral and limestone deposits reach a thickness of 100m. This is the basis on which there is established the Bamburi Cement factory.

Long rains occur between the month of March and June with 55% reliability and short rains start towards end of October and continue until December/January. Besides the normal rains, the district occasionally experience localized conventional type of rainfall due to land and sea breezes.

The district has no permanent river however, the nature of the rock allow the water table to be high hence making water available in boreholes and this has led to increased water supply through boreholes and water pans. Most areas have piped water from the Mombasa water and sewerage company.

The hottest months are between December and February while the coolest months are between June and August. The maximum temperatures are experienced in January at 33.1⁰C while the coolest month is July at 22.7⁰C. This kind of climate is ideal for tropical crops such as cassava, oranges and coconuts. Other crops include mangoes and cashew-nuts although not done on a commercial level/scale.

3.6 Wild Life:

The area the line will pass is settled and not within a conservation area. No significant indigenous trees are likely to be destroyed. A number of wild animals especially monkeys are common around Bamburi Cement factory and Kisauni has scanty bird life due to lack of forested or swampy areas. The coastal line is rich with marine organisms which need protection from environmental pollution.

3.7 SOCIO ECONOMIC SETTING OF THE PROJECT AREA

Socio economic status of the affected persons

During Public consultation in the EIA process, the Socioeconomic status of affected/neighbouring persons was sought. Majority rely on small scale subsistence farming, with some coupled with a few livestock. A small portion of the people within the project area operate small retail businesses mainly shops, and fruit/vegetable vending. Majority of the persons interviewed were low income earners mainly because of unreliable rainfall and lack of farmable parcels of land. Kisauni district however has some common challenges and cross cutting issues experienced in Agriculture, livestock, education, Gender and Social services, youth, water, roads, Environment, Health and Forestry.

Agriculture:

Challenges facing Agriculture include erratic and unpredictable rainfall, high rate of environmental degradation, low use of farm inputs, low uptake and adoption of technology, poor trade and low market value for agricultural produce, and undeveloped management system.

The area is ideal for tropical crops such as cassava, oranges, coconuts mangoes and cashew-nuts although not done on a commercial level/scale due to small parcels of land owned by majority of the residents.

Livestock:

Main challenges include frequent outbreak of notifiable diseases (Rabbits, sheep/ Goat pox, etc), lack of vaccinations, persistent low yields, limited consumption of animal products at household level, low quality products, and escalating environmental degradation.

Education

The area has high illiteracy levels, lack of funding, high drop outs, inadequate teaching staff and some negative influence from the coastal tourism business. Several schools have been built up and the level of primary and secondary enrolments is on the increase. Concordia primary school neighbors the project



Gender and inequality:

Occasioned by poor socialization process, few role models, high levels of youth dropout, low participation of youth in socio-economic activities and policy formulation, high rate of unskilled labour and high rate of drug abuse among the youth.

Water:

There is prevalence of water borne diseases, inadequate water supply for domestic use and mismanagement of community based water schemes. The Mombasa Water and Sewerage services company has installed several water points where the residents fetch water. Piped water in some households and especially in the commercial houses is available. The expansion of the settlements and increasing population in the area is however impacting pressure on water resources.

Roads:

Poor road infrastructure worsened by bad weather, inadequate funding, inadequate technical staff and unreliable road works characterize the interior of the project area.

Environment:

Inadequate waste disposal, poor farming practices and deforestation worsened by erratic weather patterns have contributed to degradation of the area environment. Mushrooming of hotels within the coastal beach need to be managed to avoid marine pollution. Reclamation of abandoned limestone mining quarries has greatly enhanced the vegetation and aesthetics of the area especially the area adjacent the New Bamburi Substation and also near the factory itself all the way to Bamburi Nature trail. Some beach clean up exercises have been organized in the recent past through sponsorship from major stakeholders and involvement of the provincial administration.

Health:

Maternal deaths, infant mortality, late childhood illness, HIV/AIDs/STIs, poor latrines and spillage during rains, poor buildings and unplanned urban development are some of the challenges facing the health sector. Lack of adequate health facilities is also a challenge.

4 CHAPTER FOUR: RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORKS

4.1 Introduction

There are many environmental problems and challenges in Kenya today. Among the cardinal environmental problems include: loss of biodiversity and habitat, land degradation, land use conflicts, human animal conflicts, water management and environmental pollution. This has been aggravated by lack of awareness and inadequate information amongst the public on the consequences of their interaction with the environment.

There is a growing concern in Kenya and at global level that many forms of development activities cause damage to the environment. Development activities have the potential to damage the natural resources upon which the economies are based. Environmental Impact Assessment is a useful tool for protection of the environment from the negative effects of developmental activities. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound.

Kenya has over 77 statutes which relate to environmental concerns. Most of the statutes are sector specific, covering issues such as land use, occupational health and safety, water quality, wildlife, public health, soil erosion, air quality among others.

4.2 Environmental Policy Framework

Environmental Impact Assessment (EIA) critically examines the effects of a project on the environment. An EIA identifies both negative and positive impacts of any development activity or project, how it affects people, their property and the environment. EIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones. EIA is basically a preventive process. It seeks to minimize adverse impacts on the environment and reduces risks. If a proper EIA is carried out, then the safety of the environment can be properly managed at all stages of a project-planning, design, construction, operation, monitoring and evaluation as well as decommissioning. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 1999 and other relevant national laws.

4.3 Institutional Framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environment Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS) and others.

4.3.1 National Environment Management Authority (NEMA)

The objective and purpose for which NEMA was established was to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. However, NEMA's mandate is designated to the following committees:

4.3.2 Provincial and District Environment Committees

According to EMCA, 1999 No. 8, the Minister by notice in the gazette appoints Provincial and District Environment Committees of the Authority in respect of every province and district respectively. The Provincial and District Environment Committees are responsible for the proper management of the environment within the Province and District in respect of which they are appointed. They are also to perform such additional functions as are prescribed by the Act or as may, from time to time be assigned by the Minister by notice in the gazette. The decisions of these committees are legal and it is an offence not to implement them.

4.3.3 Public Complaints Committee

The Committee performs the following functions:

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

4.3.4 National Environment Action Plan Committee

This Committee is responsible for the development of a 5-year Environment Action Plan among other things. The National Environment Action Plan shall:

- Contain an analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time.
- Contain an analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity.
- Recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and operational processes.
- Recommend methods for building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development.
- Set out operational guidelines for the planning and management of the environment and natural resources.
- Identify actual or likely problems as may affect the natural resources and the broader environment context in which they exist.
- Identify and appraise trends in the development of urban and rural settlements, their impact on the environment, and strategies for the amelioration of their negative impacts.
- Propose guidelines for the integration of standards of environmental protection into development planning and management.

- Identify and recommend policy and legislative approaches for preventing, controlling or mitigating specific as well as general diverse impacts on the environment.
- Prioritise areas of environmental research and outline methods of using such research findings.
- Without prejudice to the foregoing, be reviewed and modified from time to time to incorporate emerging knowledge and realities and;
- Be binding on all persons and all government departments, agencies, States Corporation or other organ of government upon adoption by the national assembly.

4.3.5 Standards and Enforcement Review Committee

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

4.3.6 National Environment Tribunal

This tribunal guides the handling of cases related to environmental offences in the Republic of Kenya.

4.3.7 National Environment Council (NEC)

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

4.4 Kenyan Environmental Legal Framework

Previously, environmental management activities were implemented through a variety of instruments such as policy statements, permits and licences and sectorial laws. There was however need for a stronger enforcement machinery to achieve better standards in environmental management. The enactment of the Environmental Management and Coordination Act (EMCA) in 1999 provided for the establishment of an appropriate legal and institutional framework for the management and protection of the environment.

4.4.1 The Environment Management and Co-ordination Act, 1999

The Environmental Management and Coordination Act (EMCA) 1999 is an Act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.

The main objective of the Act is to:

- Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- Provide a framework legislation for over 77 statutes in Kenya that contain environmental provisions;
- Provide guidelines for Environmental Impact Assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

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

Part II of the Environment Management & Coordination Act, 1999 states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment. In order to partly ensure this is achieved, Part VI of the Act directs that any new programme, activity or operation should undergo Environmental Impact Assessment and a report prepared for submission to the National Environmental Management Authority (NEMA), who in turn may issue a license as appropriate.

Part VIII section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. Section 73 require that operators of projects which discharges effluent or other pollutants to submit to NEMA accurate information about the quantity and quality of the effluent. Section 74 demands that all effluent generated from point sources be discharged only into the existing sewerage system upon issuance of prescribed permit from the local authorities or from the licensee. Finally, section 75 requires that parties operating a sewerage system obtain a discharge license from NEMA to discharge any effluent or pollutant into the environment.

Section 87 Sub-section 1 states that no person shall discharge or dispose of any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person, while section 88 provides for acquiring of a license for generation, transporting or operating waste disposal facility. According to section 89, any person who, at the commencement of this Act, owns or operates a waste disposal site or plant or generate hazardous waste, shall apply to the NEMA for a licence. Sections 90 through 100 outline more regulations on management of hazardous and toxic substances including oils, chemicals and pesticides.

Finally the Environmental Impact Assessment Guidelines require that a study be conducted in accordance with the issues and general guidelines spelt out in the Second and third schedules of the Environmental Regulations (2003). These include coverage of the issues on Schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on Schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures.

Under EMCA 1999 NEMA has developed regulations to establish guidelines for better management of the environment and promote sustainable development. To date, the regulations presented in the following sections have been gazetted.

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

The Environmental Impact Assessment and Audit Regulations state in Part III Rule No. 6 that an Environmental Impact Assessment study shall be conducted in accordance with the terms of reference developed.

Part III Rule 16, takes into account environmental, social, cultural, economic, and legal considerations, and shall:

- Identify the anticipated environmental impacts of the project and the scale of the impacts;
- Identify and analyse alternatives to the proposed project;
- Proposed mitigation measures to be taken during and after the implementation of the project; and
- Develop an environmental management plan with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing the measures

The Proponent has commissioned the Environmental Impact Assessment study in compliance with the Act. The environmental management and monitoring plan laid out in this report shall be adhered to by the Proponent.

b) Environmental Management and Coordination (Water Quality) Regulation 2006

These regulations are described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 74, September 2006. The regulation applies to drinking water, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purposes. This includes the following:

- Protection of sources of water for domestic use;
- Water for industrial use and effluent discharge;
- Water for agricultural use.

The regulations outline:

- Quality standards for various sources of domestic water;
- Quality monitoring for sources of domestic water;
- Standards for effluent discharge into the environment;
- Monitoring guide for discharge into the environment;
- Standards for effluent discharge into public sewers;
- Monitoring for discharge of treated effluent into the environment.

This Legal Notice on Water Quality provides that anyone who discharges effluent into the environment or public sewer shall be required to apply for Effluent Discharge License. The license for discharge is Ksh 5,000 while annual license fee for discharge into the environment will be Ksh. 20,000 or Ksh 100,000 depending on the facility. Non-compliance with the regulations attracts a fine not exceeding Ksh 500,000 and the polluter pay principle may apply depending on the court ruling. Table 4, gives Waste Water Discharge Guidelines from NEMA

Table 5: NEMA Waste Water Discharge Guidelines

Parameter	Units	Discharge into public sewers	Discharge into open water bodies
PH	-	6.0 – 9.0	6.0 – 9.0
BOD (5 days at 20° C) not to exceed	Mg/l	500	20
COD not to exceed	Mg/l	1000	50
Total suspended solids not to exceed	Mg/l	500	30
n-hexane extract not to exceed	Mg/l	Nil	30
Oils(mineral, animal & vegetable)	Mg/l	10	5
Total phenol not to exceed	Mg/l	10	2
Copper (Cu) not to exceed	Mg/l	1.0	0.05
Zinc (Zn) not to exceed	Mg/l	5.0	0.5
Lead (Pb) not to exceed	Mg/l	1.0	0.1
Arsenic (As) not to exceed	Mg/l	0.2	0.002
Total Mercury (Hg) not to exceed	Mg/l	0.05	0.005
Alkyl mercury not to exceed	Mg/l	0.01	0.001
PCB (Polychlorinated biphenyl) not to exceed	Mg/l	Nil	0.003
Pesticides residues not to exceed	Mg/l	Nil	0.05
Sulphates not to exceed	Mg/l	1000	500
Dissolved manganese (Mn)	Mg/l	-	1.0
Chromium (total)	Mg/l	1.0	0.1
Chloride not to exceed	Mg/l	1000	1000
Fluoride not to exceed	Mg/l	-	2.0
Coliform bacteria	-	-	1000/100ml
Free ammonia not to exceed	Mg/l	2.0	0.2
Sulphides (S) not to exceed	Mg/l	2.0	0.1
Cadmium (Cd) not to exceed	Mg/l	0.5	0.05
Cyanide (CN) total not to exceed	Mg/l	0.5	0.1
Organic phosphorous not to exceed	Mg/l	30	1.0
Chromium six (Cr 6) not to exceed	Mg/l	0.5	0.005
Total dissolved solids not to exceed	Mg/l	3000	1200
Selenium (Se) not to exceed	Mg/l	1.0	0.05
Nickel (Ni) not to exceed	Mg/l	3.0	1.0
Barium (Ba) not to exceed	Mg/l	10	2.0
Temperature not to exceed	-	+/- 2° of the ambient temperature of the sewer	+/- 2° C of ambient temperature of the water body
Oil/ grease	Mg/l	No trace	Nil/ no trace
Toxic substances	Mg/l	Nil	Nil
Odour	-	-	Not objectionable to the nose
Colour	-	-	Not objectionable to the eye or
<i>Environmental Impact Assessment Project Report</i>			Page 30 exceed 5 mg Pt/l

C) Environmental Management and Coordination (Waste Management) Regulation 2006

These regulations are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69, September 2006. These Regulations apply to all categories of waste as provided in the regulations. These include:

- Industrial wastes;
- Hazardous and toxic wastes;
- Pesticides and toxic substances;
- Biomedical wastes
- Radio-active substances.

These Regulations outline requirements for handling, storing, transporting, and treatment/disposal of all waste categories as provided therein.

The regulation provides that a waste generator shall use cleaner production methods, segregate waste generated and the waste transporter should be licensed. The notice further states no person shall engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment licence issued by the National Environment Management Authority.

d) Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006

These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84, December 2006. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

Additionally, these links provide for the local enforcement of the International Convention on Biological Diversity (CBD).

The proposed site has no rich biodiversity and there is no known rare or endangered species in the area.

e) Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The fossil fuels considered are petrol, diesel, fuel oils and kerosene.

This legislation gives caution to proponent and contractor on careless handling of fuels and possible consequences for failing to observe.

f) Environmental Management and Coordination, (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations 2009

These regulations are described in Legal Notice No. 19 of the Kenya Gazette Supplement No. 9, February 2009. These regulations include management of wetlands, wetland resources, river banks, lake shores and sea shores. Specific sections have requirements that apply to wetlands in Kenya either in private or public land. These regulations empower the District Environment Committee to co-ordinate, monitor and advise on all aspects of wetland resource management within the district.

g) Environmental Management and Coordination, (Noise and Excessive Vibration Pollution) Regulations 2009

These regulations are described in Legal Notice No. 31 of the Kenya Gazette Supplement No. 21, May 2009. These regulation 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. It also prohibits excessive vibration which annoys, disturb, injure or endanger the comfort, repose, health or safety of others and the environment or excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 metres from any moving source.

Part 11 section 6(1) provides that no person shall cause noise from any source which exceeds any sound level as set out in the First Schedule of the regulations.

This regulation guides on permissible noise levels during construction, operation and decommissioning phases.

4.4.2 Public Health Act (Cap. 242)

This is an Act of Parliament to make provisions for securing and maintaining health. Sections include those dealing with notification of infectious diseases; inspection of infected premises and examination of persons suspected to be suffering from infectious diseases; rules for prevention of diseases; venereal diseases and infection by employees, among others. The proposed project will encourage the movement of people in search of jobs and opportunities, and with this, the risk associated with spread of diseases.

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 and include nuisances caused by accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

The environmental management plan (EMP) advises the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost.

4.4.3 Local Government Act (Rev. 1998)

This Act provides for the establishment of authorities for local government, to define their functions and to provide for matters connected therewith and incidental thereto. In all areas where the project shall be undertaken, the local authorities will require to be informed.

Section 160 helps local authorities ensure effective utilization of the sewages systems. Section 170, allows the right to access to private property at all times by local authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs of sewers.

The Act under section 176 gives powers to local authority to regulate sewage and drainage, fix charges for use of sewers and drains and require connecting premises to meet the related costs. According to section 174, any charges so collected shall be deemed to be charges for sanitary services and will be recoverable from the premise owner connected to the facility. Section 264 also requires that all charges due for sewage sanitary and refuse removal shall be recovered jointly and severally from the owner and occupier of the premises in respect of which the services were rendered. This in part allows for application of the “polluter-pays-principle”

Section 163 allows the County Council to prohibit all business, which may be or become a source of danger, discomfort, or annoyance due to their noxious nature through smoke, fumes, dust, noise, or vibrations. Section 165 allows the local authority to refuse to grant or renew any license which is empowered in this act or any other written law on the grounds that the activity does not conform to the requirements of any by-laws in force in the area of such local authority the granting of the license would be contrary to the public interest.

Part XI section 168 provides that every municipal council, town council or urban council may establish and maintain sewerage and drainage works within or without its area of jurisdiction. For purposes of the land required for such development, section 144 states in part “A local authority may, subject to the approval of the Minister, apply to the government or any other authority having power to acquire land required for purposes of any of its functions, to be acquired compulsorily for and on behalf of, and at the expense of the local authority”. The Act, however, does not indicate the repercussions of impacts on landowners.

Section 160 helps local authorities ensure effective utilization of the sewerage systems. It states in part that municipal authorities have powers to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with all kinds of refuse and effluent and where such service is established, compel its use by persons to whom the service is available. However, to protect against illegal connections, section 173 states that any person who, without prior consent in writing from the council, erects a building on: excavate or opens-up: or injures or destroys any sewers, drains or pipes shall be guilty of an offence. Any demolitions and repairs thereof shall be carried out at the expense of the offender.

For maintenance of such sewerage systems, the following relevant clauses have been drawn from section 169 of the Act that reads in part “A municipal council may for purposes of carrying out any drainage or sewerage works-----”:

“-----cause such sewers, drains and pipes to be made, altered, deepened, covered, laid and maintained either within or without as may be necessary for effectively disposing of the sewage and draining of its area -----“

“-----carry such sewers, drains and pipes through, across, or under any public road, street, square or open place laid out for public road, street, square or open space without paying compensation and after giving 30 days notices in writing to the owner or occupier of the intention to do so -----“

“-----from time to time alter, enlarge, divert, discontinue, close-up or destroy any sewers, drains, or pipes under its control -----“

Section 170, allows the right of access to private property at all times by local authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs. In addition, the municipal Council may establish and maintain sewage farms or disposal works, and dispose of the effluent therefrom, but shall not be liable for any nuisance or damage as a consequence of proper and ordinary conduct of the sewage farms or disposal works (section 171). To ensure sustainability in this regard, the local authority is empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided for under section 201 of the Act.

To ensure sustainability in this regard, the local authority is empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided for under section 201 of the Act.

The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendations provided for mitigation/minimisation/avoidance of adverse impacts arising from the project activities.

4.4.4 Physical Planning Act, 1996

The Local Authorities are empowered under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area.

Section 24 of the Physical Planning Act gives provision for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. The plan shows the manner in which the land in the area may be used.

Section 29 of the physical Planning Act gives county councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans. On zoning, the act empowers them to formulate by-laws in respect of use and density of development.

Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The act also gives the local authority power to compel the developer to restore the land on which such development has taken place to its original conditions within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. In addition, the same section also states that no person shall carry out development within the area of a local authority without development permission granted by the local authority. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority.

Section 36 states that if in connection with development application a local authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an Environmental Impact Assessment report. The Environmental Impact Assessment report must be approved by the National Environmental Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999. Section 38 states that if the local authority finds out that the development activity is not complying to all laid down regulations, the local authority may serve an enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to its original conditions.

The site is currently under electrical use and the proponent has also commissioned an Environmental Impact Assessment study for approval by NEMA.

4.4.5 Land Planning Act (Cap. 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the local authorities submit any plans to the Minister for

approval, steps should be taken as may be necessary to involve the owners of any land affected by such plans.

4.4.6 Water Act, 2002

The Act vests the water in the State and gives the provisions for the water management, including irrigation water, pollution, drainage, flood control and abstraction. It is the main legislation governing the use of water especially through permit system.

Part II, section 18, of the Water Act 2002 provides for national monitoring and information system on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority (WRMA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information thereof furnished to the authority.

The Water Act Cap 372 vests the rights of all water to the state, and the power for the control of all body of water with the Minister, the powers is exercised through the Minister and the Director of water resources in consultation with the water catchments boards, it aims at provision of conservation of water and appointment and use of water resources.

Part II Section 18 provides for national monitoring and information systems on water resources. Following on this, Sub-section 3 allows the Water Resources Management Authority to demand from any person, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept and the information thereof furnished to the authority on demand.

Section 25 of the Act requires a permit to be obtained for among others any use of water from a water resources, discharge of a pollutant into any water resource. According to section 29 of the same Act, application for such a permit shall be subject to public consultation as well as an Environmental Impact Assessment as per the Environmental Management and Coordination Act, 1999. The conditions of the permit may also be varied if the authority feels that the water so used is causing deterioration of water quality or causing shortage of water for other purposes that the authority may consider has priority. This is provided for under section 35 of the Act.

Section 73 of the Act allows a person with a license to supply water (licensee) to make regulations for purposes of protecting against degradation of sources of water which he is authorised to take. Under the Act, the licensee could be a local authority, a private Trust or an individual and the law will apply accordingly under the supervision of the Regulatory Board.

Section 76 states that no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including the payment rates for the discharge as may be provided under section 77 of the same Act.

All construction, operation and decommissioning phases will take caution to contain oil leaks to prevent soil and water pollution. Soil erosion and interference with natural drainage pattern of the area will be taken care of.

4.4.7 Energy Act of 2006

This is an Act of Parliament passed to amend and consolidates the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority and for connected purposes.

The Energy Act of 2006 replaced the Electric Power Act of 1997 and The Petroleum Act, Cap 116. The Energy Act, amongst other issues, deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes.

The Energy Act, 2006, also established the Energy Regulatory Commission (ERC) whose mandate is to regulate all functions and players in the Energy sector. One of the duties of the ERC is to ensure compliance with Environmental, Health and Safety Standards in the Energy Sector, as empowered by Section 98 of the Energy Act, 2006.

In this respect, the following environmental issues will be considered before approval is granted:

1. The need to protect and manage the environment, and conserve natural resources;
2. The ability to operate in a manner designated to protect the health and safety of the project employees; the local and other potentially affected communities.

Licensing and authorisation to generate and transmit electrical power must be supported by an Environmental Impact Assessment Report (EIA) approved by NEMA.

Part IV Section 80(1) provides that a person shall not conduct a business of importation, refining, exportation, whole sale, retail, storage or transportation of petroleum, except under and in accordance with the terms and conditions of a valid licence.

Part IV Section 90 (1) stipulates that a person intending to construct a pipeline, refinery, bulk storage facility or retail dispensing site shall before commencing such construction, apply in writing to the Energy Regulatory commission for a permit to do so. The application shall: specify the name and address of the proposed owner; be accompanied by three (3) copies of plans and specifications and be accompanied by an Environmental Impact Assessment (EIA) Report.

Part IV section 91(1) stipulates that the Energy Regulatory Commission shall, before issuing a permit under section 90, take into account all relevant factors including the relevant government policies and compliance with Environment Management and Coordination Act, 1999 and in particular EIA report as per Impact Assessment and Audit Regulations 2003, the Physical Planning Act, 1996 and the Local Government Act.

Part iv section 100 (1) provides that it is an offence if a person being the owner or operator of a refinery, pipeline, bulk liquefied Petroleum gas or natural gas facility, service station, filling station or storage depot, fails to institute appropriate environmental, health or safety control

measures. The offence if convicted, he/she shall be liable to a fine not exceeding two million shillings or to a maximum term of imprisonment of two years, or to both.

The proposed project will be required to follow the guidelines set out in this Act.

4.4.8 The Standards Act Cap 496

The Act is meant to promote the standardization of the specification of commodities, and code of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control.

The proponent will ensure that commodities and codes of practice utilized in the project adhere to the provisions of this Act.

All materials and spares used for construction will comply with the Standardized specifications and Certification.

4.4.9 Penal Code Act (Cap.63)

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commits an offence.

The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/minimisation/avoidance of adverse impacts arising from the project activities.

4.4.10 The Wildlife Conservation and Management Act, Cap 376

The Wildlife (Conservation and Management) Act, Cap 376 of 1976, as amended in 1989, covers matters relating to wildlife in Kenya including protected areas, activities within protected areas, control of hunting, import of wildlife, enforcement and administrative functions of Wildlife authorities.

This Act provides for the protection, conservation and management of wildlife in Kenya. The provisions of this Act should be applied in the management of the project.

Part III Section 13 subsection (I) stipulates that any person who not being an officer of Kenya Wildlife Service hunts any animal in a National Park shall be guilty of a forfeiture offence and liable to a fine or imprisonment. Subsection 2 of the Act likewise provides that any person who, without authorization conveys into a National Park, or being within the area thereof, in possession of, any weapon, ammunition, explosive, trap or poison, shall be guilty of a forfeiture offence

The Act provides that no person is allowed to use any aircraft, motor vehicle or mechanically propelled vessel in such a manner as to drive, stampede or unduly disturb any protected animal or game animal. Therefore it will be prudent that the construction workforce is conversant with the provisions of this Act.

The proposed project is not located within a conservation/protected area and this act will not be triggered.

4.4.11 The Lakes and Rivers Act Chapter 409 Laws of Kenya:

This Act provides for protection of rivers, lakes and associated flora and fauna. The provisions of this Act may be applied in the management of the project.

4.4.12 The Forestry Services Act, 2005

The Act led to the establishment of Kenya Forest Service which is charged with management of forests in consultation with the forest owners. The body enforces the conditions and regulations pertaining to logging, charcoal making and other forest utilization activities.

To ensure community participation in forest management, the service collaborates with other organizations and communities in the management and conservation of forests and for the utilization of the biodiversity.

Section 43 (1) provides that if mining, quarrying or any other activity carried out in the forest, where the activity concerned is likely to result in forest cover depletion, the person responsible shall undertake compulsory re-vegetation immediately upon the completion of the activity.

The proposed project is not next to a conservation area and this act will not be triggered.

4.4.13 Occupational Safety and Health Act, 2007

This is an Act of parliament to provide for the safety, health and welfare of all workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. It applies to all workplaces where any person is at work, whether temporarily or permanently.

The purpose of the Act is to:

- Secure the safety, health and welfare of persons at work;
- Protect persons other than persons at work against safety and health arising out of, or in connection with the activities of persons at work.

The Act provides that before any premises are occupied, or used as a workplace, a certificate of registration must be obtained from the Director of Occupational Safety and Health Services. The Act provides for the health, safety and welfare for employees at workplaces. This shall be considered at the construction, implementation and decommissioning phases of the project. The following are other provisions of the Act.

4.4.13.1 Health

The premise must be kept clean; a premise must not be overcrowded. The circulation of fresh air must secure adequate ventilation of workrooms. There must be sufficient and suitable lighting in every part of the premise in which persons are working or passing. There should also be sufficient and suitable sanitary conveniences separate for each sex, must be provided subject to conformity with any standards prescribed by rules. Food and drinks should not be partaken in dangerous places or workrooms. Provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles, gas masks, and head covering, and maintained for the use of workers in any process involving exposure to wet or to any injurious or offensive substances.

4.4.13.2 Safety

Fencing of premises and dangerous parts of other machinery is mandatory. Training and supervision of inexperienced workers, protection of eyes with goggles or effective screens must be provided in certain specified processes. Floors, passages, gangways, stairs, and ladders must be soundly constructed and properly maintained and handrails must be provided for stairs. Special precaution against gassing is laid down for work in confined spaces where persons are liable to overcome by dangerous fumes. Air receivers and fittings must be of sound construction and properly maintained. Adequate and suitable means for extinguishing fire must be provided in addition to adequate means of escape in case of fire must be provided.

4.4.13.3 Welfare

An adequate supply of both quantity and quality of wholesome drinking water must be provided. Maintenance of suitable washing facilities, accommodation for clothing not worn during working hours must be provided. Sitting facilities for all female workers whose work is done while standing should be provided to enable them take advantage of any opportunity for resting.

Every premise shall be provided with maintenance, readily accessible means for extinguishing fire and person trained in the correct use of such means shall be present during all working periods.

Regular individual examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earning for the employees and if possible within normal working hours.

The (OSH) Act provides for development and maintenance of an effective programme of collection, compilation and analysis of occupational safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are adhered.

The environmental management plan (EMP) advises the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost.

4.4.14 Work Injury and Benefits Act,(WIBA) 2007

This Act provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc. *In case of any accidents or incidents during the project cycle, this Act will guide on the course of action to be taken.*

4.4.15 Occupiers Liability Act (Cap. 34)

This Act provides that it's the duty of occupier of the premises owes to his visitors in respect of danger and risk due to the state of the premises or to things omitted or attributes an affliction on his/her health to a toxic materials in the premises.

4.4.16 The Radiation Protection Act (Cap 243 Laws of Kenya)

This is an Act of Parliament to provide for the protection of the public and radiation workers from the dangers arising from the use of devices or material capable of producing ionizing radiation and for connected purposes.

Since 1982, Kenya decided to join in the global movement for the use of nuclear energy for peaceful purposes, a movement lead by the International Atomic Energy Agency (IAEA). Most of such uses are in the fields of medicine, agriculture, energy and environmental monitoring. The dangers of injury to the public prompted the adoption of the Radiation Protection Act (Cap 243) in November 1984 to provide according to its citation, protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation and for connected purpose.

The Act prohibits the unauthorized manufacture, production, possession or use, sale, disposal, lease, loan or dealership, import, export of any irradiating device or radioactive material. All authorized buyers, sellers, users, of such device must be properly licensed. The Act is administered by the Chief Radiation Protection Officer assisted by a Radiation Protection Board.

The proposed project won't emit/produce ionizing radiations.

4.4.17 The Traffic Act Chapter 295 Laws of Kenya

This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users.

Many types of equipment and fuel shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations.

The Act also prohibits encroachment on and damage to roads including land reserved for roads. *The project will observe the provisions of the Act.*

4.4.18 The Public Roads and Roads of Access Act (Cap 22 Laws of Kenya)

Section 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent landowners seeking permission to construct the respective roads.

The project design concept has left the required road reserves and relevant road widening surrenders.

This Act consolidates the law relating to traffic on all public roads. The Act also prohibits encroachment on and damage to roads including land reserved for roads.

The proposed facility location complies with the provision of the Act. It is not on road reserves and six meters of the project plot along the road will be left free to cater for any future road expansion.

4.4.19 The Way leaves Act Cap 292

According to the Way leaves Act cap 292 Section 2, Private land does not include any land sold or leased under any Act dealing with Government lands. Section 3 of the Act states that the Government may carry any sewer, drain or pipeline into, through, over or under any lands whatsoever, but may not in so doing interfere with any existing building. Section 8 further states that any person who, without the consent of the Permanent Secretary to the Ministry responsible for works (which consent shall not be unreasonably withheld), causes any building to be newly erected over any sewer, drain or pipeline the property of the Government shall be guilty of an offence and liable to a fine of one hundred and fifty shillings, and a further fine of sixty shillings for every day during which the offence is continued after written notice in that behalf from the Permanent Secretary; and the Permanent Secretary may cause any building erected in contravention of this section to be altered, demolished or otherwise dealt with as he may think fit, and may recover any expense incurred by the Government in so doing from the offender.

The incoming 33 kV distribution line will be from New Bamburi 132/33 KV Substation within the same compound and in case wayleaves for the outgoing feeders will be acquired; this act will be observed.

4.4.20 The Agriculture Act, Cap 318 of 1980 (revised 1986)

This Act has stated objectives to promote and sustain agricultural production, provide for conservation of the soil and its fertility, and stimulate the development of agricultural land in accordance with accepted practices of good land management and good husbandry.

The proposed site is not adjacent to settlements or small scale agricultural activities and this act will not be triggered.

4.4.21 Antiquities and Monuments Act, 1983 (Cap 215)

This Act aims to preserve Kenya's national heritage. Kenya is rich in its antiquities, monuments and cultural and natural sites which are spread all over the country. The National

Museums is the custodian of the country's cultural heritage. Through the National Museums many of these sites are protected by law by having them gazetted under the Act.

The project site has no cultural/ natural sites and this act will not be triggered.

4.4.22 The Registration of Titles Act Cap 281

This Act provides for the transfer of the land by registration of titles. Parts within the Act elaborate on mechanisms of bringing lands under the Act, and for related purposes. The Act also elaborates on the incorporation of group representatives and the administration of groups.

Section 34 of this Act states that when land is intended to be transferred or any right of way or other easement is intended to be created or transferred, the registered proprietor or, if the proprietor is of unsound mind, the guardian or other person appointed by the court to act on his/her behalf in the matter, shall execute, in original only, a transfer in form F in the First Schedule, which transfer shall, for description of the land intended to be dealt with, refer to the grant or certificate of title of the land, or shall give such description as may be sufficient to identify it, and shall contain an accurate statement of the land and easement, or the easement, intended to be transferred or created, and a memorandum of all leases, charges and other encumbrances to which the land may be subject, and of all rights-of-way, easements and privileges intended to be conveyed.

The Proponent has a valid title deed for the project plot. (See attached documents on land in Appendices section)

4.4.23 The Land Titles Act Cap 282

The Land Titles Act Cap 282 section 10 (1) states that there shall be appointed and attached to the Land Registration Court a qualified surveyor who, with such assistants as may be necessary, shall survey land, make a plan or plans thereof and define and mark the boundaries of any areas therein as, when and where directed by the Recorder of Titles, either before, during or after the termination of any question concerning land or any interest connected therewith, and every area so defined and marked shall be further marked with a number of other distinctive symbol to be shown upon the plan or plans for the purposes of complete identification and registration thereof as is herein after prescribed.

The proponent has a title deed for the plot land Reference Plot No. 776 – Bamburi, North-Coast.

4.4.24 The Land Acquisition Act Chapter 295 Laws of Kenya

The Act provides for the compulsory or otherwise acquisition of land from private ownership for the benefit of the general public. Section 3 states that when the Minister is satisfied on the need for acquisition, notice will be issued through the Kenya Gazette and copies delivered to all the persons affected. Full compensation for any damage resulting from the entry onto land to do things such as survey upon necessary authorization will be undertaken in accordance with section 5 of the Act. Likewise where land is acquired compulsorily, full compensation

shall be paid promptly to all persons affected in accordance to sections 8 and 10 along the following parameters:

- (i) Area of land acquired
- (ii) The value of the property in the opinion of the Commissioner of land (after valuation),
- (iii) Amount of the compensation payable,
- (iv) Market value of the property,
- (v) Damages sustained from the severance of the land parcel from the land,
- (vi) Damages to other property in the process of acquiring the said land parcel,
- (vii) Consequences of changing residence or place of business by the land owners,
- (viii) Damages from diminution of profits of the land acquired.

Part II of the Act allows for the temporary acquisition of the land for utilisation in promotion of the public good for periods not exceeding 5 years. At the expiry of the period, the Commissioner of Land shall vacate the land and undertake to restore the land to the conditions it was before. Any damages or reduction of value shall be compensated to the landowners.

Any land that may be acquired for way leaves will be done observing this act

4.4.25 The Civil Aviation Act Cap 394

Under this act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of Transmission lines and masts when they are on or proximal to flight Paths so as to ensure the safety of flying aircraft.

Under Section 9 of this act, notwithstanding the provisions of any written law, or terms of any deed, grant, lease, or license concerning the use and occupation of land, the minister may, where he considers it to be necessary in the interests of air navigation, by order published in the Gazette, prohibit the erection within a declared area of any structure above height specified in the order.

Failure to adhere to the provisions of this act, one commits an offence and upon conviction shall be liable to a fine not exceeding two million shillings or to imprisonment for a term not exceeding three years or to both.

The proposed Substation is not going to penetrate the atmosphere beyond 15 meters and is not proximal to any airstrip and this act will not be triggered.

4.5 International Environmental Guidelines

Kenya is a signatory to a number of conventions on sustainable development and is a member of various bilateral and multilateral organizations. Some of the relevant International treaties and conventions include:

- Vienna Convention for the Protection of the Ozone Layer. Inter-governmental negotiations for an International agreement to phase out ozone depleting substances concluded in March 1985 with The adoption of this convention to encourage Inter-governmental co-operation on research, systematic observation of the ozone layer, monitoring of CFC production and the exchange of information;
- Montreal Protocol on Substances that Deplete the Ozone layer: Adopted in September 1987 and intended to allow the revision of phase out schedules on the basis of

periodic scientific and technological assessment, the Protocol was adjusted to accelerate the phase out schedules and has since been amended to introduce other kinds of control measures and to add new controlled substances to the list.

- The Basel Convention: Sets an ultimate objective of stabilizing greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system;
- Kyoto Protocol: Drawn up in 1997, pursuant to the objectives of the United Nations Framework Convention on Climate Change, in which the developed nations agreed to limit their greenhouse gas emissions, relative to the levels emitted in 1990;
- Convention on Biological Diversity (CBD, 1992): This Convention entered into force on 29 December 1993, and its objectives are to: conserve biological diversity; use biological diversity in a sustainable fashion and share the benefits of biological diversity fairly and equitably. This Convention governs Kenya's international obligations regarding biological diversity;
- UNESCO Convention for the protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972): This Convention aims to encourage the identification, protection, and preservation of Earth's cultural and natural heritage. It recognizes that nature and culture are complementary and that cultural identity is strongly related to the natural environment in which it develops;
- Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention): The Convention was signed in Iran in 1971 and came into force in 1975. It represents the first attempt to establish a legal instrument providing comprehensive protection for a particular type of ecosystem. The Ramsar parties agree to implement their planning so as to promote conservation of the wetlands included in the list. There is no Ramsar site near the proposed site.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): This convention seeks to control the trade in species of wild animals and plants that are, or may be, threatened with extinction as a result of International trade. CITES is an important line of defense against the threat posed to diversity by invasive species.
- The Africa-Eurasia Migratory Water Bird Agreement (AEWA, 1995): The goal of the agreement is to protect migratory waterfowl by ensuring that they are protected for the entire length of their migratory routes. The list of birds protected under the AEWA Convention covers 235 species of birds.
- African Convention on Conservation of Nature and Natural Resources (1968): This Convention of the African Union is ratified by 40 African countries, including Kenya. The fundamental principle requires contracting states to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people.

Kenya has a duty under these multilateral agreements. The project should adhere to strict guidelines and procedures to ensure the agreements are not violated.

4.6 World Bank Environment and Social Safeguards 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 borrower staffs 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 population.

The Safeguard Policies aims at improving decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

4.6.1 Environment Assessment (Operational Policy, OP/BP 4.01)

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies'.

The EMP developed in this report will ensure the project is environmentally sound and sustainable.

4.6.2 Natural Habitats (Operational Policy, OP/BP 4.04)

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species.

The proposed project doesn't trigger this policy because the project won't cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project). The substation will pose insignificant environmental impacts.

4.6.3 Indigenous Peoples (Operational Policy 4.10)

The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.

The proposed project doesn't trigger this policy because there are no indigenous peoples that will be affected by the project.

4.6.4 Physical Cultural Resources (Operational Policy 4.11)

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.

The policy will not be triggered.

4.6.5 Involuntary Resettlement (Operational Policy, OP/BP 4.12)

The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.

The policy will not be triggered because the project will be on the proponent's parcel of land and most power lines will be along the Roads.

4.6.6 Forests (Operational Policy, OP/BP 4.36)

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

This policy will not be triggered. Gazetted Forests in the district will not be affected by this development.

5 CHAPTER FIVE: PUBLIC PARTICIPATION

5.1 Public Stakeholder Consultation

Public participation is an essential and legislative requirement for environmental authorization. The EIA team undertook the public stakeholder consultation (PSC) for the proposed project in accordance with the requirements for an EIA Study stipulated in the EMCA, 1999 and EIA/EA Regulations 2003.

The purpose of public participation is to identify PAPs and to allow such parties the opportunity to provide input and comment on the EIA process, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making. In complying with the public participation process (PPP) for the EIA, consultations were carried out to ensure that issues, concerns and potential impacts identified by PAPs, including the authorities, proponents, technical specialists and the public are addressed fully.

5.2 Sources of Information

Public participation was a key component of the EIA of the Proposed New Bamburi 33/11kV substation. Positive and negative views and comments of the immediate neighbours were sought as from 13th to 18th November 2013. The exercise was conducted through one on one consultation with various relevant stakeholders within Kisauni sub-county. The experts first visited the Deputy county commission for consultations before heading to other key departments. Public consultations were conducted through the use of public baraza, pre-designed questionnaires and interviews with neighbours within the project line route.

5.3 Objective of Public Stakeholder Consultation

The objectives of public participation in an EIA are to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them identify issues of concern, and provide suggestions for enhanced benefits and alternatives.

5.4 Meeting with deputy commissioner's team (HODs)

Since the project area falls under the jurisdictions of Kisauni sub-County, consultations were made with the area deputy County Commissioner and his team to get their views and inputs on the project. The project was highly accepted the team added that it of great importance to ensure that the public is widely consulted and awareness created coupled appropriate compensation for those to be affected by the proposed project.

5.5 Local community consultation

Public consultations through barazas, interviews and pre designed questionnaires were done which included visits to different neighbours to solicit views and inputs from them on the proposed line project.



A public forum at Corncodia Primary School held on 16/11/2013.

5.6 Comments and Responses from the Stakeholders

During consultations the Scope of activities associated with project were presented by EIA expert to the stakeholders and community members. The audience was then asked to make suggestions, comments and ask questions for clarifications. All comments received on the consultation were incorporated into the Final Impact Assessment Report and submitted to the NEMA for the issuance of a decision on the proposed development.

Detailed Public Participation and Consultation was envisaged as part of the EIA exercise as required under EMCA 1999 regulations. The consultations were undertaken as part of the EIA in order to obtain the views of stakeholders, their concerns and suggestions towards sustainable implementation of the project. The summary of the various stakeholders concerns and suggestions are summarized below.

The following were the major concerns that were raised up by various stakeholders in regard to the proposed project

Positive Issues

- Employment opportunities
- Improvement of local and national economy

- Boosting of the informal sector
- Improved Security
- Improved Electricity Supply
- Increased protection from Possible lightning strikes

Negative Issues

- Visual Impacts
- Increased dust pollution
- Increased Noise Level and Vibration
- Accidents during Construction
- Possibility of Sexually transmitted diseases
- The project will lead to cutting down of trees
- Soil erosion
- Vegetation clearance

The following suggestions were raised during stakeholders' consultation meetings:

- The proponent should ensure that trees are not cut down unnecessarily and those that will be felled should be replaced elsewhere.
- Blackouts are common in the area and KPLC should try to minimize
- The Proponent should ensure its CSR is felt within the county.
- The stakeholders were also concerned about the start and end dates of the project.
- The proponent should consider employing casual workers from the local areas during construction phase of the project.
- Noise pollution should be controlled.
- The proponent and contractor should control vehicle speed to avoid accidents

Generally the stakeholders consulted were in support of the proposed project.

6 CHAPTER SIX: IDENTIFICATION OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS OF THE PROPOSED SUBSTATION:

Introduction

This Section identifies and discusses both negative and positive impacts associated with the proposed distribution Substation. The impacts are identified according to Phases namely: Construction Phase, Operational Phase and Decommissioning Phase.

Table 6: Summary of Project Potential Impacts

Environmental & Social Impact	Positive/Negative	Direct/Indirect	Temporary/Permanent	Major/Minor	Occurrence		
					Construction	Operation	Decommissioning
Employment Opportunities	Positive	Direct & Indirect	Permanent/Temporary	Major	√	√	√
Gains in the Local and National Economy	Positive	Direct	Permanent	Major	√	√	x
Provision of Market for Supply of Building Materials	Positive	Direct	Temporary	Major	√	x	x
Informal Sectors Benefits	Positive	Direct & Indirect	Temporary	Minor	√	x	√
Environmental Benefits – Reduction in pollution from kerosene and Wood fuel	Positive	Indirect	Permanent	Major	x	√	x
Noise pollution & increased vibration	Negative	Direct	Temporary/Permanent	Major	√	x	√
Generation of Exhaust Emissions	Negative	Direct	Temporary	Minor	√	x	√
Dust Emissions	Negative	Direct	Temporary	Minor	√	x	√
Increased water demand	Negative	Direct	Temporary	Minor	√	x	√
Workers accidents and hazards	Negative	Direct	Temporary/Permanent	Minor	√	√	√
Extraction and Use of Building Materials	Negative	Direct	Temporary	Minor	√	x	x
Solid Waste Generation	Negative	Direct	Temporary	Minor	√	x	√
Possible Exposure of Workers to Diseases	Negative	Direct	Permanent	Minor	√	√	√
Increased Storm Water Runoff from New Impervious Areas	Negative	Direct	Permanent	Major	√	√	x
Soil Erosion	Negative	Direct	Temporary	Minor	√	x	√
Destruction of existing vegetation	Negative	Direct	Temporary	Minor	√	√	x
Fire Outbreaks	Negative	Direct	Temporary	Minor	√	√	√

Proposed New Bamburi 33/11 kV Substation in Mombasa County

Oil spills	Negative	Direct	Temporary	Major	√	√	√
Increase in electricity supply	Positive	Direct	Permanent	Major	x	√	x
Increased Population around the project area	Negative	Direct	Permanent/Temporary	Minor	√	√	x
Visual Intrusion	Negative	Direct	Permanent	Minor	√	x	√
Education Opportunities	Positive	Direct	Permanent	Major	√	√	x

The project being a national development agenda in the energy sector has immense benefits that could save the area losses from power failures that will quickly be responded and attended to, contribute enormously towards environmental conservation and open up opportunities for research and learning for students and Scholars and stabilized power supply will sustain general economic growth. Stabilized and increased power supply will sustain growth of the informal sector (Juakali) and will encourage sprout of processing industries. However poor planning and implementation of the project could also affect the environment in terms of pollution, soil erosion and rejection of the project by the host community and the Regulatory Authority.

The summary of the main potential impacts of the proposed project are listed in Table below and analyzed into different categories based on stakeholder's views and perceptions as well as the consultant's experience and trainings in undertaking EIA of similar nature.

The project impacts are classified as positive or negative. However the study goes further to categorize the impacts in terms of direct or indirect, temporary or permanent, major or minor and discussed throughout the project cycle.

6.1 Potential Impacts during Construction Phase

6.1.1 Positive Impacts during Construction Phase

The positive impacts associated with the proposed Substation project during construction phase are as discussed below;

Employment Opportunities

With the construction of the Proposed Substation, there will be employment opportunities especially for casual workers from the local community. Creation of employment opportunities has both economic and social benefit. Skilled and unskilled labour will be used in economic production while socially these young and energetic otherwise poor people will be engaged in productive employment other than remaining idle. Employees with diverse skills are expected to work on the site during the construction period. Unskilled Employees will gain work experience and Professionals will be engaged in manning and attending to issues within the Substation.

Gains in the Local and National Economy

There will be gains in the local and national economy as a result of the construction of the proposed Substation, through consumption of locally available materials including: cement, ballast and available labour. The consumption of these materials in addition to fuel oil and others will attract taxes including Value Added Tax (VAT) which will be payable to the government. The cost of the materials will be payable directly to the producers.

Provision of Market for Supply of Building Materials

The project will require supply of small quantities of building materials most of which can be sourced locally like cement, doors and windows, Fencing materials. This provides ready market for local enterprises with such materials.

Boosting of the informal sector

During the construction phase of the proposed Substation; it is expected that the other businesses in the informal sector will flourish. These include activities such as hotel and accommodation, shops, artisan industries and may be food vending which will be benefiting directly from the construction, operational and decommissioning staff members who will be buying commodities from such. This will promote the informal sector in securing some temporary revenue and hence livelihood.

Environmental Benefits

Landscaping during and after construction and re-vegetation of open places where possible will boost aesthetics and environmental conservation. Because of stabilized and quality supply of electricity, lesser or no use of diesel generator sets or kerosene lamps will enhance environmental conservation.

6.1.2 Negative Impacts during Construction Phase

The following negative impacts are associated with the construction phase of the proposed Substation.

Noise pollution

The proposed site is along Kenyatta road which is busy and noise from the construction activities is not expected to magnify the noise levels in the area. However special works like metal grinding, and welding works may pose noise hazard and the workers involved are advised to use appropriate hearing Protection devices. The construction works is most likely to be noisy especially during movement of materials to and from site and also from the construction activities and workers. Though such noise from Substation construction activities may be minimal and undetectable due to existing baseline noise levels, it is worth noting that it will cumulatively contribute to total weighted noise in the area and noise control measures during construction need to be applied. Such noise will be temporary and insignificant.

Generation of Exhaust Emissions

Exhaust emissions are likely to be generated by Motor vehicles that will be used to ferry construction materials, and other thermal energized equipment like concrete mixers and the impacts will be direct, Temporary and not significant.

Dust Emissions

Particulate matter pollution is likely to occur during the site excavation, construction and transportation activities. This impact is going to be direct, temporary, and significant if not mitigated.

Disposal of Excavated Soil

Though little excavation is likely to take place especially during foundation setting; most of excavated material will be used for leveling and there will be no carting away of soil or cleared vegetation from site. The impact will be direct, temporary and minor.

Increased water demand

Water will be used during the construction of support structures foundations, guy rope pads, general construction of control room and other utilities, as well as sprinkling to minimize dust pollution etc. This may lead to increased demand of the resource and possible competition. The increase in water demand will be direct, temporary and minor.

Energy Consumption

Fossil fuels (mainly diesel) will be used to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental

implications on its availability, price and sustainability. Exhaust emissions also have deleterious effect to the environment. The impact will be direct, temporary and minor.

Extraction and Use of Building Materials

Building materials such as hard core, ballast, cement, rough stone and sand required for the construction of guard house, control room and other utilities will be obtained from hardware shops and NEMA approved quarries. The impact of extraction will be direct, temporary and minor. The concreted pads will have direct, permanent and minor environmental impacts.

Solid Waste Generation

Very minimal solid waste will be generated and will include small quantities of cleared vegetative matter, a few bags of cement and probably food packagings. This will be disposed of appropriately and no burning of litter will be allowed on site. This impact will be direct, temporary and minor.

Workers accidents and hazards during construction

It is expected that construction workers especially unskilled temporary employees are likely to have accidental injuries as a result of exposure to workplace hazards if supervision, training and use of Personal Protective Equipment is not adequate. Because of these intensive engineering and construction activities including erection of steel structures, welding, metal grinding and cutting and concrete work among others, construction workers will be exposed to risks of accidents and injuries. Injuries can result from trips & falls and other physical and mechanical hazards.

Increased Storm Water Runoff from New Impervious Areas

Construction of the proposed Sub-Station, buildings and pavements within the proposed project site will lead to additional runoff through creation of impervious areas and compaction of soils. Impervious areas and compacted soils generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas.

Soil Erosion

There are possibilities of soil erosion occurring during the construction of the proposed Sub-Station especially during rainy and windy sessions. The impact will however be minimal as the area to be disturbed is small. Roadways and footpaths will be paved with impervious material to minimize soil erosion. Drainages will be constructed to drain storm water and harvesting of rain water will be factored. The impacts will be direct, temporary and minor.

Social Vices

Construction activities will attract an influx of people to the project area. This may lead to social vices like drug abuse, spread of diseases including HIV/AIDs and insecurity. Sensitization and awareness creation need to be done before and during the construction works.

6.2 Potential Impacts during Operation Phase

6.2.1 Positive Impacts during Operation Phase

Reduction of pollution associated with thermal Power Generation, kerosene and wood fuel:

Electricity supplied from National Grid would ensure less or no people use diesel generator sets for domestic power generation, reduced reliance on kerosene both for lighting and cooking and will be an alternative to wood fuel and charcoal because of better and effective electrical appliances like cookers and electric irons. This would mean less carbon dioxide is released to the environment and destruction of forests will be reduced hence decreasing greenhouse gases production while conserving and increasing carbon sinks.

Employment opportunities

Employees with Electrical Engineering back ground will man and work in the substation and control rooms, security and cleaning job opportunities will be available during the operation phase of the Substation to non-skilled employees.

Improvement of local and national economy

With stabilized and reliable source of Electricity, it is expected that small scale industries will increase and more self-employment opportunities in Welding, Salons, etc. More customers would be connected and retail of reliable electricity by Kenya Power will attract tax revenue to the country.

Improved Electricity Supply

Stable and quality electricity supply will be achieved and there will be reduction of technical losses from long distance distribution feeders.

Education

Stabilized power would also facilitate development and equipping of Laboratories in schools and Hospitals. Increased lighting in schools can also lead to academic excellence.

Improved Security

With the establishment of the proposed Sub-Station at the proposed site, the level of security will be improved around the project areas. This is as a result of more security lights and security personnel being employed to guard Sub-Station. The project site will also be well fenced. Lighting up more residential areas and amenities results to improved security.

6.2.2 Negative Impacts during Operation Phase

Visual Impacts:

Visual intrusion caused by the construction of the Substation may cause alteration to the natural scenery of the project area. However the Substation installations are not expected to protrude beyond 15 meters into the atmosphere.

A perimeter wall will be constructed and this is expected to shield the conspicuity of the substation.

Noise Pollution

No significant noise pollution is anticipated from substation operation, except the humming of transformers which may not be detectable outside the perimeter wall fence and given the project site is front a busy road.

The following tables give the permissible levels by NEMA and continuous monitoring will be necessary.

Table 7: Maximum Permissible Levels (Source: www.kenyalaw.org)

ZONE		Sound Level Limits dB(A) (Leq, 14 h)		Noise Rating Level (NR) (Leq, 14 h)	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Places of Worship	40	35	30	25
C	Residential: Indoor	45	35	35	25
	Outdoor	50	35	40	25
D	Mixed residential (with some commercial places of entertainment)	55	35	50	25
E	Commercial	60	35	55	25

Time Frame:

Day: 6.01 a.m. -8.00 p.m. (Leq. 14 h)

Night: 8.01 p.m. – 6.00 a.m. (Leq, 10 h)

Table 8: Maximum Permissible Levels for Construction Sites (Source: www.kenyalaw.org)

(Measurement taken within the Facility)

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day	Night
i	Health Facilities, educational institutions, homes for disabled etc.	60	35
ii	Residential	60	35
iii	Areas other than those Prescribed in (i) and (ii)	75	65

Time Frame:

Day: 6.01 a.m. -6.00 p.m. (Leq. 14 h)

Night: 6.01 p.m. – 6.00 a.m. (Leq, 10 h)

Waste Generation

The proposed Sub-Station is not expected to generate wastes during the operation phase; transformation of electricity is a relatively clean process. Minimal waste from compound clearing and cleaning will need to be handled in an environmentally sustainable manner.

Oil pollution:

This could occur during operation phase in case of accidental spill of oil during servicing of Transformers. Transformer explosions are very rare but in case it happens it could be a major cause of oil pollution.

Water Use

The operation activities during the operation phase of the proposed Sub-Station will use minimal quantities of water mainly in the washrooms. This may not increase the strain on water resources in the area.

Increased Storm Water Flow

The building roofs and pavements of the proposed Sub-Station will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the proposed Sub-Station during operation phase. Storm runoff should be directed to existing storm drainage system. Rain water harvesting should also be factored right from the design stage.

6.3 Potential Impacts during Decommissioning phase

6.3.1 Positive Impacts during Decommissioning Phase

Site Rehabilitation:

Upon decommissioning of the proposed Sub-Station, rehabilitation of the project site will be carried out to restore the site to its original status or to a better state than it originally was. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual, vegetative and aesthetic quality of the site.

Employment Opportunities

For demolition to take place properly and in good time, several people will be involved. As a result several employment opportunities will be created for the demolition staff during the demolition phase of the proposed Sub-Station. Rehabilitation staff will be employed to do landscaping and re-vegetation of the decommissioned site.

6.3.2 Negative Impacts during Decommissioning Phase

Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing, loading and transport of the Substation and associated structures. The impact will be direct, temporary and minor.

Solid Waste Generation

Demolition of the Sub Station, control room, fence, guard house, toilet and associated structures will lead to generation of solid waste comprised of concrete, metal, stones, wood, glass, paints, adhesives, sealants and fasteners. Such demolition waste is generally considered to be less harmful to the environment since it is composed of inert materials, and is mostly recyclable. The impact will be direct, temporary and minor.

Generation of Dust

Some dust will be generated during demolition works of the Substation and associated structures. This will affect demolition staff as well as the neighbours. The impact will be direct, temporary and minor.

Loss of employment and Livelihood

The staff previously employed to man and operational controls within the Substation and Control room will loss employment and livelihood. Decreased power supply will also lead to employment loss in the informal sector.

7 CHAPTER SEVEN: MITIGATION MEASURES AND MONITORING PROGRAMMES

This section highlights the mitigation measures for potential negative impacts of the proposed project. The negative impacts and the possible mitigation measures have herein been analyzed under three stages: Construction, Operation and Decommissioning phases of the project.

7.1 Mitigation of Construction Related Negative Impacts

The following measures can be applied to ameliorate or minimize the negative impacts associated with the construction of the proposed Substation during construction phase.

Noise and Vibration

The project proponent of the proposed Sub-Station shall put in place several measures that will mitigate noise pollution arising during the construction phase. The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise at the project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Install sound barriers for pile driving activity.
- Use quiet equipment (i.e. equipment designed with noise control elements).
- Co-ordinate with relevant agencies regarding all construction.
- Limit vehicles to a minimum idling time and observe a common-sense approach to vehicle use, and encourage drivers to switch off vehicle engines whenever possible.

Compliance with the Noise and Vibration Regulations of 2009 is expected at all the phases of the project.

Exhaust Emissions

- Vehicle idling time shall be minimized
- Alternatively fuelled construction equipment shall be used where feasible
- Equipment shall be properly tuned and maintained
- Emissions of other contaminants (NO_x, CO₂, SO_x, and diesel related PM₁₀) that would occur from Vehicle exhaust emissions could be reduced by maintaining vehicles in good state of service, fuel and lubricants to be of standardized quality and sourced from approved suppliers.

This will also be achieved through proper planning of transportation of materials to be used during construction of the project to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.

Dust Emissions and Air quality

- During construction, any stockpiles of earth should be enclosed / covered / watered during dry or windy conditions to reduce dust emissions;

- Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions into the surrounding areas;
- All personnel working on the project will be trained prior to starting construction on methods for minimizing air quality impacts during construction.
- During construction, where necessary, sprinkle loose surface earth areas with water to keep dust levels down.
- Masks should be provided to all personnel in areas prone to dust emissions throughout the period of construction.
- Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling, and they limit their speeds so that dust levels are lowered.
- Maintain all machinery and equipment in good working order to ensure minimum emissions including carbon monoxide, NO_x, SO_x and suspended particulate matter;

Excavated Soil during Construction

The Excavated soil during site preparation will be minimal and will be used for backfilling, leveling and landscaping

Minimization of increased Water Demand

The proponent and contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use. Where practicable; water recycling will be done.

Minimization of Worker accidents and hazards during Construction phase

To reduce the workers accidents and hazards during the construction phase, the contractor and proponent are expected to adhere to the provisions of the Occupational Safety and Health Act, 2007 and its subsidiary legislations. It is the responsibility of the project proponent and contractor to provide a safe and healthy environment for construction workers as outlined in the EMP. An emergency Response and Evacuation Plan must be in place in addition to safety education and training to be provided to the employees.

The contractor should follow safe work procedures and obtain permits to work as appropriate. Provision and proper use of Personal Protective Equipment should be maintained throughout the project lifecycle where workers could be exposed to work related hazards.

Reduction of Energy Consumption

The Contractor should ensure proper planning and transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts and no unnecessary trips to and from site.

Construction Work should be carried out during the day from 8.00 a.m. to 5.00 p.m. to ensure maximum use of available natural light.

Extraction Sites and Efficient Use of Raw Materials

Building materials such as sand, ballast and hard core will be sourced from NEMA approved sites.

Proponent and Contractor will ensure accurate budgeting and estimation of actual construction requirements to ensure that materials are not extracted or purchased in excessive quantities. Moreover, the proponent will ensure that wastage, damage or loss (through run-off, wind, etc.) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the proponent shall consider reuse of construction materials and use of recycled building materials.

Minimization of Solid Waste during Construction Phase

Main solid waste expected is small amounts of concrete debris from foundations and floor slabs of demolished houses at the site, material packaging's, and any cut offs from timber and wood materials. Any wood material that can be used as firewood will be donated to the local community. No burning of trash will be done on site. Any personal effects like food packaging's will effectively be removed by the contractor to appropriate disposal points.

Additional recommendations for minimization of solid waste during construction of the proposed Substation include:-

- i. Use of durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time
- ii. Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements
- iii. Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials
- iv. Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- v. Use of construction materials containing recycled content where possible and in accordance with accepted standards.
- vi. Any foundation debris that could not be used for backfilling and landscaping should be carted away and disposed in designated landfills.

Possible exposure of workers to diseases

Possible exposure of workers to diseases from building materials at construction site shall be mitigated by compliance with occupational health and safety standards. Proper work procedures and efficient use of PPEs will be observed. Sensitization and awareness of HIV/AIDs will be done.

Minimization of Storm Water Run-off and Soil Erosion

Proper drainage channels and landscaping of the Substation will be done to reduce run-off velocity and increase infiltration of rain water into the soil. Within the project site, construction vehicles will be restricted to designated areas to avoid soil compaction, while any compacted areas will be ripped to reduce run-off. Caution will be required during construction at times of heavy rains. Re-vegetate exposed areas around the site so as to mitigate erosion of soil by storm water runoff. Minimization of disturbances and scarification of the surface should be observed to reduce erosion impacts.

Surface and Underground Water Quality Degradation

Vehicle maintenance and service should be done away from project site in approved garages or service stations to avoid any possible oil and fuel spills that could contaminate soils and possibly ground water quality. The project proponent will prepare a hazardous substance control and an emergency response plan that will include preparations for quick and safe cleanup of accidental leaks. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe cleanup of accidental contaminations. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous

materials, if any, will be permitted. Trial holes digging will be conducted before construction begins and soil information will be provided to construction crew to inform them about soil conditions and potential hazards. Oil absorbent material, traps and storage drums will be used to contain and control any minor releases of engine and other equipment oil.

7.2 Mitigation of Operation Phase Negative Impacts

The negative impacts of the proposed Substation during operation phase will be mitigated as discussed below:

Occupational Hazards

Safe work procedures should be observed. Trained and skilled personnel should man and maintain the Substation. Protection of the workers from Substation operations work related hazards should be factored from the Machine and Equipment design stage where transformers with less humming should be procured, transformers that use gas cooling system instead of oil and automation of the Substation. Use of appropriate PPEs should be observed where necessary. Necessary medical tests to check the health of workers should be done at least annually. The Transformers and associated equipment should be serviced regularly and as appropriate by qualified Personnel.

Noise

With Modern technology no significant noise will be expected from the 7.5 MVA Transformer and considering the locality of the Substation, buffer space left round the Substation, land scapping and proper maintenance and service, the project is expected to cause no noise pollution during its operation phase. Where it is inevitable like vehicles moving to and from the substation, the EMP advises on necessary mitigation measures.

Accidental Oil Spills or leaks

Transformers will be maintained in a good state of repair, regular service as necessary and any change or addition of oil will be done with precaution to avoid any oil leaks but in case of any; contaminated top soil should be scooped and disposed of appropriately. The transformers will be mounted on stands with a below Containment pit able to accommodate one and half times the oil it contains in case of an incident which is very rare.

Solid Waste

The project proponent of the proposed Sub-Station will be responsible for efficient management of any solid waste generated by the project during its operation. In this regard, the proponent will provide waste handling facilities such as labelled waste bins and enclosed receptacles for temporarily holding any solid waste generated at the site. In addition, the project proponent will ensure that such wastes are disposed of regularly and appropriately. It is recommended that the proponent puts in place measures to ensure that the Sub-Stations' operating personnel manage the waste efficiently through segregation, recycling, reuse and proper disposal procedures.

The proponent will put in place an integrated solid waste management system and give priority to reduction at source of the materials. This option will demand a solid waste

management awareness programme in the management and the operator employees. Solid wastes shall be disposed of in a manner that is acceptable to NEMA and Environmental Regulations.

Ensure Efficient Water Use

The project proponent will install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff. In addition, the plant operators will be sensitized to use water efficiently. The project will adopt the policy of harvesting rainwater for use in the washrooms.

Any storm water will be harvested or directed to storm drainage system and never to sewer systems.

Fire hazards:

The proposed Sub-Station will be equipped with adequate firefighting equipment of high standards and in key strategic points all over the project site. Fire/smoke detection alarm systems and portable fire extinguishers (dry powder and Carbon dioxide) shall be installed. A fire evacuation plan must be posted in various points of the construction site including procedures to take when a fire is reported. All substation operators must be trained on fire management. Regular fire drills shall be undertaken. A fire Assembly point should be identified and marked and no smoking signs mounted on conspicuous sites.

Hazardous waste

The amount of hazardous waste generated will be little and scarce, mostly waste lead-acid batteries and waste oil. The mitigation measure is to provide training to site operation staff and to follow the Company's waste disposal procedures. The hazardous wastes shall be well labeled, stored and collected by registered agents for proper disposal with the aid of waste tracking documents.

7.3 Mitigation of Decommissioning Phase Impacts

Just as in the case during the construction and operation phase, the negative impacts of the decommissioning phase can be mitigated as follows:

Minimization of Noise and Vibration

The following noise-suppression techniques will be employed to minimize the impact of temporary demolition noise at the project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Use sound attenuated equipment designed with noise control elements.
- Install sound barriers for pile driving activity.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to switch off vehicle engines whenever possible.
- Demolishing works to be daytime from 8.00 a.m to 5.00 p.m.

Efficient Solid Waste Management

Solid waste resulting from demolition of substation structures, fence, guard house, toilet and associated structures will lead to generation of solid waste comprised of concrete, metal, stones, wood, glass, paints, adhesives, sealants and fasteners. Such demolition waste is generally considered as less harmful to the environment since it is composed of inert materials, and is mostly recyclable. The following measures should be applied:

- Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements
- Use of materials that have minimal packaging to avoid the generation of excessive packaging waste
- Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided.
- Any recyclables should be sold to recyclable waste dealers and any that can be donated to the community for their livelihood should be given out.

Reduction of Dust emissions

High levels of dust concentration resulting from demolition or dismantling works will be minimized as follows:

- Watering all active demolition areas as and when necessary.
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at demolition sites.

Site Rehabilitation after Decommissioning

The project operator shall, on decommissioning of the project, restore the site to its original status as far as practicable and plant suitable grass and trees at the site.

Loss of employment and Livelihood

The staff previously employed to man and maintain the Substation will loss employment and livelihood. The proponent should deploy them in suitable positions elsewhere and if not feasible adequate lay off compensation packages should be paid.

8 CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

This chapter describes and examines the various alternatives available for the project. Alternatives examined during the study included;

- Alternative sources of energy other than relying on KPLC's National grid
- Site alternatives in project location particularly with regard to location based impacts and land use conflicts
- Technology alternatives
- A No Project alternative was also assessed to determine the impact of this No Project Scenario.

8.1 Alternative Sources of Energy

During the EIA study; alternative sources of energy other than relying on the KPLC's National Grid were analyzed. Some of the possible options included relying on small diesel generators at household / individual level. This would lead to increased noise and emission of greenhouse gases. Other sources of energy include Biogas and Biofuel which have not yet been fully explored towards electricity generation. Other alternatives would include use of firewood to generate energy at individual levels. It is worth noting that most of these alternatives are not sustainable and some have adverse environmental impacts like desertification and increased concentration of greenhouse gases in the atmosphere. Other alternatives would be Generating solar power which is not yet adequately explored for commercial purposes in Kenya. Solar Power is green energy with minimal maintenance costs but it is capital intensive. Many people still opt to being connected to the National power grid for domestic and commercial power supply.

8.2 Alternative Site

The proponent initially wanted to site the project at Mshomoroni/Vikwatani and initiated the process of acquiring land for the same around 2009. Due to problems of acquiring land and the urgency for the project, the proponent finally decided to construct the Substation within its existing site housing New Bamburi 132/33 kV Substation comprising of approximately 5 acres. (See annexed land documents). The proposed 33/11kV Substation will occupy less than 1 acre of land.

8.3 Analysis of Alternative Construction Materials and Technology

The proposed Substation will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The support structures in a substation can be wooden or steel. Because of its durability and strength, steel is the best choice and all support structures will be steel. Perimeter fence can be a reinforced wire mesh fixed to support structures that can be wooden, concrete or steel. Alternatively a stone perimeter wall can be constructed and this is the option of choice since it is more durable, offers better protection and requires less maintenance.

8.4 No Project Alternative

The no-project scenario will mean the status quo of the area remains and no occurrence of adverse impacts as well as positive impacts associated with construction of the proposed Substation.

The no project option will have the forgone costs and benefits including

- The targeted consumers will forgo improved electricity supply
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
- The country won't meet its energy requirement
- The objectives of the Energy Sector Recovery Programme (ESRP), as well as the Governments efforts towards achieving Vision 2030 will not be realized.

9 CHAPTER NINE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Significance of an EMP

Environmental and Management Plan (EMP) for development projects provides a logical framework within which identified negative environmental and socio – economic impacts can be mitigated and monitored. In addition the EMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. EMP is a vital output of an Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation. The EMP outlined below addresses the identified potential negative impacts and mitigation measures of the proposed Substation during construction, operation and decommissioning phases, based on the Chapters of Environmental Impacts and Mitigation Measures of the expected negative impacts.

Table 9: Environmental Management Plan (EMP):

Environmental Impact	Recommended Mitigation Measures	DURATION	Responsible Party	Cost (Ksh)
Extraction of Raw Materials	Source Raw Materials from NEMA approved sites	C & D	Proponent & Contractor	Included in the Contract (IC)
	Ensure accurate budgeting to ensure only Necessary material is ordered	PC & C	Contractor	IC
	Proper storage to ensure minimal lose	PC & C	Contractor	IC
	Practice the three R's i.e. reduce, re-use, and recycle to minimize materials exhaustion and increased waste generation.			
	Use recycled and recyclable materials where possible	C	Contractor	Recurrent Expenditure (RE)
Visual Intrusion	Proper fencing and Landscaping will be done to blend the Substation with the area	C		100,000
	Suitable Tree species compatible to the development will be planted at the edges of the project plot for conservation and aesthetic purposes.	C,O & D		
	Where possible earth colours will be used for paint works to blend the Substation with the natural environment.	C		
	Development will be in compliance with the physical planning act	PC		
Vegetation Clearance, disturbance and Habitat Loss	Ensure Proper demarcation and clear only necessary areas	PC & C	Contractor	50000
	Specify Parking, Loading and Off loading Zones within the site	C &D	Contractor	IC
	Plant only plants suitable and compatible to the project			120,000
Noise and Vibration	Use equipment designed with Noise Control Elements	C & D	Contractor	IC
	Limit Vehicles and equipment to minimum idling limits	C & D	Contractor	IC
	Set and Observe speed Limits and avoid raving of engines	C & D	Contractor	IC
	Observe and Comply with NEMA's 2009 Noise and Vibration Regulations	C, O & D	Contractor and Proponent	150,000
Exhaust Emissions	Minimize Vehicle Idling	C, O & D	Contractor and Proponent	-
	Maintain Vehicle and powered equipment in a good state of repair	C & D	Contractor	IC

Environmental Impact	Recommended Mitigation Measures	DURATION	Responsible Party	Cost (Ksh)
	Fuel and Lubricants to be of standardized quality and sourced from approved suppliers	C & D		IC
Dust	Sprinkle water on loose surface as necessary	C,O,D	Contractor	500,000
	Personal Protective Equipment (PPE) to be provided and used appropriately	C & D	Contractor	500,000
Increased Water Demand	Sensitize staff on efficient water use	C	Contractor	IC
	Storm water harvesting need to be factored from planning stages			IC
	Recycle water where possible			
Oil leaks or accidental spill	Any service/ Repair of vehicles to be done offsite in approved garages or service stations	C & D	Contractor	IC
	Vehicle and Equipment to be in a good state of repair	C & D	Contractor	IC
	Proper storage of oil and careful refilling of Transformers	O	Proponent	150000
	All Transformers should have bund walls and a containment pit able to sustain any accidental spill	O	proponent	IC
	Oil separators should be fitted to trap oil before water joins the storm drainage system	O	Proponent	IC
	In case of contamination, scoop and dispose contaminated stuff appropriately. Rehabilitate contaminated areas.	O	Proponent	120000
	Have an emergency preparedness program in force and tests	O	Proponent	50000
Fire Hazards	No burning of any litter/ cleared vegetation on site	C	Contractor	IC
	Monitor power loads to avoid overloading transformers which can result to explosions and fire hazards	O	Proponent	Recurrent expenditure
	Ensure Transmission and Distribution lines maintain the recommended tensile strength and separation to prevent short circuiting and sparks	O	Proponent	“
	Ensure that joineries are tightly fixed to prevent arcing	O	Proponent	“
	Avoid Careless handling of cigarette butts	C & O	Contractor/ prompt/Proponent	
	Have appropriate, serviced and adequate firefighting equipment in place	C, O & D	Contractor / Proponent	IC

Proposed New Bamburi 33/11 kV Substation in Mombasa County

Environmental Impact	Recommended Mitigation Measures	DURATION	Responsible Party	Cost (Ksh)
Occupational Health and Safety	Ensure provision and proper use of Personal protective Equipment	C, O & D	Contractor/ Proponent	IC
	Follow safe work procedures	C & O	Contractor/ Proponent	
	Use trained and skilled labor	C, O & D	Contractor/ Proponent	Recurrent expenditure
	Staff Training and regular equipment service and testing	O	Proponent	500000
	Maintain a fully stocked and accessible first aid kit	C, O & D	Contractor/ Proponent	50000
	Observe OSHA 2007 regulations	C, O & D	Contractor/ Proponent	RE
Negative cultural exchange and social ills	Sensitization and creation of awareness on HIV/AIDs and tolerance and respect of varying cultures. Disseminate warning information through billboard on site	C &D	Contractor / Proponent	
Decommissioning and Staff layout	Redeployment in suitable placements within the Company	After D	Proponent	RE
	Adequate Compensation	After D	Proponent	As per the Working Terms
	Inform affected staff in good time and Counseling	D	Proponent	100000
Rehabilitation	All concreted areas should be opened up, break all compacted areas, Do landscaping and plant suitable vegetation and grass to ensure that the site is left as much as its prior state or in a better state.			500,000
Total Cost for Implementing the EMP				2,890,000.00

Legend: PC = Pre – Construction O=Operation RE =Recurrent expenditure
 C = Construction D=Decommissioning

10 CHAPTER TEN: ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMP):

The Environmental and Social Monitoring Plan (*ESMP*) will provide the basis for monitoring of Potential environmental Impacts associated with the Substation. The implementation of the Monitoring Plan together with the Environmental and Social Management Plan will provide a benchmark for future environmental audits. The ESMP provides effective observation and documentation of monitor-able parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance. The environmental and social parameters monitoring procedures and techniques for the Substation is summarized in the Following Table.

Table 10: ENVIRONMENTAL AND SOCIAL MONITORING PLAN (*ESMP*)

Potential Environmental /Social impact	Parameter to be monitored	Timing	Responsibility
Noise	Measure the Noise Level within the Project plot and at distances of 50 meters up to a distance of 400 meters from Substation	During Construction, Operation and Decommissioning phases	The KPLC and Contractor
Vegetation and Habitat Loss	Quantify the weight of cleared Vegetation	During Construction	Contractor
Soil erosion	Assess size of rills or Gulleys forming from accelerated run off from compacted areas	During operation phase	The KPLC
Dust	Monitor the surfaces and record magnitude of Dust generated during windy weather, moving vehicles etc.	During Construction, operation and decommissioning phases.	The KPLC
Exhaust Emissions	Monitor colour of smoke from Vehicle exhaust systems	During Construction, Operation and decommissioning phases	The KPLC (O) and the Contractor (C,D)
Increased water Demand	Record amount of Litres used	During Construction and Decommissioning Phases	The KPLC and Contractor
Oil Spills	Record any leakages from Transformers. Record all accidental spills and number of litres	During Operation phase	The KPLC

Potential Environmental /Social impact	Parameter to be monitored	Timing	Responsibility
Fire hazards	Record any Fire incidences and investigate on possible causes	Throughout project cycle	The Contractor and The KPLC
Occupational Health and Safety Issues	Record any accidents and Possible hazard scenarios	Throughout Project Cycle	The Contractor and The KPLC

11 CHAPTER ELEVEN: ASSUMPTIONS, PROJECT UNCERTAINTIES AND GAPS IN KNOWLEDGE:

11.1 Assumptions:

The following assumptions were made in the EIA process:

- All the technical data and information provided by the proponent and the Specialists is accurate and up to date.
- The design features will be put in place to minimize risks from external factors which could threaten the integrity of the facility which include lightning, earth tremors, or malicious damage and attacks from third parties such as terrorists and Vandals.
- The Public participation process was sufficient and effective in identifying critical concerns about the project that need to be addressed
- The Proponent and the contractor will implement the EMP as recommended
- The proponent and the Contractor will undertake monitoring of the aspects as recommended in the ESMP to determine the efficacy of the EMP and establish any areas that need continuous improvement.

11.2 Uncertainties and difficulties in Compiling information

This EIA project report faced the following uncertainties:

- Uncertain changes that may occur in the baseline conditions due to external factors over the lifetime of the project
- Uncertainty related to the proponents policy initiatives that might influence the assessment of future baseline and post development conditions
- Uncertainty in design information which should be dealt with by the definition of design parameters by the proponent and the contractor
- Uncertainty in relation to project planning and implementation as the detailed construction means may be influenced by the choice of the contractor and the detailed design of the development.
- The difficulties in compiling information for this project report have been principally related to the above uncertainties. To preclude these difficulties the Lead expert has used past experience wherever applicable and consultation with the proponent on similar projects to gauge and recommend appropriate mitigation measures in this study.

11.3 Gaps in Knowledge:

- This study does not consider how the present world currency fluctuation and donor funding may affect the construction and management of the proposed project *Ceteris paribus*.
- The study does not also factor advancement and future changes in technology that may influence the design and maybe need for total change or overhaul of the project.
- The study does not factor future changes that may be related to legislative and regulatory frameworks that may affect the project.

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 Conclusion

The analysis of the EIA has evidenced that the construction and operation of the Substation will have positive impacts to the Proponent and Kenyan society at large. The impacts will include Increase in reliable and sustainable clean energy, decrease in pollution emanating from individual Diesel Generator sets and other sources of energy like charcoal and Kerosene.

The proposed project design has integrated mitigation measures with a view to eliminating or ameliorating as much as practicable any negative impacts and ensuring compliance with all the applicable laws and procedures. The Substation and associated structures will be installed to the required planning/architectural/structural designs and standards to ensure efficient utilization of existing power and compatibility with the distribution system. During project implementation, operation and decommissioning stages **sustainable environmental management (SEM)** would be ensured; avoiding inappropriate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, general public at the vicinity and the expected beneficiaries of power Supply.

In relation to the proposed mitigation measures that will be incorporated during construction, operational and decommissioning phases; the development's input to the society and environment; the project is considered beneficial and important. The proposed development is a timely venture that will subscribe to the government's policy under The Least Cost Power Development Plan 2010-2030, Energy Scale up and Access project and towards the Governments realization of Vision 2030.

12.2 Recommendations

Recommendations for the prevention and mitigation of adverse impacts are as follows:

- All solid waste materials and debris resulting from construction of the Substation must be disposed of at approved dumpsites.
- During construction, all loose soils must be compacted to prevent any erosion by wind or water. Other appropriate soil erosion control measures can be adapted. Any stockpiles of earth should be enclosed, covered or sprinkled with water during dry or windy conditions to minimize generation of dust particles into the air.
- Construction activities must be undertaken only during the day i.e. between 0800 hours to 1700 hours. This will minimize disturbance to the general public within the proximity of the site/project.
- The proponent and contractor should follow the guidelines as set by relevant authorities to safeguard and envisage environmental management principles during installation, operation and decommissioning phases of the project.
- Maintenance activities for vehicles must be carried out in service bays and garages off site to reduce chances of oils or grease or other maintenance materials, from coming into contact with environment (water or soil).
- Once construction of the Substation is done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/ leveling and planting of low grass (in open areas) and suitable aesthetic plants.
- Ensure proper water usage throughout the project life.

- Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of rubbing metal bodies. Maintenance should be conducted off site in a designated area and in a manner not to interfere with the environment.
- Used and new oils must be handled and stored appropriately to avoid oil leaks and spills on the site.
- Personal utilities like toilet should be constructed at the site before commencement of construction works. The guard house and its utilities should be secluded from the main switch yard and control room for safety purposes.
- During operation phase only competent and authorized staff should have access to the Substation and Work Permits should be issued as necessary.
- Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
- Fully equipped first aid kits and a trained first aider must be provided within the site.
- Environmental Audits should be carried annually or as prescribed by the Authority during the operational phase and invitation of Inspectors and Experts from NEMA to ascertain compliance with the provided ESMP and set NEMA regulations and Standards.

It is in the opinion of the Environmental team that the anticipated negative impacts can readily and effectively be mitigated and on the whole the proposed project does not pose any significant threat to the Environment.

Diligence on the part of the contractor and proper supervision by the proponent is crucial for mitigating the anticipated impacts and ensuring structural strength, safety, and efficient operation of the Substation.

13 REFERENCES

- Continental Drift**, 1993. *Encyclopedia Britannica*. 15th edition.
- Environmental Assessment Source Book, 1999** (World Bank),
- George, C. and Lee, N., 2000** Environmental Assessment in Developing and Transitional Countries, Willey: Chichster, UK
- Government of Kenya (GoK), 1999**. The Environmental Management and Co-ordination Act, 1999. Government Printer.
- Government of Kenya (GoK), 2003**. The Environmental (Impact Assessment and Audit) Regulations, 2003.
- Government of Kenya (GoK), 2009**. The Environmental Management and Co-ordination Act, Regulations 2009, Legal Notice No. 61, 2009. Government Printer
- Government of Kenya (GoK) 2007**. Occupational Health and Safety Act
- Government of Kenya (GoK)**. The Public Health Act Chapter 242 Laws of Kenya.
- Government of Kenya (GoK), 2002**. The Water Act 2002. Government Printer, Nairobi, Kenya.
- Government of Kenya (GoK)**, Building code, Building order 1968 and Grade 11 Building Order 1968
- Government of Kenya (GoK)**, The Physical Planning Act
- Sombroek WG, Braun HMM & Van der Pouw BJA, 1982**: Exploratory Soil Map and Agro-climatic Zone Map of Kenya, 1980 (Kenya Soil Survey, Nairobi),
- The Way Leaves Act**, Cap. 292,
- The Survey Act**, Cap. 299,
- Mombasa District Development Plan**, 2008 - 2012

14 ANNEXES

14.1 Annex 1: Land Documents



Bamburi Portland Cement Company Limited

P O BOX 90202 · MOMBASA · KENYA
CABLES: BAMBU · TELEX 21265 · FAX 485151 · TELEPHONE 485501/8

Our ref. RB/mf/87/91

Your ref.

Administration Manager,
The K.P.&.L. Co. Ltd.,
P.O. Box 30099,
NAIROBI.

3rd September, 1991

Att: Mr. R.S. Nzioki



Dear Sir,

PROPOSED 132/33/11KV SUBSTATION AT
PLOT NO. 776 BAMBURI - NORTH COAST

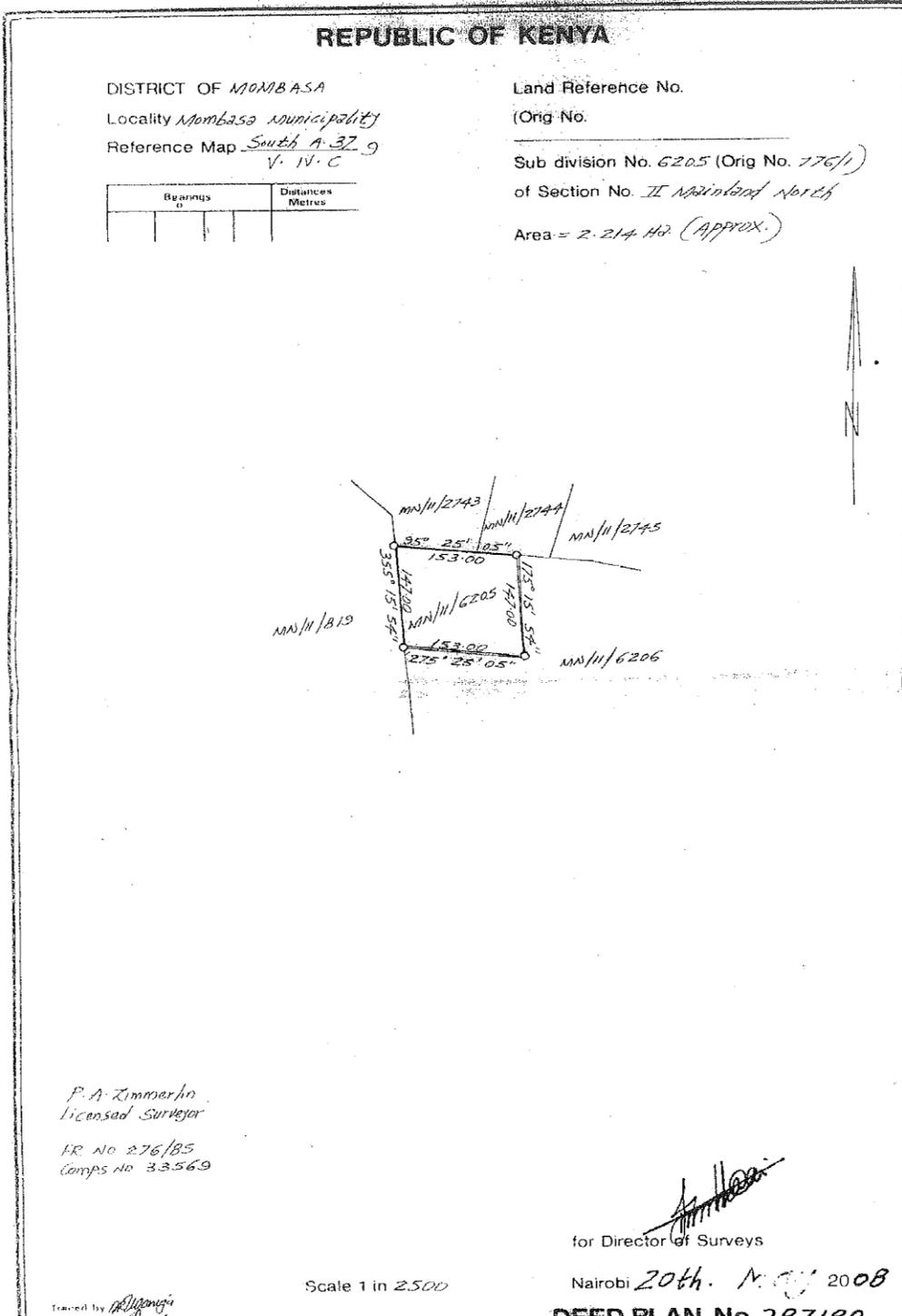
With reference to your letters dated 8th July and 5th August, 1991, on the above subject, I am pleased to inform you that the Board of Directors of our Company has approved the transfer of five acres of land from plot No. 776 free of charge to your company for the construction of the proposed 132/33/11KV substation.

Fees for sub division and transfer of title will be to your expense, and we suggest that you appoint Messrs Hime & Zimmerlin, P.O. Box 99024, Mombasa, who are also our surveyors to do the necessary. If we can be of any further assistance, please let us know.

Yours faithfully,

R. BRENNEISEN
MANAGING DIRECTOR

B/v file
9/9



14.2 Annex 11: Minutes for Public consultations:

**MINUTES FOR THE PUBLIC CONSULTATIVE MEETING HELD ON SARTURDAY
16/11/2013 ON THE PROPOSED NEW BAMBURI 33/11kV SUBSTATION AT
CORNCODIA PRIMARY SCHOOL**

Members present



**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED
NEW BAMBURI 33/11 KV SUBSTATION**

ACTIVITY: STAKEHOLDER CONSULTATION

DATE: 16/11/2013
VENUE: CONCORDIA PRIMARY

NO.	NAME	LOCATION	ID NO. & MOBILE	SIGN
1.	HANISI - S. KESI	KISUMU	0721253705	[Signature]
2.	HON: LUCY CHIREKI	MCA MTOPANGA	0724445369	[Signature]
3.	DR. BOBONGEM	VIKWATANI	0713791860	[Signature]
4.	MICHAEL MWERO	VIKWATANI	0723634648	[Signature]
5.	JAPHET FONDO	VIKWATANI	0729434738	[Signature]
6.	JOHNSTONE MWANDAWIRO	MANDONI B	0722343517	[Signature]
7.	ROSE MUSIMBI	MANDONI B	0721-879105	[Signature]
8.	RUKIA SHARIF	MANDONI B	0722838247	[Signature]
9.	MARIAM ABDULLAH	MANDONI B	0711168977	[Signature]
10.	OLIVER KANSA	MANDONI B	0723077373	[Signature]
11.	ESAU OLWADE	MANDONI	0733976914	[Signature]
12.	JAMES KANSA	MANDONI B	0726799204	[Signature]
13.	MBAHA TSUMU	MANDONI B	0710367080	[Signature]
14.	DARIES TOLE	MANDONI	0724562847	[Signature]
15.	MWANGI WILU	CONCORDIA	0721-199626	[Signature]
16.	Daniel said	MANDONI	0731950820	[Signature]
17.	Simon Mwangi	Kengefael	0722595046	[Signature]
18.	Pius MACHA	Kengefael	0722581424	[Signature]
19.	ANTHONY JAMBO	VIKWATANI	0712519202	[Signature]
20.	SAMUEL TUSA	VIKWATANI	0729595834	[Signature]
21.	Geoffrey Kamau	VIKWATANI	0718681907	[Signature]
22.	Hazel Kazingu	VIKWATANI	0722360760	[Signature]
23.	phelister Yawa	CONCORDIA	0714635593	[Signature]
24.	GAM MAMUNGE	MTOPANGA	0722442585	[Signature]
25.	Rose Juma	VIKWATANI		Rose
26.	ABULHAMAN GENGU	VIKWATANI	0722787674	[Signature]

27.	SHEHUNURISA	VIKWATANI	0727859102	AKIBI
28.	NWAZALA NDAE	VIKWATANI	0729847698	NDAE
29.				
30.				
31.				
32.				
33.				
34.				
35.				
36.				
37.				
38.				
39.				
40.				
41.				
42.				
43.				
44.				
45.				
46.				
47.				
48.				
49.				
50.				
51.				
52.				
53.				
54.				
55.				
56.				

Agenda:

- Opening prayers
- Introductions
- Preliminaries
- Positive impacts of the proposed project
- Negative impacts associated with the proposed project
- Proposed mitigation measures
- Way forward
- A.O.B

MINUTE 1-16/11/2013: Preliminaries

The meeting was brought to order at 10:30 a.m. and an opening prayer was offered by a volunteer. Brief introductions were done and the area Chief Mr. Hamisi Kesi welcomed all present to the meeting. The KPLC Environment team explained to the members present that the public baraza meeting was held in fulfillment of Environmental Impact Assessment procedures as directed in EMCA 1999, and the Environmental Impact Assessment/Environmental Audit Regulations 2003.

Members were informed that minute taken, photos and questionnaires filled would be attached to the EIA Project report of the proposed substation that would be submitted to NEMA for review and Licensing.

Following Power load studies, and the increase in customer connections as well as future demand projections KPLC found out that electrical power supply within Kisauni and its environs needs to be boosted/stabilized and this can be done easily by stepping down power from existing Bamburi 132/33kV substation. The new Bamburi 33/11kV substation will then be used to distribute power to the adjacent environs, and also form a ring with other neighboring distribution substation within Mombasa county so that in case one substation is under maintenance they can have power from another substation.

The increased and stabilized power supply would ensure more customers are connected to the grid in accordance to Kenya Power's connection targets and in line with the country's vision 2030. The KPLC team went further to explain environmental management is currently a core consideration in any development projects. It was pinpointed that any development that did not factor environmental issues was bound to fail because environmental consideration in any development is a pillar for sustainable development. Members were encouraged to embrace the spirit of open and constructive discussion during the EIA consultative meeting.

MINUTE 2 –16/11/2013: Positive and Negative Impacts

Some of the positive impacts associated with the Proposed New Bamburi 33/11 kV substation discussed during the consultative forum included but were not limited to:

- Stabilized and reliable supply of electricity
- Provision of Employment (unskilled especially during the construction phase).
- Improved standards of living
- Passing of information during the Consultation process, exchange of ideas on necessary improvements/ mitigation measures for anticipated impacts.
- Improvement in Health and Education standards in the area
- General growth in economic sector.

Some of the negative impacts associated with the Proposed New bamburi 33/11 kV substation discussed during the consultative forum included but were not limited to:

- Spread of STDs
- Generation of dust and noise during construction stage
- Influx of foreigners within the project site

MINUTE 3 –16/11/2013: Concerns

During the public consultative meeting the participants pinpointed the following concerns anticipated with the establishment of the proposed New Bamburi 33/11kV substation. The concerns and discussed mitigation measures are as in the following table:

Concern	PROPOSED MITIGATION MEASURES
Will the locals benefit on Employment during the project construction?	It was discussed and agreed that the proponent and the contractor would involve the local youths for unskilled jobs such as digging of holes. Residents were advised to liaise with the provincial administration in case of any such employment related issues.
When will the project start and end	A 33/11kV substation takes 8-12 Months once it starts to be complete. But the start date cannot be disclosed since all the necessary approvals have not been received by the proponent
Does KPLC have CSR	Yes. The CSR covers concerns on Environment, Health and Education.
How does the Company intends to end the issue of blackouts	The construction of new Bamburi 33/11kV substation is one of the methods to curb blackouts. Other methods include building more lines and interconnecting them with more substations to form a ring. Increase in generation and promoting wind power
Is it possible to connect living on mud houses?	The company advocates connection to permanent houses so as to avoid safety risks associated with semi permanents houses.

Can KPLC construct the poor roads and put security light in Mtopanga ward?	It was discussed and agreed that the core business of KPLC is to distribute and retail power to consumers. Roads construction falls under KENHA while street lighting is for Municipalitie/local council, there for KPLC can only partner with these bodies to solve the issues in Mtopanga ward.
--	---

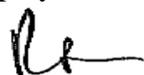
MINUTE 4 –16/11/2013: Way Forward

It was agreed that the project was welcome and the community insisted on the need of Kenya Power to solve the problem of blackouts in the area. The EIA team would progress with collation of information for Environmental Impact Assessment of the proposed project, prepare an Environmental Project Report which would include all the stakeholders concerns and the proposed mitigation measures.

MINUTE 5 –16/11/2013: A.O.B

Structured questionnaires were distributed to the members present to seek further information and contributions about the project. The filled up questionnaires would be attached to the Environmental Impact Assessment Project Report to be submitted to NEMA.

MINUTE 6 –16/11/2013: Closure of meeting There being no other business, the Chairperson thanked all the attendants for their turn up and contributions. The meeting ended with a closing prayer at 12:15 P.m.



Pius Nyaga Ngari
Environmental & Social Specialist
Safety, Health & Environment Department
The Kenya Power & Lighting Company Limited.

14.3 Sample Questionnaires



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

.....
This will reduce the power blackout which is a risk to electronics in households. It will reduce insecurity since there will be light throughout.
.....

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

.....
Electric faults.
.....
.....

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

.....
Put the electronic guards if any.
.....
.....

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT

Signature..... *[Signature]*

ID NO.

Tel No. 0721 499279

LOCATION/AREA

Date 14/11/2013





Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Improved supply of power, Minimal damaging of electronic items.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

I don't expect any negative impacts if everything is done professionally.

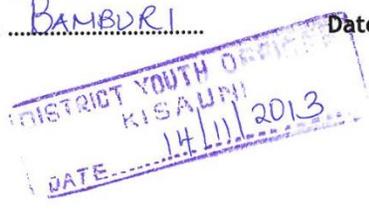
3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

N/A

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT YOUTH OFFICER Signature [Signature]
ID NO. 14656412 Tel No. 0712618251
LOCATION/AREA BAMBURI Date 14/11/2013





Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Stabilization of power
with empowerment

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

There shall be alot of dust
and minimal noise pollution.
- Vegetation around must be cleared

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

- Organize replanting of trees
- Work to be done during 12 day
- Sprinkling of water to minimize dust

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT Signature.....
ID NO. Tel No.....
LOCATION/AREA Date.....

DISTRICT COMMISSIONER
KISAUNI DISTRICT



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Faida ya Power ni kurahisisha kazi za ulimwengu. Kuchanulea mifugo ya kukifadhi vyakula kwa kuuza furaha na hata kwa miungano pia kwa okea mikate.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

Madhara ni ushahidi wa mazingira kwa kuuza mifugo wa kukifadhi na pia hatari kwa maisha ya watu na mifugo ya ulimwengu.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Kuuza vilanda mbalima miji ya watu.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT STEPHEN MURISA

Signature

ID NO. 2265199

Tel No. 0727869102

LOCATION/AREA Kisumu

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)? *KAZI NZURI*

.....
.....
.....
.....

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

N/A
.....
.....
.....

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

NE
N/A
.....
.....
.....

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT *MWANZALA*
ID NO.
LOCATION/AREA *VILWASANI*

Signature *WA*
Tel No. *0729 847692*
Date *26-11-2013*



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project

(FAIDA)?

1. Employment of our youth & women
2. Strengthen power supply
3.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

1. Spread of STD's and unwanted pregnancy

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Conduct awareness workshop on STDs and related cases to the public prior to the beginning of the project

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT Samuel Funa Signature
ID NO. 8656865 Tel No. 0729595834
LOCATION/AREA KISAUNI Date 15-11-2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

The positive impacts from the proposed project is that people will get electricity so that it can help the living standard of the people in the vicinity

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA) ?

It leads to death during any shortages of power

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

By eliminating people to know how to use the electric power and its elements

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT ANTHONY

Signature *Anthony*

ID NO. 13445087

Tel No. 0712519202

LOCATION/AREA KISAJINI

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

It will help the internet community to get enough power

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

when the machineries are working people to put on masks to prevent dust. And the site to be fenced.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Before the project start, meetings to community informing negative.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT Darius Jole

Signature Darius Jole

ID NO. 16014206

Tel No. 0724562847

LOCATION/AREA KISAUNI

Date 16-11-2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Vibaruwa kwa vijana
tutapata Umeme kwa wigi

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

Kubata miti kwa wigi

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

ina kupata kupanda miti wote kwa wigi

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT Mariam Abdalla Signature.....

ID NO. 237555667 Tel No. 0711162947

LOCATION/AREA Mamburi Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

- This will create job opportunity to the community
- The demand of power is very high so if the Kenya power will add another station then it will cater everybody will get power.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

- Air pollution of the area.
- Some will come with negative effects like may be the contractors come from outside the area, that's he will come with other behaviour like prostitution, unwanted pregnancy.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

- The treatment
- Plant another tree where the tree is removed.
- Educate our children

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT LUCY C. CHIKWEE Signature [Signature]
ID NO. 13852957 Tel No. 0724145369
LOCATION/AREA KISAUNI Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

- Stabilization of power supply
- Minimize power outages
- Creation of jobs for the time the construction will be on

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

- Cutting of trees

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

- Planting trees to replace those cut

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

- tick as appropriate Yes

No

NAME OF RESPONDENT Hawa

Signature Hawa

ID NO. -

Tel No. 0723 360769

LOCATION/AREA VIKWANI

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Project hii itapatia watu wetu kazi au vibarus vya kuwa saada. Pia itatupunguzia kila kila ya kukosa moto (black out).

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

Madhara yake ni ya kukata miti.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Inatupasa kupanda miti kwa wingi. Tusiwae na tchizi ya kujikata miti itayopita jani ya wazi.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT Phelister

Signature *Phelister*

ID NO. 8463581

Tel No. 0714635593

LOCATION/AREA Ukwatani

Date 17/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

.....
Job creation for the local people
.....
.....
.....

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA) ?

.....
- Environment disturbances during the work
- May lead to diseases due to mixed up of people from different places
.....

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

.....
.....
.....

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT ESAU
ID NO. 9023371
LOCATION/AREA MTOPIANGA

Signature [Signature]
Tel No. 0733976914
Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Simply we need light for our development.
Power on shops, fridges, cooking, studies,
security of our own heads light to see
and to carry security.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

Follow up of fallen poles to be immediate
fallen wires too, strong poles to avoid
death on bicyclists

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Installation to be done correctly by
power light employees, to check wires, poles
transformer enclosed to reduce blast
out. fast a quick response to emergency
on that location once occurs

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT Mr. Mwangi

Signature..... [Signature]

ID NO. 575949

Tel No. 0721253701/0738253705

LOCATION/AREA K. S. M. V. M.

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

- (1) Improved supply therefore reduced blackout
- (2) Job creation
- (3) one way of pushing the development agenda i.e vision 2030.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

- (1) kelele kidogo kwa Muds
- (2) Numbi kidogo kwa Muds
- (3) social impact life unwanted pregnancies, HIV/AIDS spread.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

- (1) Community awareness through a chiefs Baraza.
- (2) Weka condom mfukoni kama mwezi kujigwa.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT

JOHNSONE MWANDAWIRY

Signature

ID NO.

0155131

Tel No.

0722 343517

LOCATION/AREA

MANDINI B

Date

16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

POWER BLACKOUTS WILL BE REDUCED
GENERATE JOB OPPORTUNITIES

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA) ?

LURKING DANGER - SEXUAL CONTACTS WITH CONTRACTORS
COULD LEAD TO INFECTIONS AND SPREAD OF HIV
AND SEXUAL TRANSMITTED DISEASES

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

EDUCATE THE DESIGNATED AREA POPULATION
ON THE DANGER

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT JAMES KATANA Signature: JKatana
ID NO. 8618346 Tel No. 0720799204
LOCATION/AREA VIKWATANI Date. 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

ⓐ Job creation

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA) ?

not App n/a

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

n/a

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT Geoffrey K.

Signature G. Kanan

ID NO. 13357163

Tel No. 0718681907

LOCATION/AREA VIKWAFANI

Date 16-11-2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Ukosefu wa Mato ulapungua.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

Kufata kufata miti kumalivu Mazungira.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Kuelimisha wakazi wa Eneo lile kuhusu madhara.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT *Olivero Karisa* Signature *[Signature]*
ID NO. *11870917* Tel No. *0723 077373*
LOCATION/AREA *Vikwani* Date *16/11/2013*



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

- Reduces power black-out, risks of any fault that cause human harm.
- Employment to our youth during construction.
- In case of any damage caused by power failure, it will be easy to be detected.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

- Dust from the construction site
- Noisy from different machinery from the construction site
- Deforestation.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

- Widen the area to reduce dust.
- Shovel plant trees when they cut some of them.

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT MAYUMBE

Signature [Signature]

ID NO. 25042495

Tel No. 0722442589

LOCATION/AREA MIOPIA

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

UPANUZI WA MAENDELEO
KARI KWA NJANA NA PIA
WENTE BIASHARA WATAJATA
FUKA YA MAAZI YAO

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA)?

N/A

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

KUWA NA WANGALIFU
KWENYE HAO KATI IJI
JAMII ISIJE KWA THIRIKA

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes

No

NAME OF RESPONDENT FONDO

Signature

ID NO. 6720439

Tel No. 0729434732

LOCATION/AREA KISAUNI

Date 16/11/2013



Public Consultation Questionnaire for Proposed New Bamburi 7.5 MVA 33/11 KV SUBSTATION

Kenya Power plans to construct a 7.5 MVA 33/11 KV Substation in Mombasa County. The objective of the project is to boost and stabilize electricity supply in the area and its environs. Please respond to the following questions regarding the proposed project.

1. What positive impacts/benefits do you anticipate from the Proposed Project (FAIDA)?

Kazi simkaya
Mradi huu simkaya kutu

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed project (MADHARA) ?

Kazi kutopata kwa vijana
kwa

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned? (JINSI YA KUZUIA AU KUPUNGUZA MADHARA)

Nizalwe sana
Moto ni faid kwote

4. Do you support the construction and operation of Substation? (UNAKUMBALI AU HAUPENDEKENZI MRADI?)

-tick as appropriate Yes No

NAME OF RESPONDENT Mhaka Isuna Signature [Signature]

ID NO. 10438639 Tel No. 0710367080

LOCATION/AREA Vikwatani Date 18/11/2013

14.4 Annex 1v: Lead Experts NEMA Certificate and Practicing License

FORM 7 (r.15(2))



nema
mazingira yetu | uhai wetu | wajibu wetu

Application Reference No. **2733**
Licence No. **2046**
FOR OFFICIAL USE

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT / AUDIT (EIA / EA) PRACTICING LICENSE

M/S **SIMON NGUTA MWANGANGI** (individual or firm) of
Address **P.O BOX 30099-00100**
.....
NAIROBI
.....

is licensed to practice in the capacity of a (Lead Expert / Associate Expert / Firm of Experts)
..... **LEAD**

in accordance with the provisions of the Environmental Management and Coordination Act, 1999

Dated this **08TH** Day of **FEBRUARY** **13**

Signature 

(Seal)

Director General
The National Environment Management Authority

CONDITIONS OF LICENSE

1. This license expires on 31st December of the year it is issued.
2. The expert shall comply with the code of practice and professional Ethics for EIA/EA experts.
3. The expert shall comply with the attached conditions.

P.T.O.
