ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED KIONGWE HOUSING PROJECT ON LR NO. LMU/1281/01/16 IN BAHARI WARD, MPEKETONI-LAMU COUNTY.

PROPONENT

BAHARI WIND LIMITED

P.O.BOX 72118-00200

NAIROBI

CERTIFICATION

This report has been prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 which require that every development project must have an ESIA report prepared for submission to the National Environmental Management Authority (NEMA).

This report is prepared for and on behalf of:

The Proponent

Bahari Wind Limited

P. O. Box 72118

00200 Nairobi Kenya

Signed by: Susan Nurchwa

Designation: Director

Signature: .....

BAHARI WIND LIMITED
P. O. Box 13216 - 00400,
NAIROBI.

ESIA/EA Lead Experts

On behalf of **HUDUD Tech Limited**, we the undersigned, certify that the particulars in this report are correct to the best of our knowledge and a true representation of the Environmental Impact Assessment Report for the proposed Kiongwe Housing project located in Bahari ward, Mpeketoni-Lamu County.

Name: Ali Mwachui (Reg. No.6805)

Designation: Lead Expert

Signature: .....

Date: 21st April 2021

Name: Clamson Ondieki Ogutu (Reg. No.0524)

Designation: Lead Expert

Signature: for Clamson Ondieki

Date: 21st April 2021

LIST OF ACCRONYMS

Cap.	Chapter
CIDP	County Integrated Development Plan
DOHS	Directorate of Occupational Health and Safety
EA	Environmental Audit
ESIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act, Cap 387
ESMP	Environmental Social Management Plan
GPS	Global Positioning System
No.	Number
KPLC	Kenya Power and Lighting Company
LN	Legal Notice
LR	Land Reference
NEC	National Environmental Council
NEMA	National Environmental Management Authority
OHSMS	Occupational Health and Safety Management System
PPE	Personal Protective Equipment
SERC	Standards and Enforcement Review Committee
WRA	Water Resource Authority
CPP	Consultations and Public Participation
REF.	Reference
SQM	Square Meter
KEBS	Kenya Bureau Standard
BR	Bedroom
WCMA	Wildlife Conservation Management Act
FCMA	Wildlife Conservation Management Act
GoK	Government of Kenya
GRM	Grievance Redress Mechanism
PIA	Project Implementing Agency
FGM	Female Genital Mutilation

LIST OF TABLES

LIST OF FIGURES

Contents

EXECUTIVE SUMMARY

The County Assembly of Lamu, in the need to tap into the available green energy resources, approved the proposed KES 20 billion wind power project in Bahari Ward in Mpeketoni Sub County. The proposed Bahari wind farm project is expected to generate about 90MW of electricity to be injected into the national grid. The National Land Commission, on behalf of the County Government of Lamu, granted lease to Kenwind Limited a local affiliate of Bahari Wind Limited for 1,332Ha for a period of 60 years for implementation of the wind power project. Therefore, the proponent will relocate the existing settlement to an alternative site. This alternate site was identified by National Lands Commission, the Lamu County Government, and the Ministry of Lands. It was approved and published in the Kenya gazette as Part Development Plan (PDP) No. 1 with reference No. LMU/1281/01/16. In addition, Bahari Wind can compensate for the houses that will be lost project affected households have been moved.

An important preliminary process for the project is the planned resettlement for the host community and the people directly affected by the project from land earmarked for the proposed Bahari wind energy project, and provision of housing for them on alternative land. The resettlement program shall involve the construction of 333 houses to accommodate the resettled population.

The resettlement land allocated is located north of the wind farm next to Kiongwe village. This is largely an agricultural resettlement programme since most of those being resettled are farmers. The details of the settlers is indicated in the RAP. The county has also prepared a land subdivision map that will guide the resettlement process which is annexed in this report. To prevent land dispute among the resettled persons, the county will issue title deeds for the parcels of agricultural land allocated.

To ensure environmental sustainability, proposed development projects are subjected to an ESIA to guide management and mitigation of the potential impacts of the project activities and operations on the environment. The Legislation was enacted in 1999 in Cap. 387 of the Kenyan Laws. It is for this reason that the ESIA exercise was commissioned for the **Proposed Kiongwe Housing Project on LR No. LMU/1281/01/16 in Bahari ward, Mpeketoni-Lamu County**.

The EIA study is governed by the following Legal framework, standards and guidelines:

I. The Kenyan Constitution.
II. National and local (county) laws and regulations.

III. The IFC Performance Standards for Environmental and Social Sustainability (2012);
IV. International conventions and agreements ratified by Kenya

The scope of work covered the following proposed activities in the resettlement and housing project.

i. Construction of Houses for the Host communities and Project Affected persons;
ii. Document and analyze potential impacts of the planned amenities in the resettlement action plan;
iii. Reconnaissance survey and primary site assessment to collect and review baseline environmental and social conditions;
iv. Collection of additional secondary environmental, social and demographic information;
v. Identification and review of the applicable standards and identification of key issues;
vi. Assessment of potential environment impacts of the project and its components;
vii. Assessment of social impacts on the local communities and the Project affected people and other stakeholders identified during the consultation process.

The methodology used for the EIA involved both desk study (scoping) and field work. During scoping stage, the potential impacts relevant to projects of this nature were identified and categorized. The systematic investigative and reporting methodology specified in the conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted. The approach adopted included:

No.	Approach Methodology	Target Group
1	Key informant interviews	• Key persons in lead agencies • NGO & CBO leaders • Religious leaders • KWS • KFS • County Government officials etc.
2	Administration of questionnaire	Kiongwe residents
3	Residents focus group discussions	Kiongwe residents

4	Stakeholder meetings	• Administrative committee meeting • Project affected persons committee meeting • Host community committee meeting • Kiongwe baraza village meeting
5	Observations	Visit to the proposed project s area
6	Photography	Project surrounding environment

The study has identified anticipated environmental impacts of the proposed project activities involving the planned construction of 333 housing units intended for the resettlement exercise, and suggested ways to mitigate them. Assuming the successful completion of the ESIA and acceptance by NEMA (National Environmental Management Authority), the construction phase will kick off once resources have been secured.

From the foregoing analysis, the social and economic rating for this project is highly positive. Evaluation of alternatives has already shown that options are limited and costly. Already the proponent has sunk a substantial amount of money in the project up to design stage and relocation action planning. We take cognizant that the proponent has undertaken a Bahari Wind farm project ESIA in the same premises and recommend integration of this ESIA with the existing action plans particularly in respect to resettlement and environmental management.

Further delay of the project is denying all stakeholders the anticipated benefits of the investment. On the other hand, redesigning or relocation will lead to loss of time and money that is already tied in the preliminary costs of the project. The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project. The proposed development will have positive insitu and ex-situ impacts on socio-economic dimension of the area, enhance human health and well-being, and promoting integration of communities. The project will further boost the diminishing housing supply in the Lamu County.

During the preparation of this report for the proposed houses construction it is observed and established that most of the negative impacts on the environment are rated low and short term with no significant effect. The positive impacts are highly rated and will benefit all stakeholders and the neighboring communities and Lamu County at large. The project proponents have proposed to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project

as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements

This study is recommendable and should be approved by NEMA for issuance of an ESIA license subject to annual environmental audits after it has been completed and occupied. This will follow the Environmental Management and Coordination Act of 1999 and the Environmental Impact Assessment and Audit regulations, 2003. Above all the proponents should carry out Environmental Audit after the project is completed. The proponent should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report and the statutory requirements.

This ESIA concludes that the project is compatible with the land use and will contribute positively to human well-being. With good management and implementation of the ESMP (see table 1 below), adverse impacts will be well mitigated, and the positive impacts enhanced.

Environmental/social impact	Proposed mitigation measures	Persons Responsible	Monitoring/ Indicator	Cost (Ksh)
▪ Dust pollution (Generated during excavation, vehicle movement and uncovered trucks delivering sand and site clearance)	▪ Workers to be provided with adequate personal protective equipment like dust masks and goggles. ▪ Trucks transporting materials should be covered to prevent dust pollution. ▪ Sprinkle dusty areas with water in order to keep dust level low. ▪ Install dust trappers around the site. ▪ All personnel working on the project will be trained prior to starting construction on methods of minimizing air pollution during construction. ▪ Control speed and operation of construction vehicles	Contractor	▪ Air quality monitoring ▪ Workers wearing protective clothing and earmuffs. ▪ Lack of complaints	100,000
Air emissions (Generated from vehicles and fuel machines on site)	▪ Decreasing the number of trips carried out by the vehicles by delivering materials in bulk to minimize air pollution. ▪ Vehicles used during construction phase should be kept in good working condition to prevent them from emitting excessive emissions	Contractor	▪ Vehicle/Machine working state/condition	To be merged in construction operations
Noise Pollution (Caused by movement of vehicles, construction equipment and	▪ Construction works and material delivery to be done only during the day(8am-5pm) ▪ Machinery that makes excessive noise should fixed with silencers.	Contractor PIA	▪ Noise levels ▪ Lack of complaints	70, 000

loading and offloading of materials)	▪ Locating noisy activities away from sensitive neighbors like school, restaurant, working offices etc. ▪ workers to be provided with adequate personal protective equipment like earmuffs. ▪ construction machines should be well maintained and regularly serviced. ▪ Machinery, vehicles and instruments that emit high levels of noise will be used on a phased basis to reduce the overall impact. These equipment's such as drills, excavators and cement mixers will be used when the least number of residents are expected to be affected, for example during periods where most residents are at work or school.			
Traffic Management	▪ Proper signage put in place to notify neighbor of activity and presence of heavy vehicles and to direct traffic. ▪ Assign traffic marshals to ensure strict adherence to traffic rules. ▪ Erect speed control measures at sensitive spots such as speed bumps.	Contractor PIA	▪ Monitoring number of traffics incidences. ▪ Presence of site Notice Board	30,000
Soil Erosion, soil compaction and	▪ Minimize clearing of unnecessary areas at the construction site and protect such areas	Contractor PIA Site engineer	▪ Ratio of area cleared against	40,000

clearing of vegetation	during construction by temporary fencing off. ▪ Controlled access for heavy machinery and designate storage areas. ▪ Revegetation and landscaping upon completion ▪ Provide drainage channels to natural drains and rivers/streams to minimize erosion. ▪ Control earthworks to prevent compaction of loose soils that may hinder water and air penetration. ▪ There should be designated pathways and driveways for movement within the compound to avoid unnecessary compaction		designated area to be cleared. ▪ Percentage of landscaped areas	
High energy demand (Construction activities will use machines that require fossil fuel inputs such as diesel and petrol and generators whose application will increase the demand for energy)	▪ Create awareness among workers on the importance of conservation of energy resources. ▪ Employ technologies that demand less energy consumption. ▪ The project proponent and contractor shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.	Contractor PIA	▪ Machines' conditions ▪ Fuel consumption	40,000

	▪ Proper planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the proponent shall monitor energy use during construction and set targets for reduction of energy use. ▪ Switch off engines when not in use. ▪ Use well serviced construction machinery that are fuel efficient. ▪ Maximize the use of natural lighting by limiting construction works to daytime.			
Solid waste (Solid waste in the form of soil, stones, timber, metal, glass, plastics and other debris)	▪ Reuse or recycle construction materials where possible to reduce amount of waste e.g., building stones, timber etc. ▪ waste generated be collected by a NEMA approved solid waste handler. ▪ Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time. ▪ The site should have waste receptacle with bulk storage facility at convenient points to prevent littering	Contractor PIA	▪ Amount of waste on site, handling and disposal ▪ Presence of well-maintained receptacle and central collection point	100,000
Large amount of water consumption (Mixing and casting concrete, dust area	▪ Ensure water conservation in all activities. ▪ Water be recycled without compromising on quality and health.	Contractor PIA	▪ Presence of a water meter and automatic water taps	To be prioritized in construction

sprinkling, human use e.g., drinking and sanitary use)	▪ Ensure good use of water resources during construction by installing taps on all outlets. ▪ Put in place sound water storage reservoirs that are leak proof. ▪ Instill water use discipline among employees. ▪ Sea water can be used for activities that do not require fresh water and are not likely to cause pollution.		▪ Amount of water used	operations
Occupation Health and safety	▪ Designate adequate first aiders to respond accident and incidence. ▪ Provision of adequate PPE (safety shoes, gloves, helmets) ▪ Give employees correct tools and equipment for the assigned job. ▪ A well-stocked first aid kits to be maintained by qualified personnel. ▪ The site shall be fenced off and provided with security at the access gates to reduce potential accidents and injuries to the public. ▪ Buildings under construction should be covered with dust and debris arrestors during construction. ▪ Moving parts of machines should be guarded to protect workers from injury.	Contractor	▪ PPE compliance ▪ Number of accidents and incidences recorded. ▪ Presence of a well- stocked first Aid kit Box ▪ Presence of security guards on the site ▪ Presence of a register on the site	80,000

	▪ The contractor shall conform to all the stipulations of the Occupational Health Safety Act, 2007. The Act requires the designation of a Health and Safety representative when more than 20 employees are deployed			
Fire Prevention	▪ Provide necessary fire prevention equipment on site in line with applicable regulations.	Contractor		
Labour Rights	▪ Ensure that workers have access to and are aware about the Grievance Mechanism. ▪ Ensure legal labour standards as per the Kenyan constitution and the ILO regulations (child/forced labour, no discrimination, working hours, recommended wages) are met. ▪ Provide housing conditions in accordance with all applicable health and safety regulations and norms by ensuring the provision of adequate space, supply of water, adequate sewage and garbage disposal system, appropriate protection against heat, cold, damp, noise, fire and disease-carrying animals, adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural and artificial lighting, and in some cases basic medical services.	PIA	▪ Grievance Mechanism in place and grievances recorded. ▪ Provide hygienic, adequate facilities for workers, ensuring toilets and changing rooms are separated to male and female employees	

	▪ Ensure the workforce has access to primary healthcare on site, providing prescriptions. ▪			
Environmental contamination/ spills	▪ Collect and segregate wastes and ensure safe storage and in line with legal requirements. ▪ Ensure disposal through waste contractors licensed for treatment/removal/recycling of each of the waste types. ▪ Ensure appropriate and safe storage of contaminants such as fuels, construction materials and wastes. Provide absorbent and intervention materials in sufficient quantities and at relevant locations for intervention in case of leakages/spills. ▪ Implement appropriate secondary containment and spill controls for maintenance or refueling works. ▪ Ensure appropriate containment and disposal of construction wastewater, including sanitary water. ▪ Ensure immediate cleaning of any spills and remediation of contaminated areas after construction.	Contractor PIA	▪ Waste collection areas existent, waste inventories ▪ Water disposal compliant with legal requirements ▪ Safe storage of hazardous materials, Spill remediation equipment in place. ▪ Containment and spill controls in place ▪ Workers trained	

Site Clearance- Vegetation removal and habitat disturbance	▪ Limit vegetation clearing to areas within the site boundary where it is absolutely necessary. ▪ Replanting new trees when mature trees are cut. ▪ Avoid off-road vehicle traffic. Use existing roads. ▪ Ensure revegetation of cleared areas where possible after construction using native species.			

Table 1: Construction ESMP

CHAPTER ONE

1.0 INTRODUCTION

1.1Background

On 7th February 2017 the National Land Commission, on behalf of the County Government of Lamu, granted 60-year renewable lease to the proponent for 1,332Ha to be used for wind power project implementation. This resettlement and housing site was identified by National Lands Commission, the Lamu County Government, and the Ministry of Lands. It was approved and published in the Kenya gazette as Part Development Plan (PDP) No. 1 with LR No. LMU/1281/01/16. The proponent has to resettle those currently occupying land earmarked for the wind project to the alternative site. In addition, Bahari Wind will compensate for the houses that will be lost after project affected households have been moved. The resettlement program shall involve the construction of 333 houses to accommodate the resettled population by the project. Lamu County government is responsible for providing essential amenities such as access roads, hospitals, schools, and water as set out in their approved part development plan.

In the recent past, policy makers have been directing their efforts towards economic development without due regard to the state of natural resources which forms the principal capital for development. As a result, there has been unprecedented environmental degradation due to lack of consideration for environmental concerns in the project design, planning, implementation, management and decommissioning phases. This has often resulted in unsustainable development practices.

To ensure environmental sustainability, proposed development projects are subjected to an ESIA to guide management and mitigation of the potential impacts of the project activities and operations on the environment.

The ESIA is therefore a useful tool in promoting the goals of sustainable development as the process includes assessment of the effects of a development project and includes local opinion and knowledge. In Kenya, the ESIA has been used to ensure that environmental management is integrated into project planning and decision-making with a view of achieving environmentally sustainable development. The Legislation was enacted in 1999 in Cap. 387 of the Kenyan Laws.

It is for this reason that the ESIA exercise was commissioned for the **Proposed Kiongwe Resettlement and Housing Project on LR No. LMU/1281/01/16 in Bahari ward,**

Mpeketoni-Lamu County. The study has identified anticipated environmental impacts of the proposed project activities involving the planned construction of 333 housing units intended for the resettlement exercise, and suggested ways to mitigate them. Assuming the successful completion of the ESIA and acceptance by NEMA (National Environmental Management Authority), the construction phase will kick off once funds have been secured.

1.2 Project Overview

Lamu County Government has identified an area for resettling the project affected households to give way to the project. The area identified is adjacent to the project site in Kiongwe village. A resettlement action plan has been prepared by the proponent with full participation of all stakeholders. Priority was given to project affected households and host communities. This resettlement process will offer the beneficiaries a parcel of farmland and for those 333 households who will lose their homes will have replacement housing built for them.

1.3 Project Context

This ESIA will mainly focus on the construction of houses component in the resettlement process. Plans have been prepared for 2 and 3-bedroom housing units to be built for the selected beneficiaries. This will happen in accordance with the final resettlement action plan.

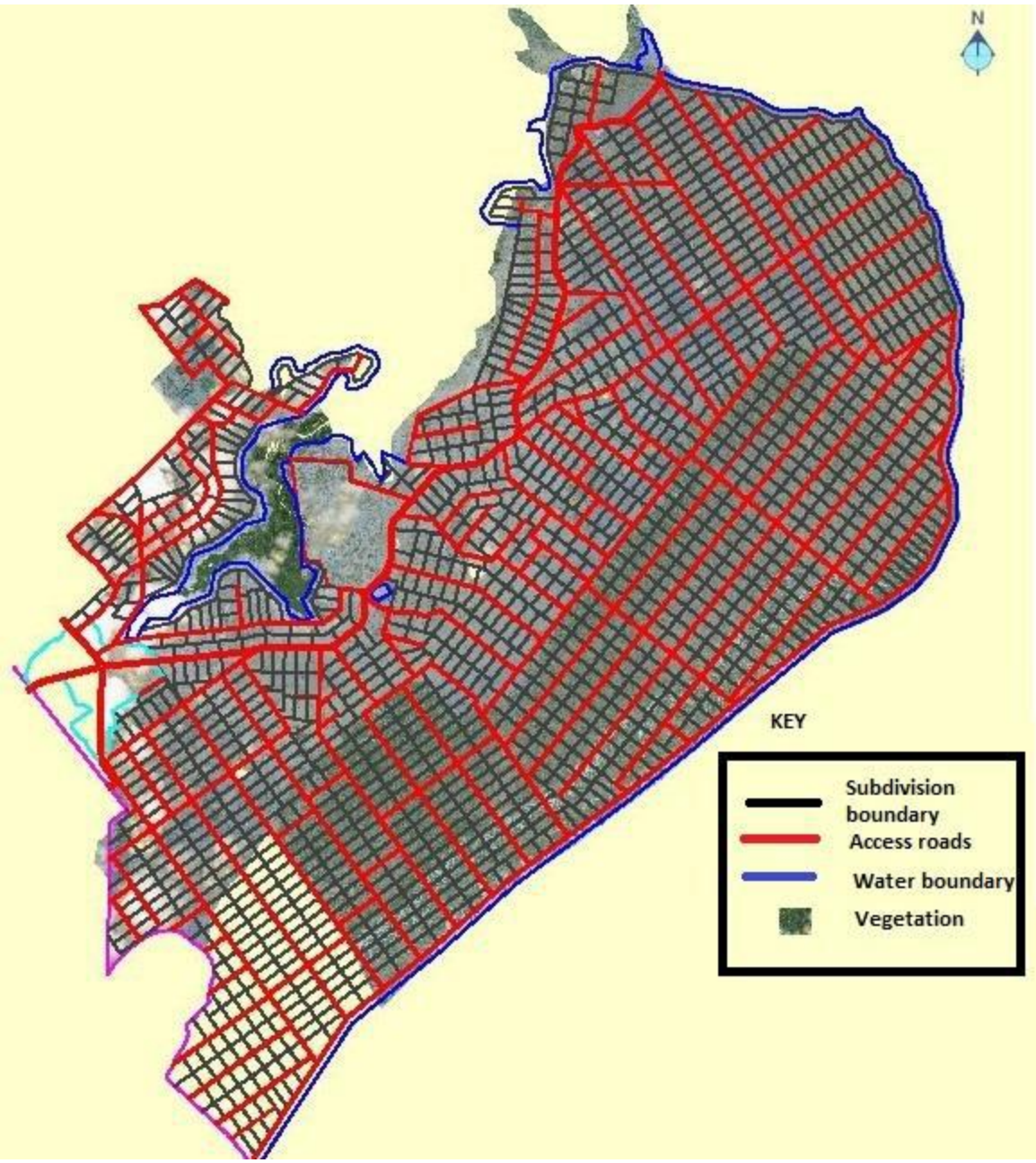


Figure 1 : Map of Bahari Resettlement plan.

1.4 ESIA objectives

The main objective of this ESIA is to assess and identify the potential impacts of the proposed construction of 333 houses for the resettled and host community in Kiongwe and recommend mitigation measures for the impacts. The study assesses the impacts on the both the biophysical and socio-economic aspects of the environment and integrates the mitigation measures into the planning, design process, implementation,

management and decommissioning phases of the proposed project. It seeks to ensure compliance with EMCA (1999) and provisions of IFC Performance Standards (IFC PSs).

The specific objectives of the study were:

i. To provide a description of the project cycle activities and the required legislative compliance.

ii. To predict and/or determine the potential impacts of the development in terms of the economic, social and environmental considerations.

iii. To propose appropriate mitigation measures to minimize or eliminate the environmental challenges associated with the development.

iv. To analyze project alternatives

v. To undertake and document a public consultative process aimed at obtaining the views of project stakeholders to mainstream their concerns and impact mitigation proposals into the Environmental Management Plan (EMP) developed for the project cycle.

The information gathered using the above strategies was evaluated and data analyzed to determine the required level of environmental performance and make recommended environmental action plans for the development proposal.

1.5 Site location

This resettlement and housing site was identified by National Lands Commission, the Lamu County Government, and the Ministry of Lands. It was approved and published in the Kenya gazette as Part Development Plan (PDP) No. 1 with reference No. LMU/1281/01/16. The area lies within GPS coordinates **2°23'26.9"S 40°46'55.4"E**.

The map below shows the location of the resettlement site in Kiongwe, Bahari Ward, Mpeketoni in Lamu County.

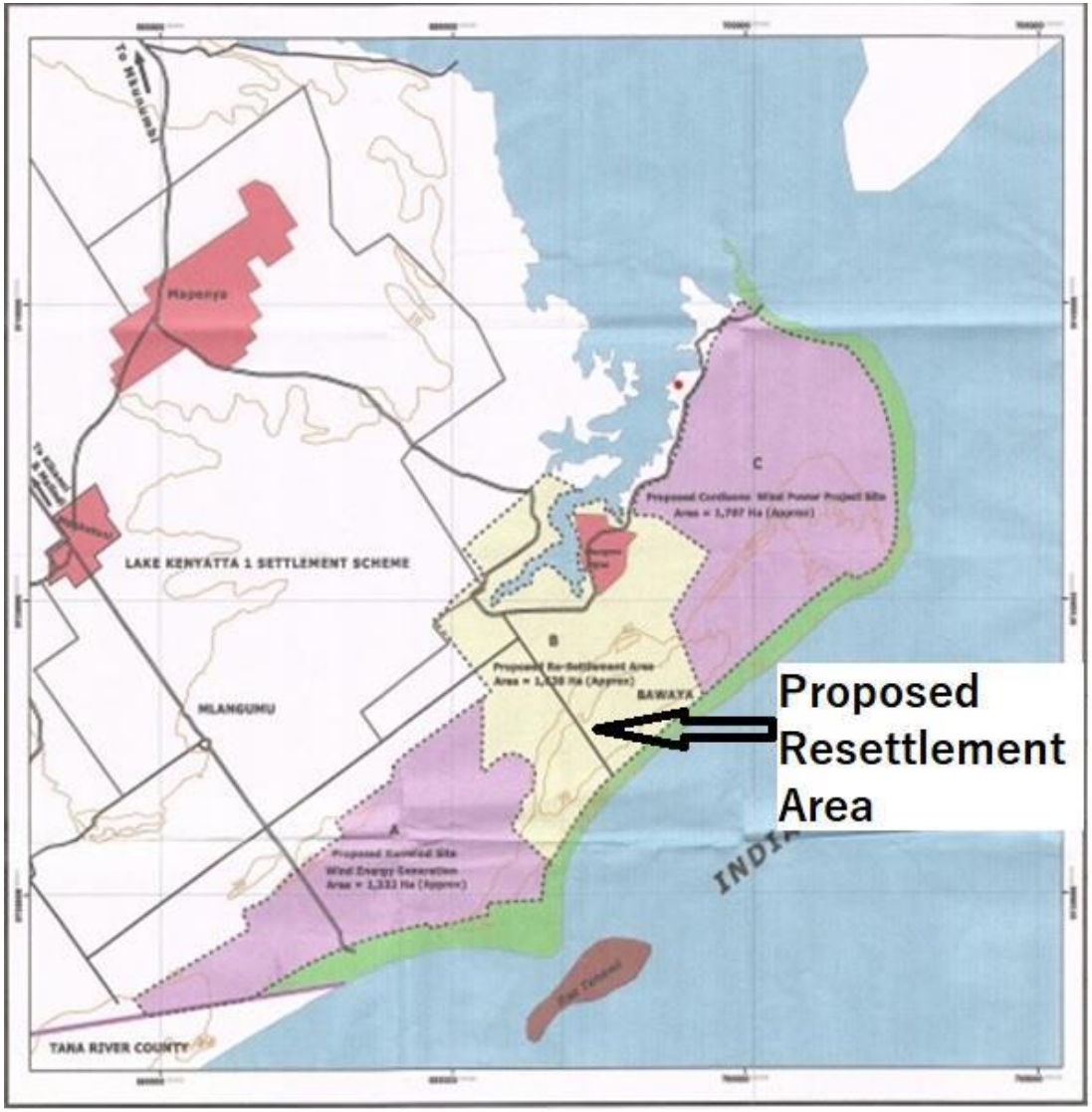


Figure 2: Map of Proposed Resettlement Area and Wind Project Site

1.6 Project cost

The proposed development will require large capital outlay to commission. The project implementation cost is estimated at Three Hundred Million Kenya Shillings (KES 300,000,000.00). The preliminary works, construction of the superstructure, electrical and plumbing works are budgeted for in the bills of quantities of the project. A summary cost the works for both the two- and three-bedroom units is annexed in this report.

1.7 Scope of the ESIA

In Kenya, the EMCA (1999) obligates-all new projects to undergo an Environmental Impact Assessment study. Therefore, the main objective of ESIA is to comply with the current requirements of the ESIA regulations of 2003 as established under the EMCA. The scope of ESIA study, therefore, covered the following key areas: -

1.7.1 Legal framework

The ESIA study is governed by the following Legal framework, standards and guidelines:

I. The Kenyan Constitution;
II. National and local (county) laws and regulations;
III. The IFC Performance Standards for Environmental and Social Sustainability;
IV. International conventions and agreements ratified by Kenya.

1.7.2 Scope of Works

The scope of work was to cover the following proposed activities in the resettlement and housing project.

i. Construction of Houses for the Host communities and Project Affected households;
ii. Document and analyze potential impacts of the planned amenities in the resettlement action plan;
iii. Reconnaissance survey and primary site assessment to collect and review baseline environmental and social conditions;
iv. Collection of additional secondary environmental, social and demographic information;
v. Identification and review of the applicable standards and identification of key issues;
vi. Assessment of potential environment impacts of the project and its components;

vii. Assessment of social impacts on the local communities and the Project affected people and other stakeholders identified during the consultation process;

1.8 Methodology

1.8.1 Environmental Screening

The projects to be subjected to ESIA are specified in the Second Schedule of EMCA (1999). As part of the screening process, the study was guided by Legal Notice No. 31 issued on 30th April 2019 which amended the second schedule of the Environmental Management and Coordination Act No. 8 of 1999. The amendment classified projects into three categories, Low risk, Medium risk, and High-risk projects.

This project falls under part 2 (b) large scale resettlement schemes. Some of the information considered in the screening process include, population densities, existing land uses, vegetation, topography, soil types, ecological settings, and public safety. Other references include the IFC Performance Standards on Environmental and Social Sustainability. A screening toolkit developed and filled out is annexed in this report.

1.8.2 Environmental Scoping

In scoping, focus was on environmental impacts of great concern. Environmental issues were categorized into physical, natural/ecological, and social, economic and cultural aspects. Impacts were also classified as short term and/or long-term impacts.

1.8.3 Desktop Study

This involved review of project documents, architectural drawings, site layouts, past ESIAs, relevant policy, legal and institutional frameworks. Documents containing climatic, demographic, and hydrological data on Lamu County were used to understand the project area. The client provided relevant documents for this study.

1.5.4 Site Visits and Public Participation

Field visits were carried out for site acquaintance and understanding the project area, identifying constraints, developing impressions on topography, soils, existing developments, practicality of resettlement and infrastructure in the proposed area.

The initial visit also marked the major inception meeting with the Local Administration Officials in the area to pave way for further indulgence of the residents in subsequent meetings and consultations. An inception report was prepared after this visit.

Several photos of the project site were taken for inclusion in this report. The study also sought public opinion/views through Consultation and Public Participation (CPP)

exercises. Questionnaires were administered to the public and interviews held with neighboring community.

1.5.5 Report Structure

Below is the report outline.

Section	Content
Chapter 1 – Introduction	Gives an overview of the proposed project and the ESIA process
Chapter 2 – Project Description and Alternatives	Provides a detailed description of the project components and processes. It further gives a breakdown of alternatives considered and the reasoning for the project rationale.
Chapter 3 – Policy, Legal and Institutional Mechanisms	Describes the applicable policy, legal and institutional arrangements for the proposed project
Chapter 4 – Environmental Baseline	Describes the existing biophysical setting of the project area
Chapter 5 – Socio-economic Baseline	Describes the existing socio-economic setting of the project area
Chapter 6 – Public Consultation and Participation	Outlines the methodology adopted for stakeholder engagements and feedback processes
Chapter 7 – Grievance Redress Mechanisms	Provides an approach for redress mechanisms to address emerging issues
Chapter 8 – Potential Environmental and Social Impacts and Mitigations	Discusses the potential environmental and social impacts of the project and suggested mitigations
Chapter 9 – Environmental and Social Management Plan	Outlines for managing environmental and social impacts of the project and provides for monitoring options
Chapter 10 – Conclusion and Recommendations	Give conclusion and make recommendations and the way forward

Table 2: Report outline

The final report has to be endorsed by the client. This report is to be submitted on the NEMA online portal. NEMA also requires that an additional print copies of this report alongside a soft copy be submitted to the Environmental Licensing office for review and issuance of a license.

1.5.2 Terms of Reference

As discussed in the screening section, a project such magnitude has to undergo a full ESIA study. Prior to commencing the study, the proponent sought approval by providing details of the study and the team to undertake by submitting Terms of Reference. NEMA approved the Terms of Reference submitted on 22nd December 2020. The approval letter in annexed in this report.

CHAPTER TWO
2.0 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 Project components

The proposed Kiongwe housing project is expected to host about 333 households from both the host community and the Project-affected households identified in the Resettlement Action Plan (RAP). It will be located in Mpeketoni, Lamu West Constituency. The project was initiated as a response for resettling squatters who will be displaced after Bahari Wind Limited occupy the allocated 1,332Ha of land in Bahari ward, Mpeketoni Sub-county in Lamu. A total of 333 houses will be constructed for Project-affected households within their allocated farmlands.

2.2 Two Bedroom Housing Unit

The proposed two-bedroom unit has a total area exceeding 30m^2. Each room has an area of 5.6m^2 which can comfortably accommodate a bed and wardrobes. The rooms are well ventilated with large windows. The windows and door allow for natural lighting during the day. Both rooms are connected to the living room. The living room is spacious enough to accommodate a sofa set and coffee table. It is also very well ventilated as the design allows for air flow through the large window and main door. This also provides ample natural lighting during the day. The store and the kitchen are both 2m^2. The kitchen has been designed with a sink and a worktop area. These two essential areas will be fitted with aerated concrete blocks to allow for good air circulation. Aerated concrete blocks are made from a combination of sand, lime, water, gypsum, and cement and provide structure, insulation, and fire and mold resistance. The windows will be made of clear glass to allow light into the bedrooms and living area. All houses will have a pit latrine conveniently situated outside. Below are images of the two-bedroom unit.

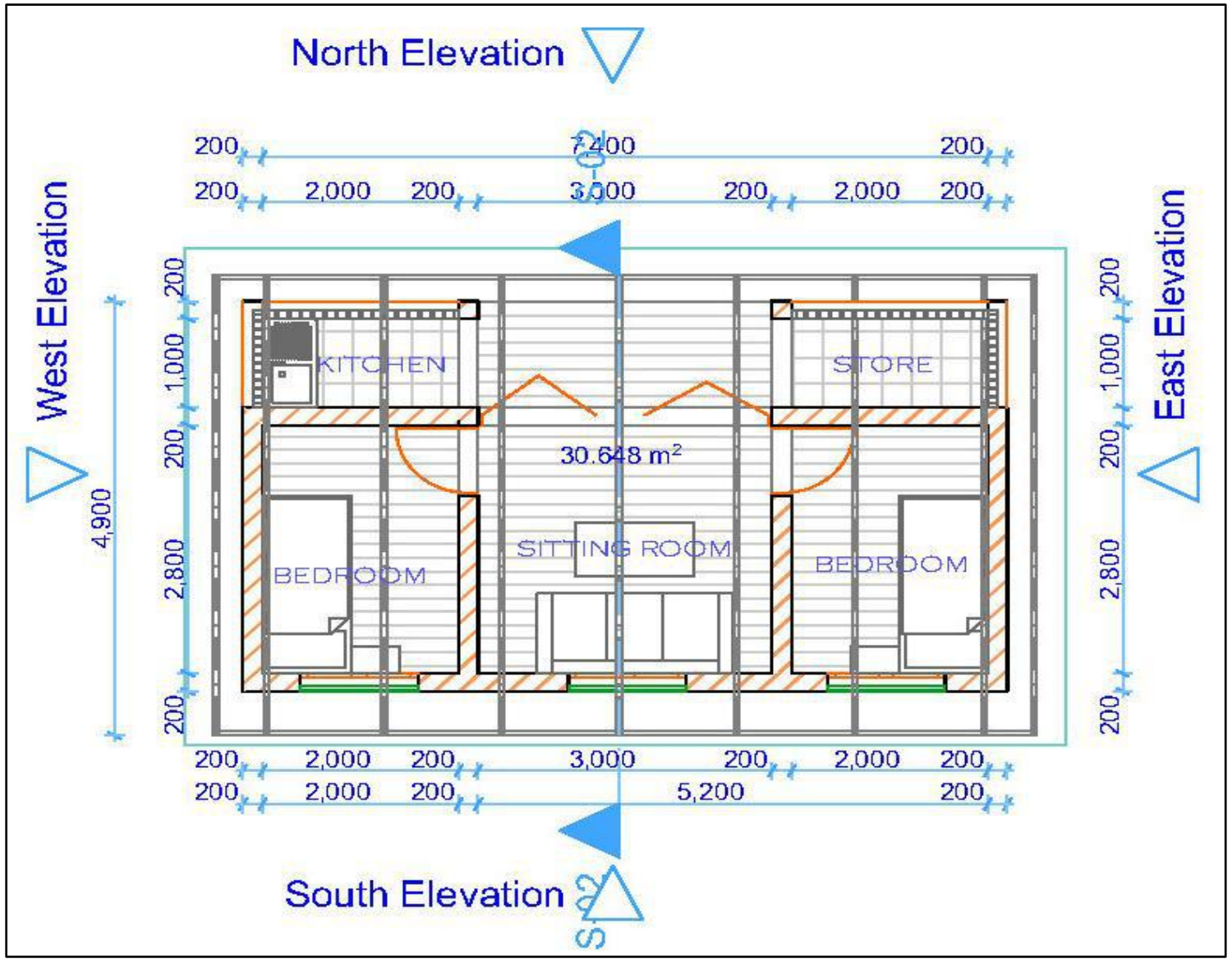


Figure 3: Layout of Proposed Two Bedroom House

Figure 4: 3D Images of Two Bedroom House

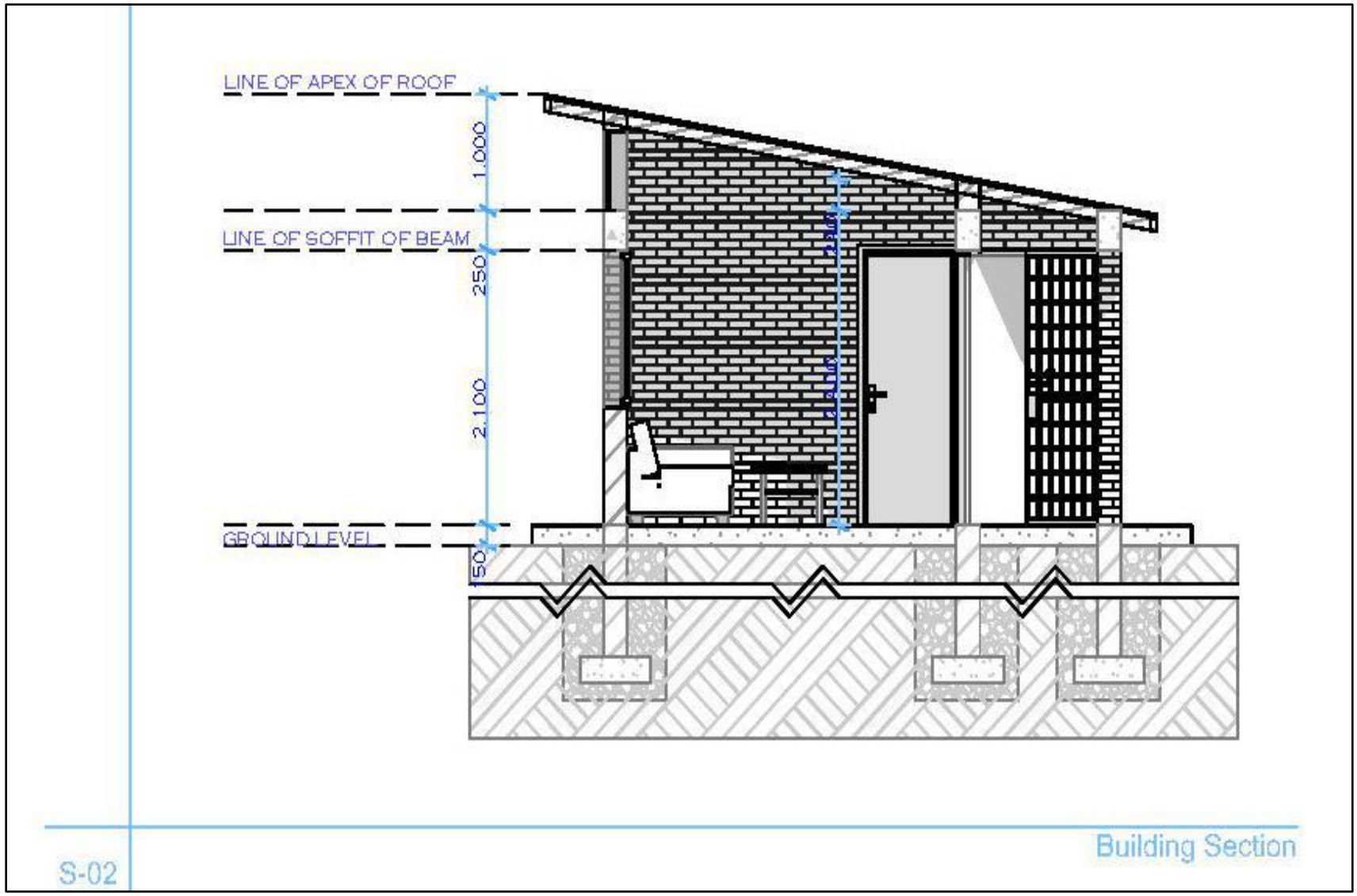


Figure 5: Cross section of Two Bedroom House

2.3 Three Bedroom Housing Unit

The three-bedroom house design has a total area exceeding 35m^2. It has two identical bedrooms (one on either side of the living room) each with a 6m^2 floor area, and a third smaller bedroom with a floor area of exceeding 4m^2. All bedrooms can accommodate a bed and wardrobe. The rooms are also well ventilated and have adequate light from the windows and doors. The living room is spacious enough to accommodate a sofa set and coffee table. It also very well ventilated as the design allows for air flow through the large window and main door. This also provides ample natural lighting during the day. The store and the kitchen are both 2m^2. The kitchen has been designed with a laundry utility sink and a worktop area. These two essential areas will be fitted with aerated concrete blocks to allow for good air circulation. Aerated concrete blocks are made from a combination of sand, lime, water, gypsum, and cement and provide structure, insulation, and fire and mold resistance. The windows will be made of clear glass to allow light into the bedrooms and living area. All houses will have a pit latrine conveniently situated outside. Below are images of the three-bedroom unit.

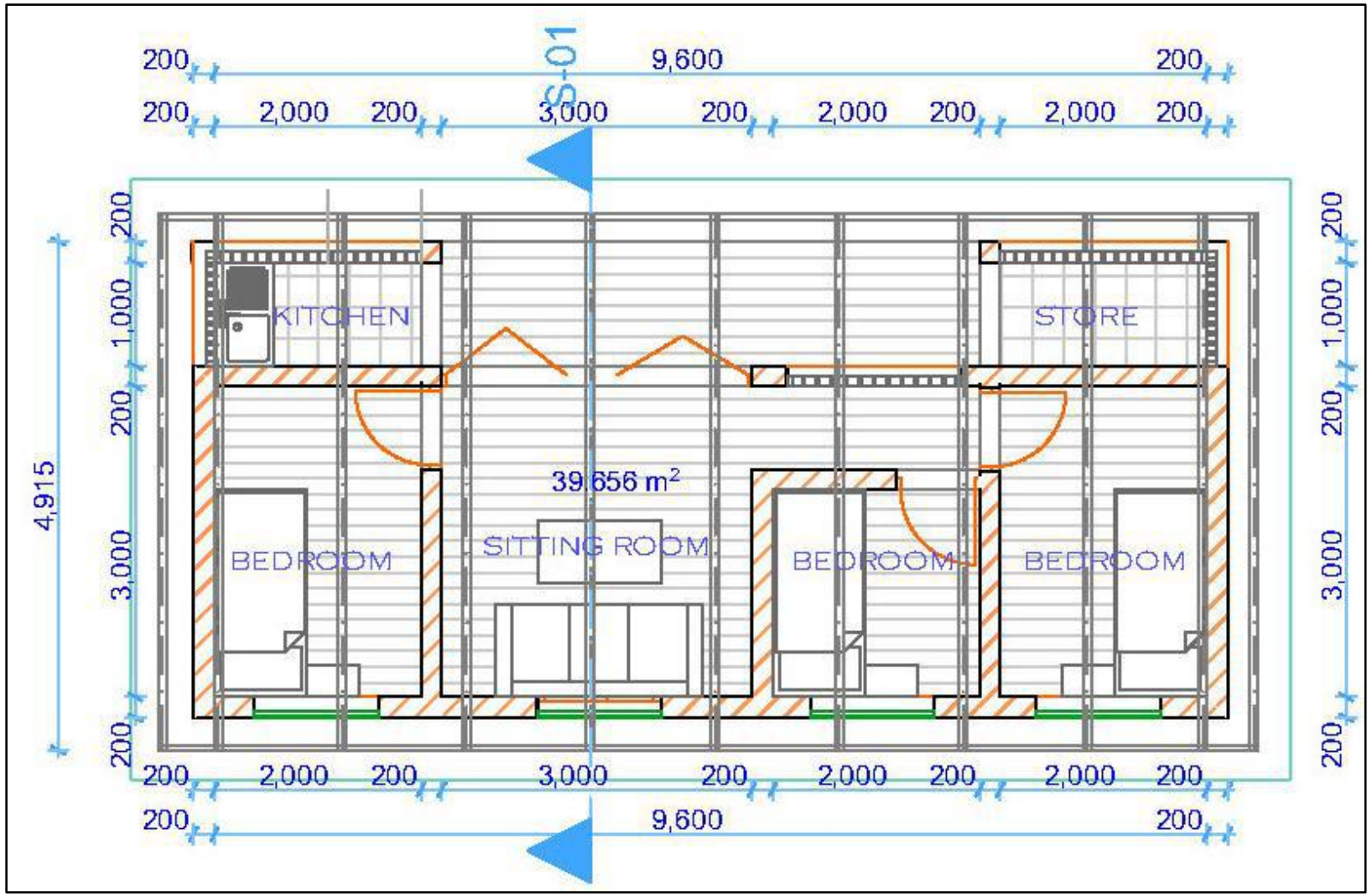


Figure 6: Layout of Proposed Three Bedroom House

Figure 7: 3D Impression of Proposed Three Bedroom House

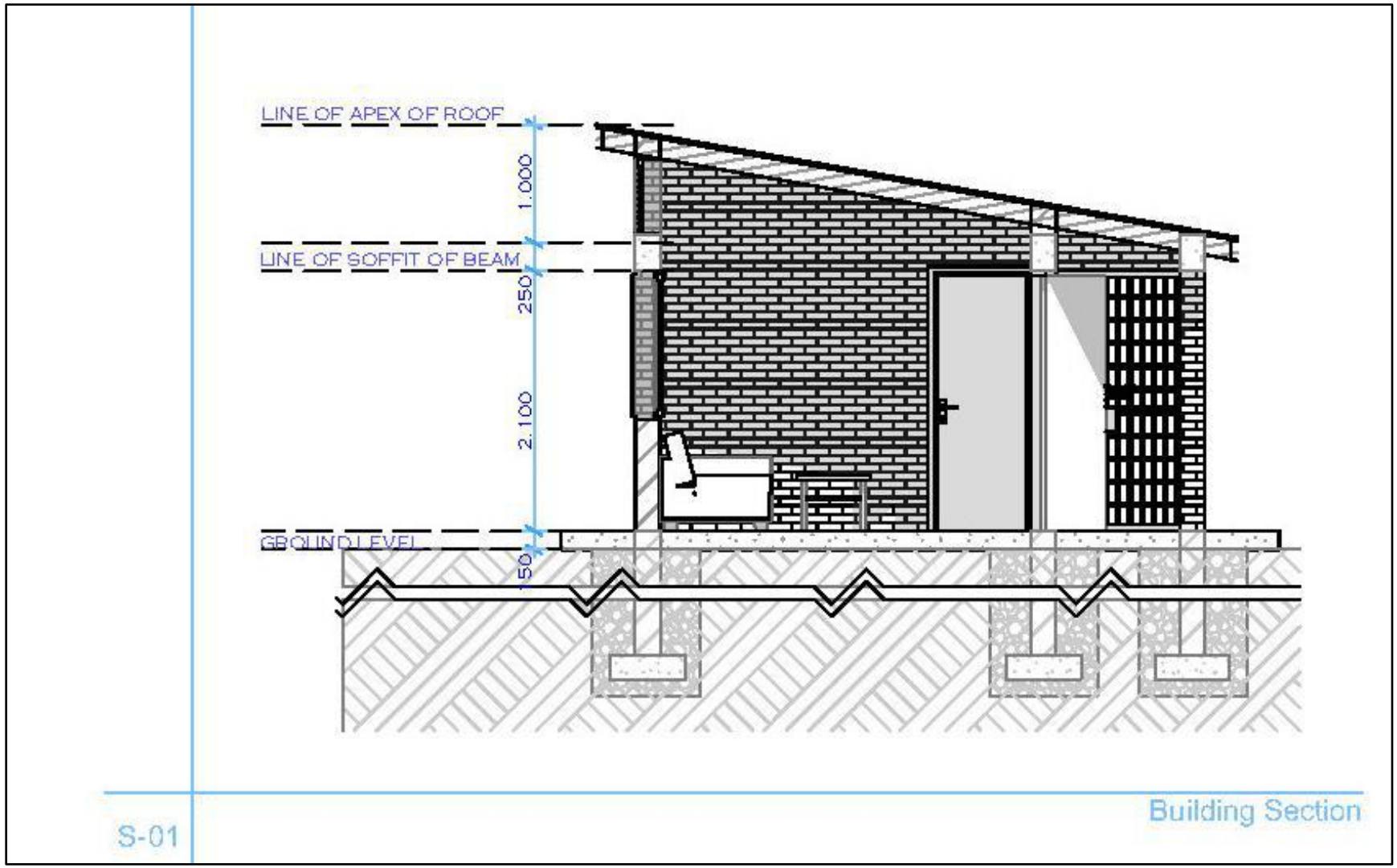


Figure 8: Cross section of the Proposed Three Bedroom House

2.4 Resettlement Plan Summary

The resettlement land earmarked is north of the wind farm next to Kiongwe village. This is largely an agricultural resettlement programme since most of those being resettled are farmers and will be compensated in accordance with the Resettlement Action Plan. The details of the settlers are indicated in the RAP. The county has also prepared a land subdivision map that will guide the resettlement process which is annexed in this report. To prevent land dispute among the resettled persons, the county will issue title deeds for the parcels of agricultural land allocated.

The planned resettlement is targeting agricultural plots for farmers who will be vacating the land earmarked for the proposed wind farm. Bahari Wind Limited will only construct the houses after resettlement has been finalized for the 333 beneficiaries identified. All houses constructed will have a pit latrine ready for sanitation. Once construction of the houses has been completed, they will be handed over to the intended recipients who will use their land ownership documents to apply for electricity, water, and other relevant utilities from the respective service providers.

2.5 Construction Processes

2.5.1 Pre-construction phase

The pre-construction phase is vital to the success of the entire project. Also referred to as the design phase, it gives a full understanding of the cost, scope, and schedule of a project. The project's success will often be dependent on this phase. This phase involves the following:

- ✓ Engineering design, budgeting and construction project plan preparation;
- ✓ Appraisal of baseline condition to determine supply and demand for required infrastructural services;
- ✓ Investigation of the site's biological and physical resources in order to minimize any unforeseen adverse impacts during the project cycle;
- ✓ Carrying out soil feasibility studies to determine stability and other site characteristics to guide and inform the construction phase;
- ✓ Conducting an ESIA and submitting the Study Report to NEMA for licensing;
- ✓ Acquisition of building permits and other statutory documents (NCA, LCG etc.);
- ✓ Identifying the implementation team and assigning responsibilities;
- ✓ Developing and establishing a coordinating and communication structure.

2.5.2 Construction phase

This stage is preceded by the procurement phase. The pre-construction phase would have established how to access the job site, the quality control procedures for the project, how and where to store all the materials and the hours that everyone will be working. The construction stage activities are known to be labor-intensive and will be supplemented by machinery. This phase shall include the following: -

- ✓ **Establishment of related work and support infrastructures that are significant for the construction work.** This would involve the transportation of machinery and deployment of the workers to the construction site. The machinery would be used for groundbreaking and for transportation of materials from the sources to the site. It is important to note that both heavy and light machinery will be used at this stage. These will include concrete mixers, welding machines, power transmission equipment etc. The contractor will also hire and mobilize human workforce consisting of both skilled and unskilled workers to the site.
- ✓ **Site Clearance and preparation**: This will involve clearing of the site of any vegetation and debris, stripping of top soil for site levelling and securing the

project site to restrict access to the site by the public. It will also involve setting up temporary construction offices and storage rooms for construction materials (cement, paint, glass etc.) and first aid facilities as well as constructing adequate sanitary facilities for workers.

- ✓ **Acquisition and transportation of building materials**: The contractor shall source for materials for construction from the various available suppliers. Supply of materials will be a continuous activity throughout the project life since different materials will be needed at different phases of the construction. The materials that shall be used in the construction include among others building stones, sand, ballast, cement, timber, concrete formwork, steel reinforcement bars, galvanized iron pipes, polyvinyl chloride pipes, concrete paving blocks and slabs, hardcore/murram and insulated electrical cables.
- ✓ **Excavation and land filling works**: Excavation works are carried out to prepare the site for laying of foundation, construction of basement and drainage system. Heavy earth moving machinery such as excavators, bulldozers, backhoe etc. can be used for excavation while loaders and tippers shall be used for loading and transporting the overburden to designated disposal site.
- ✓ **Source of construction materials and equipment**
  Structural construction of the new site will largely apply ordinary materials that are not expected to have significant impacts on the environment. Among the material to be used include mined sand and building blocks to be obtained from the local NEMA-licensed quarries, cement, water supply materials (pipes and fittings) and other secondary materials such as papers, polythene materials and fabrics, all of which will be obtained from the nearest available suppliers in Lamu County. Wall and floor finishing materials (paints, ceramic tiles and decorating materials), block boards, electrical cables and other machinery will be sourced from local outlets and suppliers in Mpeketoni and across the county.

- ✓ **Infrastructure construction:** The project will be constructed based on applicable standards of Kenya and any other standards which may be incorporated. The constructions will as well incorporate environmental guidelines, health and safety measures. The project inputs will include the following:
  - Construction raw materials will include sand, cement, stones, gravel/ ballast, metals, among others. All these will be obtained from licensed dealers and especially those that have complied with the environmental management guidelines and policies;

- Construction equipment will include machinery such as trucks, concrete mixers and other relevant construction equipment. These will be used for the transportation of materials, clearing of the vegetation and resulting construction debris. Most of the machinery will be petrol/diesel engine powered.
- A construction labor force of both skilled and non-skilled workers will be required.

✓ **Electrical and Mechanical work**: Electrical work during construction of the premises will include installation of electrical cabling, gadgets, devices and appliances, lighting apparatus, sockets outlets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting. All the electrical works will be carried out by licensed electricians to the satisfaction of the relevant authorities. The mechanical works during the construction stage will include setting up:

- Plumbing and drainage pipes
- Soil vent pipes (SVP) provided on doors and windows
- Storm drainage pipes
- Inspection chamber covers and framing

All works shall be done by qualified technicians under the supervision of the Project Mechanical Engineer and shall follow the set standards.

✓ **Structural Steel works**: Structural steel works will involve steel cutting, welding and fixing on the already constructed formwork before concreting is done. The rationale for carrying out steel works is to reinforce the concrete for structural stability.

✓ **Water Reticulation System:** Water supply for the development during construction phase of the project will be from water vendors. Other sources could be rain water harvesting through roof gutters installed on site storage and staff accommodation buildings – these are also included in the approved plans. There will be water storage tanks to increase water storage capacity at each proposed building site.

✓ **Masonry, Concrete Work and Related Activities:** General masonry and related activities include concrete mixing and laying for foundations, beams, columns and floor slabs, erection of building walls, pavement works, construction of drainage systems, plaster finishing and curing of fresh plastered and concrete surfaces.

✓ **Solid Waste Management**: Waste and construction by-products are usually produced on the project site in all construction projects. These include nails, steel

re-bar pieces, broken glass, broken masonry blocks and demolition debris, and wood waste. In this project the construction wastes will be minimal and the prompt removal and disposal of such refuse and other related wastes is necessary. Waste management infrastructure shall be set up including waste receptacles with bulk storage capacity located at convenient points where necessary. These will be used both during construction and operation stage. Collection, transportation and final disposal of waste will be done by solid waste management (garbage collection) service providers/contractors. The service provider shall be licensed as stipulated on LN No. 121 of 2006. The wastes will be disposed at the county designated landfill site. Reuse and recycling methods will be considered to reduce amount of waste on the site.

- ✓ **Sewerage:** Wastewater will be managed by a septic tank-soak pit system connected to the sanitary facilities erected for use by site personnel. These are also part of the plans for the individual houses to be constructed**.**
- ✓ **Interior and Exterior Finishes:** Finishes will entail plastering to improve the aesthetic value and to ensure the building is structurally strong. Both internal and external finishes will be carried out in accordance to the specifications of the project architect. The ultimate step will be fixing of wall and floors tiles followed by painting of the entire development.

2.6 Operation phase

This stage shall involve occupation by people for residential use and regular general maintenance.

2.6.1 Operation Inputs

Power: The premises will be connected to power from the national grid. The occupiers will use such power for lighting and other household needs.

Water: Water will be sourced from the water supply scheme in the area. Rainwater harvesting will also be done to supplement the municipal water supply connection.

2.6.2 Outputs

Solid waste management: Provision of waste receptacles with bulk storage capacity at convenient points to prevent littering during occupation. Dust bins should be provided for all households and be well protected from adverse weather and animals. The proponent will contract a NEMA-licensed waste handler who will collect all solid waste at agreed intervals and dispose them at designated dumping sites. Skips shall be provided for dry and wet waste which will temporarily hold the waste before collection.

Effluent discharge management: Installation of a septic tank/soak pit system to manage wastewater from laundry, ablution, toilets etc.

Storm water management: Storm drainage network and related infrastructure will be constructed to improve drainage within the development by channeling storm run-off away from residential areas.

Cleaning: Individuals will be responsible for washing and cleaning their own premises/ residences. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents**.**

General repairs and maintenance: The home owners will be repairing and maintaining the units during the operational phase of the project. Such activities will include repair of building walls and floors, repair and maintenance of electrical fittings, appliances and equipment, repair/replacement of damaged plumbing (pipes and fittings), painting, and replacement of worn-out materials among others.

2.7 Decommissioning Phase

Decommissioning refers to the final disposal of the project and associated materials at the expiry of the project life span. All establishments determined to be removed from the site shall be removed and disposed of using the following procedures:

- ✓ All utility connections, power, water, sanitary connections, etc. shall be identified, disconnected, capped, and properly closed prior to or at the time of decommissioning.
- ✓ All materials to be disposed of shall be taken to a licensed disposal facility, scrap yard or recycling center. Manifests of all loads, including detailed material descriptions shall be maintained.
- ✓ A final decommissioning report shall be compiled upon completion of the decommissioning activities.

2.8 Project alternatives

2.8.1 Introduction

Exploring available alternatives to the development proposal is an important aspect of the ESIA process that could invariably help in mitigating the impacts predicted in this report. In this analysis alternatives were considered on the following basis:

- ✓ No project alternative
- ✓ Yes project alternative

- ✓ Site layout alternative
- ✓ Alternative materials and technology

2.8.2 The No Project alternative

This alternative is the best in terms of preventing the anticipated environmental challenges of the project since it maintains the status quo of the environmental conditions of the project area. However;

- ✓ It will hinder progress of the wind energy project that can only kick-off after resettlement of the farmers from the proposed project site.
- ✓ It does not add value to the status of the piece of the land under consideration.
- ✓ It will cause the country will miss the opportunity to get the much need wind energy to reduce the energy deficit facing the country.
- ✓ This alternative will in addition deny the proponent, contractors and other workers a reliable income – deny the government revenue from the tax obtained on materials and licenses related to construction and operation of the premises.
- ✓ This alternative will deny residents improved housing units planned by the project.
- ✓ This alternative will also deny citizens additional business opportunities.

2.8.3 The Yes Project alternative

This option is considered as the most viable because of the following reasons:

- ✓ The proposed development will support the existing investment which contributes largely to employment creation and revenue to the government.
- ✓ There will be employment creation.
- ✓ The proposal is consistent with the existing land use character of the area.
- ✓ It will provide income to the government and other business ventures.
- ✓ The proposed project will give better housing for residents who will be compensated.
- ✓ The residents will acquire title deeds for their pieces of land which they currently do not have.
- ✓ The housing project encourages co-existence by settling Kenyans of different ethnic and cultural backgrounds to live together harmoniously.

2.8.4 Site layout alternatives

Siting alternatives would be considered if the current design layouts cannot be implemented. Since the proposed project site is deemed suitable and the proponent further has adequate land to undertake the project. Choosing another site is negated by the requirement for additional capital and the availability of suitable land for the development if the capital is available.

2.8.5 Alternative materials and technology

Technological alternatives are driven by the need for a cleaner production methodologies and conservation of raw materials, sufficient and efficient construction labor, and energy and water resources. The proposed project will apply modern local and international standards for construction practice and materials, with great emphasis and consideration for public health, safety, security and environmental aesthetic requirements. The construction works will be done using locally sourced materials that meet the Kenya Bureau of Standards requirements. The technologies available include use of traditional material which is represented by concrete structures and concrete or coral blocks. The technology to be adopted will be the most economical and one sensitive to the environment.

CHAPTER THREE

3. POLICY LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

The relevant legislations which the project must comply with are intended to ensure project's sensitivity to:

- ✓ environmental concerns
- ✓ public safety
- ✓ public health
- ✓ physical planning regulations
- ✓ County Government bylaws
- ✓ National Construction Authority (NCA) construction standards.

The major changes in land use are required to undergo an ESIA study which is later submitted to NEMA for approval and granting of an ESIA license. Environmental degradation is a major global challenge. The main challenge is maintaining sustainable development without degrading the natural environment on which people are dependent. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. Among the major environmental problems being experienced in Kenya today are:

- ✓ Land and habitat degradation
- ✓ Loss of biodiversity
- ✓ Environmental pollution
- ✓ Water management.

3.2 Policies

Some key policy frameworks, both national and international, are discussed below. They will shed light on some pertinent guidelines set for such projects to ensure sustainability and avoid conflict.

3.2.1 Sessional Paper No 1 of 1996 on Environment and Development

Sessional Paper No 1 of 1996 is the official statement on national policy on environment and was released in 1996 following recommendations of the National Environment Action Plan (NEAP) of 1994. The NEAP process had been launched earlier in 1992 following the Country's participation in the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro during which Kenya alongside other

nations became a signatory to Agenda 21 which called on all nations to pay closer attention to environmental management at national level. Through Sessional Paper No 1 of 1996, the Kenya Government guarantees every citizen the inalienable right to a clean and healthy environment and commits to pursue a policy strategy of integrating environmental sensitivity into national development planning processes, and sets broad policy objectives as follows:

- Optimal use of natural land and water resources in improving the quality of human environment;
- Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;
- Integration of environmental conservation and economic activities into the process of sustainable development;
- Meeting of national goals and international obligations by conserving biodiversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.
- Among other provisions, Sessional Paper No. 1 of 1996 also sets out sectoral priorities for environmental sustainability which in most cases have been operationalized through formulation of guidelines for quality and environmental management in respective sectors. The Environment Management and Coordination Act (EMCA, 1999) has since also been enacted to secure implementation of the national policy on environment.

This ESIA study for the resettlement and housing project is a direct response to the requirements set forth in EMCA 1999 and Legal Notice No. 101 and reflects on the 1996 sessional paper on environment and development.

3.2.2 The Poverty Reduction Strategy Paper (1999)

This strategy paper was published by the Government in 2001. The two key goals of the strategy are poverty reduction and economic growth. The document outlines the priorities and measure necessary for poverty reduction and economic growth. The objectives of economic growth and poverty reduction are borne out of realization that economic growth is not a sufficient condition to ensure poverty reduction. In this regard, measures geared towards improved economic performance and priority actions that must be implemented to reduce the incidence of poverty among Kenyans have been identified. With respect to the environment the paper proposes that adequate awareness be created among stakeholders regarding environmental costs and benefits. It further calls for community involvement and participation in environmental management and conservation.

Towards ensuring harmony with the poverty reduction policy thrust, the ESMP requires priority job placement to be accorded to residents of the larger Mpeketoni and, specifically, Kiongwe site.

3.2.3 Sessional Paper No. 3 of 2009 on National Land Policy

The National Land Policy was formulated with the aim of securing rights over land and provide for sustainable growth, investment and reduction of poverty in line with Government overall development objectives. The policy will offer a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide:

a) All citizens with opportunity to access and beneficially occupy and use land;
b) Economically viable, socially equitable and environmentally sustainable allocation and use of land;
c) Efficient, effective and economical operation of land markets;
d) Efficient and effective utilization of land and land-based resources; and
e) Efficient and transparent land dispute resolution mechanisms.

Requirements of this Policy will be triggered in the project which will entail land allocation for the Bahari wind farm project and subsequent resettlement of the farmers who were displaced. A comprehensive Resettlement Action Plan was developed to guide resolution of all displacement impacts associated to the Wind farm.

3.2.4 Sessional Paper No. 3 of 2016 on National Housing Policy

The Sessional Paper No. 3 of 2016 on National Housing Policy 2016 therefore presents the issues and policy recommendations that have been identified, analyzed, and agreed upon by the stakeholders in line with the requirements of the 2010 Constitution. In this respect, this policy document will form the foundation upon which the administrative and legislative framework will be enhanced to meet the demand for housing by Kenyans. The policy proposes remedies to problems that area manifest in rural areas, such as poor quality of the housing fabric and lack of basic services such as clean drinking water.

The Policy therefore aims at: -

- Enabling the low-income households to access housing, basic services, and infrastructure necessary for a healthy living environment especially in urban and peri-urban areas.
- Encouraging integrated, participatory approaches to slum upgrading and improvement, including income generating activities that effectively combat poverty.

- Creating a National Social Housing Development Fund to be financed through budgetary allocations and financial support from development partners and other sources for rental social housing and related infrastructure, and other low-cost housing programmes;
- Establishing a framework that enables the National Social Housing Development Fund to support research and slum upgrading.
- Promoting and funding of collaborative research on the development of low-cost building materials and construction technologies.
- Contributing to the harmonization of existing laws governing urban development factors that interact with housing delivery especially housing infrastructure to facilitate more cost-effective housing development; and
- Facilitating increased investment by the private sector in the production of housing for low and middle-income urban dwellers.

In its commitment to providing social and affordable housing, the Government has reviewed Sessional Paper No. 3 of 2004 on National Housing Policy to comprehensively address the shelter problem. The reviewed policy is anchored on four pillars: The first pillar is on policy targets which highlights urban housing, rural housing, and slum upgrading amongst others and proposes solutions, which include poverty alleviation. The second pillar is on main housing inputs and addresses ways of accessing and managing the housing inputs namely land, infrastructure, building materials and technologies as well as finances. The third pillar covers estates management and maintenance necessary to ensure long lifespan for housing stock, disaster management, environmental impact assessment for housing projects, human resource development and monitoring and evaluation while the fourth pillar deals with legislative and institutional framework and assigns specific roles to various stakeholders. Under this pillar, the policy also proposes enactment of a comprehensive Housing Act to strengthen the role of the Ministry in-charge of housing in regulating housing development.

This policy has significant directives on implementation of resettlement and housing projects such as the one in Mpeketoni. It also discusses ESIA for resettlement and housing projects.

3.2.5 Sessional Paper No. 02 of 2019 on National Policy on Gender and Development

The Constitution is express on its gender equality provisions and aspirations. In addition, gender-aware policies such as the National Land Policy (2009) which recognizes women's rights to own property on an equal basis with men; the National Policy for Prevention and Response to Gender Based Violence; and the National Policy for the

Abandonment of Female Genital Mutilation have been adopted. Similarly, the Counter-Trafficking in Persons Act, 2010, the Prohibition of Female Genital Mutilation (FGM) Act, 2011 and the Sexual Offences Act, 2006 outlaw specific forms of violence against women and the girl child.

The policy identifies a set of factors that will act as indicators for measuring the implementation and effectiveness of the gender and development agenda. If concerted efforts are made and adequate resources are allocated to the processes of institutionalizing gender equality and the empowerment of women as proposed in this policy, the result will be a fairer and transformed society in which women and men will benefit in the following ways:

- Equality of treatment and Freedom from Discrimination as provided for under Article 27 of the Constitution;
- Equality in the political, social, economic and cultural development spheres for women and men;
- Respect for the human rights of women, men, boys and girls;
- Respect for provisions on equality in the Bill of Rights in civil, administrative and judicial regulations and procedures and customary, cultural and religious practices;
- Enforcement of statutory, religious and customary laws within the framework of this policy and the Constitution; and,
- Duty bearers at the National and County levels of Government will be equipped with relevant gender responsive requirements for planning, budgeting and implementing development programmes.

3.2.6 The Lamu County Integrated Development Plan 2018-2022

It represents a strategic effort by the County Government of Lamu to drive its development agenda and spur overall economic growth. The spirit of this CIDP borrows heavily from the Country's development blueprint - the Vision 2030, the African Union Agenda 2063, the East African Vision 2050 and it also builds on the experiences, successes and lessons learned during the implementation of the first CIDP (2013 – 2017).

The plan mentions that Lamu County is set to benefit from other projects of strategic National importance including investments in the energy sector with the proposed sites for wind power site within the County. To maximize our county's economic growth, the Plan is aligned to take advantage of the region's economic strategies embodied in the

Vision 2030 such as the projects affiliated to the Lamu Port-South Sudan-Ethiopia-Transport (LAPPSET) Corridor. The plan is also well anchored and intricately linked to the Sustainable Development Goals (SDGs), the Lamu County Spatial Plan as well as other sectoral plans that exist at both the county and national level.

In the CIDP, the County Government of Lamu takes cognizance of the fact that economic development requires strong partnership with other players to make significant impact. It remarks that "as such to determine our ultimate success, we will need to build a strong framework that integrates the public-private-Non-profit sectors. In this framework, the public sector will focus on creating an enabling environment for economic growth and filling market gaps with programs for the general welfare of its citizens. The private sector on the other hand will create economic value that supports job creation while the Non-profit sector will create knowledge and provide resources thus creating social value."

The plan admits to the inadequate modern sanitary facilities and limited connection to piped water, with the exception of Lamu Old Town and Mpeketoni which affect housing and settlement. The villages are haphazard and poorly planned making accessibility difficult, and roads are quite narrow and in other areas non-existent. Housing in the County is generally inadequate, and this shortage is more acute in the upcoming urban centers outside Lamu town. The anticipated growth in population for the County occasioned by the upcoming development projects will require development of newly planned urban areas with integrated solid and liquid waste management system as proposed in the Plan.

The CIDP is a crucial policy document that the county uses to define development priorities and provide guidance on sustainable implementation of projects. The resettlement and housing project will extensively benefit from the policy guidelines set out for the period 2018 – 2022 by the plan.

3.2.7 IFC Performance Standards on Environmental and Social Sustainability

The Performance Standards provide guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. As is the case in this project, where direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities

are enhanced. Below is an outline of the IFC Performance Standard and their applicability in the Kiongwe housing project.

Performance Standard	Descriptive Notes	Applicability		Rationale
		YES	NO	
1. Assessment and Management of Environmental and Social Risks and Impacts	Environmental and social responsibility is critically important in today's global economy. An environmental and social management system (ESMS) helps companies integrate plans and standards into their core operations so they can anticipate environmental and social risks posed by their business activities and avoid, minimize, and compensate for such impacts as necessary. A good management system provides for consultation with stakeholders and a means for complaints from workers and local communities to be addressed.	√		According to the existing national laws any proposal to construct more than 100 housing units is deemed as a high-risk project because of the magnitude of works involved. The project will definitely have impacts and risks that will be managed and mitigated. However, it is important to note that there is already an existing population practicing agriculture on the proposed site for the housing project. Apart from the proposed new houses and formal subdivision of land for purposes of resettlement, the project does not anticipate high environmental and social risks.

2. Labor and Working Conditions	For any business, its workforce is its most valuable asset. A sound worker-management relationship is key to the success of any enterprise. This standard requires that companies treat their workers fairly, provide safe and healthy working conditions, avoid the use of child or forced labor, and identify risks in their primary supply chain.	√		The project will employ large number of workers, most of whom will be semi-skilled and unskilled laborers. The proposed ESMP adequately covers occupational risks. Risk of child labor within the project and indirectly at the material source points (quarries) is also addressed through a requirement in the ESMP for the proponent to fully comply with existing national labour laws. Gender balance and discrimination will be addressed through gender policy frameworks outlined in the National Policy on Gender and Development. Laws against discrimination of women and the girl child will be followed to the latter. The proponent will also adopt a grievance redress mechanism.

3. Resource Efficiency and Pollution Prevention	Industrial activity and urbanization can increase levels of pollution that may threaten people's health and the environment. This standard guides companies to integrate practices and technologies that promote energy efficiency, use resources—including energy and water—sustainably, and reduce greenhouse gas emissions.	√		The proposed house design is energy and resource efficient and the scope of the construction activities will have minimal degradation impacts on the farmlands. The impact is of low significance since the project will only utilize inputs that are required to reduce construction costs.
4. Community Health, Safety, and Security	Business activities and infrastructure projects may expose local communities to increased risks and adverse impacts related to worksite accidents, hazardous materials, spread of diseases, or interactions with private security personnel. This standard helps companies adopt responsible practices to reduce such risks including through emergency preparedness and response, security force management, and design safety measures.		√	Not applicable
5. Land Acquisition and Involuntary Resettlement	When companies acquire land for their business activities, it can lead to relocation and loss of shelter or livelihoods for communities or individual households. Involuntary resettlement occurs when affected people do not have the right to refuse land acquisition and	√		The proponent has prepared a detailed Resettlement Action Plan (RAP) through a consultative and transparent process.

	are displaced, which may result in long-term hardship and impoverishment as well as social stress. This standard advises companies to avoid involuntary resettlement wherever possible and to minimize its impact on those displaced through mitigation measures such as fair compensation and improvements to and living conditions. Active community engagement throughout the process is essential.			
6. Biodiversity Conservation and Sustainable Management of Living Natural Resources	Biodiversity loss can result in critical reductions in the resources provided by the earth's ecosystems, which contribute to economic prosperity and human development. This is especially relevant in developing countries where natural resource-based livelihoods are often prevalent. This standard recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and managing living natural resources adequately are fundamental to sustainable development.	√		The impact is of low significance. The proposed resettlement area is already occupied with the existing population engaging in crop farming and livestock keeping.
7. Indigenous People	Indigenous peoples (IPs) may be particularly vulnerable to the adverse impacts associated with project development, including risk of impoverishment and loss of identity, culture, and natural resource-based livelihoods. This standard seeks to ensure that business activities		√	The proposed project area is largely cosmopolitan having extended after the establishment Lake Kenyatta Settlement Scheme in the 1970s.

	minimize negative impacts, foster respect for human rights, dignity and culture of indigenous populations, and promote development benefits in culturally appropriate ways. Informed consultation and participation with IPs throughout the project process remains a core requirement and may include Free, Prior and Informed Consent under certain circumstances.			
8. Cultural Heritage	Cultural heritage encompasses properties and sites of archaeological, historical, cultural, artistic, and religious significance. It also refers to unique environmental features and cultural knowledge, as well as intangible forms of culture embodying traditional lifestyles that should be preserved for current and future generations. This standard aims to guide companies in protecting cultural heritage from adverse impacts of project activities and supporting its preservation. It also promotes the equitable sharing of benefits from the use of cultural heritage.		√	The project area is largely cosmopolitan with high cultural diversity. No archaeological discoveries have been recorded in the project area.

Table 3: Outline of IFC Performance Standard.

3.2.8 World Bank Guidelines in EHS

The EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project based on the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. Guidelines are appropriate, in view of specific project circumstances; a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

3.3 Legislative framework

The key national laws that govern the management of environment resources in the country are discussed below.

3.3.1 The Constitution of Kenya (2010)

The Constitution of Kenya 2010 is the supreme law of the land. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all which includes the right:

- ✓ To have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
- ✓ To have obligations relating to the environment fulfilled under Article 70.

The Constitution identifies the responsibility of the national government in respect to the environment in Sections 69 and 70. Section 69 (1)-f requires the State to Establish systems of environmental impact assessment, environmental audit and monitoring of the environment. In Sections 69 and 70, the Constitution has inter alia identified National Obligations in respect of the environment and Enforcement of Environmental Rights respectively as follows:-

Section 69

1) The State shall—

a. Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits
b. Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya
c. Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities
d. Encourage public participation in the management, protection and conservation of the environment;
e. Protect genetic resources and biological diversity
f. Establish systems of environmental impact assessment, environmental audit and monitoring of the environment
g. Eliminate processes and activities that are likely to endanger the environment
h. Utilize the environment and natural resources for the benefit of the people of Kenya.

2) Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Section 70:

1) If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.
2) On application under clause (1), the court may make any order, or give any directions, it considers appropriate: -

    a. To prevent, stop or discontinue any act or omission that is harmful to the environment;

    b. To compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or

    c. To provide compensation for any victim of a violation of the right to a clean and healthy environment.

3) For the purposes of this Article, an applicant does not have to demonstrate that any person has incurred loss or suffered injury

Essentially, the New Constitution has embraced and provided further anchorage to the spirit and letter of Cap 387 whose requirements for environmental protection and management have largely informed Sections 69 through to 71 of the Document. In Section 72 however, the new constitution allows for enactment of laws towards enforcement of any new provisions of the Supreme Law.

3.3.2 The Environmental Management and Co-ordination Act (EMCA Cap 387)

The Environmental Management and Coordination Act (EMCA) No. 8 of 1999 is the supreme environmental law which lays out the legal and institutional framework for environmental management in Kenya. The statute was enacted in 2000 with a view to harmonizing environmental legislation previously scattered in 77 national laws. Under EMCA, provisions and safeguards for environmental management have been put in place and established the administrative structures to implement EMCA, 1999 as follows:-

The National Environment Council: The National Environment Council (the Council) is responsible for policy formulation and directions for the purposes of EMCA 1999. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment.

The National Environmental Management Authority (NEMA): EMCA 1999 allows for formation of the National Environmental Management Authority (NEMA) as the body charged with overall responsibility of exercising general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. NEMA was established in 2001 when the first Director General was appointed by the President. Activities of NEMA are rolled out through three core directorates in charge of Enforcement, Education and Policy. This is the institutional framework under which this Project Report process will be regulated and processed to conclusion.

Public Complaints Committee: Under EMCA 1999, a Public Complaints Committee has been established to provide an administrative mechanism for addressing environmental harm. The Committee whose membership include representatives from the Law Society of Kenya, NGOs and the business community has the mandate to investigate complaints relating to environmental damage and degradation. EMCA requires Environmental Impact Assessment for new projects

The Environmental Management and Coordination Act (Cap 387) is the principle legislation governing conduct of ESIA in Kenya. Section 58 requires that an Environmental Impact Assessment (ESIA) study precede all development activities proposed to be implemented in Kenya. The Act further requires that ESIA studies so designed, be executed in accordance with the Guidelines for Conduct of ESIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003) as published by the National Environmental Management Authority (NEMA).

The Second Schedule of Cap 387 specifies projects that require to be subjected to ESIA studies. The proposed resettlement and housing triggers requirements for an ESIA under this Second Schedule. The ESIA Report has thus been prepared in compliance with this requirement.

EMCA provides for gazzettment of Environmental Regulations under Cap 387, NEMA has gazetted legal tools that govern conduct of ESIAs and general environmental protection. The proposed resettlement and housing project by the Bahari Wind has been screened and will require a full ESIA study. EMCA has several Regulations that are discussed in the proceeding sections.

3.3.2.1 The Environmental Management and Co-ordination (ESIA/EA) Regulations – LN No. 101 of 2003

The ESIA/EA Regulations are meant to ensure the implementation of Sec. 58 of EMCA. It makes it illegal for anyone to undertake developments without an ESIA license and stipulates the ways in which environmental experts should conduct the Environment Impact Assessment and Audits reports in conformity to the requirement stated. It is concise in its report content requirements, processes of public participation, licensing procedures, inspections and any possible offences and penalties under the Act. Acquisition of ESIA license prior commencement of the project. The operations of the project are similarly licensed since the ESIA report contains an Environmental Management Plan which forms the basis for approval of the project by NEMA and imposition of conditions to safeguard the environment. Environmental Auditing should be done annually.

Relevance to the proposed project: The proponent should ensure an ESIA is conducted as per the EMCA requirements and submitted to NEMA for review and issuing of the license before the commencement of the project. The proponent should also ensure annual EAs are carried out and EA reports submitted to NEMA for review and necessary action. In addition, the proposed project will be planned, designed,

constructed and operated based on these regulations. It shall be maintained and guided by the same regulations.

3.3.2.2 Environmental Management and Co-ordination (Water Quality) Regulations – LN No. 120 of 2006

Water quality regulations were gazette as a legislative supplement to mainly address the challenges of pollution of water sources and conservation. It consists of VI parts and eleven schedules dealing with protection of water sources for domestic use to miscellaneous provision. Effluent discharge and water for industrial use are dealt with under part III which sets out the following:

- ✓ Standards for discharge into the environment,
- ✓ Standards for discharge monitoring, and
- ✓ Application for effluent discharge license.

Generally the legal notice addresses the challenges of pollution of water resources as well as their conservation. The regulation provides guides for water use and conservation as well as effluent standards for discharge. It is Important to protect ground water resources. Since there is a potential of work force effluent to be discharged into the environment, the proponent should ensure that such effluent is managed accordingly.

Relevance to the proposed project: The proponent should care and appropriate measures to prevent pollution of underground and surface water are implemented throughout the project cycle and ensure good water use and conservation since human settlement and farming activities require good water quality.

3.3.2.3 The Environmental Management and Co-ordination (Waste Management) Regulations – LN No. 121 of 2006

These regulations focuses on management of solid wastes, industrial wastes, hazardous wastes, pesticides and toxic substances and radioactive substances The regulations are aimed at addressing the following concerns;

- ✓ Licensing of waste recycling and disposal sites,
- ✓ Licensing waste transportation waste,
- ✓ Reduction of waste through adoption of cleaner methods of production,
- ✓ Responsibilities for waste generators and obligations for disposal,

- ✓ Proper transportation and disposal of wastes,
- ✓ Management of waste disposal sites,
- ✓ Waste treatment requirements,
- ✓ Application of existing regulations in relation to waste management,
- ✓ Licensing of waste handlers and disposal sites, and,
- ✓ Licensing fees and procedures for waste handlers and pollution penalties

*Relevance to the proposed project: T*he proponent should ensure that:

- ✓ Solid wastes are disposed in the manner required.
- ✓ There is proper disposal of any materials. This could include Personal Protective Equipment (PPE), packaging, plastic wrappings, lunch containers, cartons, etc.
- ✓ All solid wastes generated by the operations of the facility shall be disposed of by a contracted NEMA licensed solid waste handler.

3.3.2.4 The Environmental Management and Co-ordination (Excessive Noise and Vibrations Pollution Control) Regulations – LN No. 61 of 2009

These Regulations were gazette to manage noise levels to levels that do not cause a disturbance to the public. The proposed activities will however have a potential for the production of noise above the acceptable limits.

MAXIMUM PERMISSIBLE NOISE LEVELS

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 and 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, 10h)

Table 4: Permissible noise levels and the noise receptor descriptions

The table below presents the maximum permissible LAeq levels for construction sites in Kenya (Second Schedule). The Kenya noise regulations define daytime period as 06:01 to 18:00 hours and night-time period from 16:01 to 06:00 hours.

MAXIMUM PERMISSIBLE NOISE LEVELS FOR CONSTRUCTIONS SITES
(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

Table 5: Permissible LAeq levels for construction sites in Kenya

Relevance to the proposed project: The proponent should ensure compliance with the set noise level limits during construction and operation activities. The contractor should ensure that employees are not exposed to excess noise levels and in such cases provide suitable personnel protection equipment (ear protective devices). Furthermore the contractor shall be required; to ensure that all machineries are in good working

condition to reduce noise should also make sure that all construction activities are carried out within the stipulated time so as not to disturb the neighbors.

Figure 9: Ear protective devices

3.3.2.5 Air Quality Regulation, 2014

This regulation is referred to as "The Environmental Management and Coordination (Air Quality) Regulations, 2014". The objective is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources, including as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set. The Regulations prohibits the Proponent from:

- ✓ Acting in a way that directly or indirectly cause or may cause air pollution to exceed levels set out in the second Schedule to the Regulations
- ✓ Allowing particulates emissions into the atmosphere from any source not listed in the six schedule of the Regulations
- ✓ Causing ambient air quality in controlled areas (listed in Schedule Thirteen) to exceed those stipulated under second Schedule
- ✓ Allowing (during construction and demolition) emission of particulate matter above the limits stipulated in second Schedule
- ✓ Causing or allowing stockpiling or storage of material in a manner likely to cause air pollution

- ✓ Causing or allowing emissions of oxides of nitrogen in excess of those stipulated in the eleventh Schedule of the Regulation

Kenyan Standards		
Pollutant	**Averaging period**	**Criterion (μg/m^3)**
NO2	annual average	96
NO2	monthly average	153
NO2	24 hour maximum	100
NO2	one hour maximum	383
NO2	Instant peak maximum	957
PM10	annual average	50
PM10	24 hour 98 percentile	70
PM2.5	annual average	35
PM2.5	24 hour maximum	75

Table 6: Kenyan Standard emission limits

Relevance to the proposed project: The Proponent shall observe policy and regulatory requirements and implement the mitigation measures proposed in this document in an effort to comply with the provisions of these Regulations on prevention of air pollution.

3.3.2.6 EMCA (Fossil Fuel Emission Control) Regulations, 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement no. 74, October 2006.The 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 partnerships to control fossil fuel emissions. The fossil fuels considered are petrol, diesel, fuel oils and kerosene.

Relevance to the proposed project: The proponent should ensure fossil fuel emission control regulations as described in Legal Notice No. 131 of the Kenya Gazette Supplement no. 74, October 2006 are adhered to pertaining the use of fuel.

3.3.3 The Water Act No. 8 of 2002

While developing the National Water Policy, the Government also established a National Task Force to review the Water Act, Chapter 372 and draft a Bill to replace the Water Act, Chapter 372. The Water Bill 2002 was published on 15th March 2002 and passed by Parliament on 18th July 2002. It was gazette in October 2002 as the Water Act, 2002 and went into effect in 2003 when effective implementation of its provisions commenced. The legal framework under the Water Act 2002 provides the guidelines in line with the existing policy changes, four key institutions with separate functions and decentralized decision making systems.

Relevance to the proposed project: The proponent should ensure that water usage in all phases of the project cycle is in line with the provisions of this Act. An ESIA should be undertaken and water abstractions permit from Water Resources Authority (WRA), Tana Basin Area (TBA) before commissioning any borehole.

3.3.4 The Occupational Safety and Health Act 2007, OSHA

The OSHA 2007 repealed the Factories Act, Cap 514 Laws of Kenya which had been originally adopted in 1962 and revised in 1972, underwent further and extensive amendments in 1990. The provisions of OSHA have far reaching implications on safety and health at the work place. The OSHA sets out to make provisions that aim to eradicate or minimize accidents at the work place. Throughout the world, work related accidents are a major concern for Governments and industry. The International Labor Organization estimates that there are over 250 million work related accidents per year; 160 million work related ill health every year and that 3000 people are killed at work per day. Many of the accidents could be avoided if appropriate safety practices and information were used. Work related accidents affect not only the injured employee, but others as well – employers, family, co-workers, clients, suppliers, community, etc. The OSHA 2007 commenced on 26th October 2007. It is an Act to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces.

Further, there is a requirement that a Safety and Health Committee must be put in place and that employee and members of this committee must be inducted and trained on the provisions of the Act accordingly. The Act imposes various obligations on both employers and employees. These are all necessary for the health and safety of persons accessing and using the premises of the proposed site. Strict provisions are made for in respect of equipment containing self-acting machines, hoists and lifts and the requirement for supervision and training of inexperienced workers. There must be put in place an SHC and proper training to be done.

Relevance to the proposed project: The proponent will ensure that the facility is registered with the DOSH as a work place. Further a well-stocked first aid kit should be available at a suitable place within the property managed by qualified personnel.

Figure 10: Personal Protective Equipment

Figure 11 : Different types of fire extinguisher

Figure 12: First aid kit tool and its components

3.3.5 Traffic Act (Cap. 403)

Section 42 Part 1 forbids any driver to drive a vehicle at a speed exceeding fifty kilometers per hour on any road within the boundaries of any trading center, township, municipality or city: The roads authority is expected to erect and maintain traffic signs as prescribed so as plainly to indicate to drivers entering or leaving such roads or areas where the fifty kilometer per hour speed limit restriction begins and ends.

Section 47 of the act states that any person who drives a motor vehicle on a road recklessly, or at a speed or in a manner which is dangerous to the public, shall be guilty of an offence and liable to a fine. Part VIII of cancelling any driving license or

provisional driving license held by the offender and declaring the offender disqualified for holding or obtaining a driving license for such period as it thinks fit.

Section 52 Part 1, The driver of the vehicles are expected at all times to obey directions given by the police officer whether verbally or in signal, conform to the indications given by any traffic sign, and when any person in charge of any cattle raises his hand or in any manner signaling to stop, and keep it stationary for as long as it is reasonably necessary.

Section 53 Part 1, No vehicle shall be allowed to remain in any position on any road so as to obstruct or to be likely to obstruct or cause inconvenience or danger to other traffic using the road, and, save where the contrary is expressly provided in this Act, every vehicle on a road, when not in motion, shall be drawn up as close to the side of the road as possible.

*Relevance to the proposed project: T*he proponent and contractor should ensure drivers or machine operators should cause no obstruction but observe the recommended speed limits. The proponent will formulate site traffic rules, speed guidelines, mark vehicles pathways and deploy traffic marshals where necessary.

3.3.6 Electricity Power Act No. 11 of 1997

The Electric Power Act No. 11 enacted in 1997 deals with generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. In this respect, the following environmental issues will be considered before approval is granted:

- ✓ The need to protect and manage the environment, and conserve natural resources
- ✓ 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

Relevance to the proposed project: Electricity power installation and usage should be done in a manner that seeks to protect the health and safety of the project employees, the local and other potentially affected communities as well as the environment. All electrical systems to be installed and operated by certified/qualified electrical companies/persons.

3.3.7 County Government Act 2012

The County Government Act 2012, gives effect to Chapter Eleven of the constitution of Kenya 2010 and ascribes to the following: To provide for County Governments` powers, functions and responsibilities to deliver services and for connected purposes. To ensure sustainability the County Government 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. The By–laws prescribe the necessary easements required for the establishment of any project within the County.

*Relevance to the proposed project: T*he proponent is obligated to seek all necessary County approvals/licenses/permits. These may include building plan approval and signage among others.

3.3.8 Public Health Act (Cap. 242)

The Public Health Act provides for the protection of human health through prevention and guarding against introduction of infectious diseases into Kenya from outside, to promote public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within Kenya, to advice and direct local authorities in regard to matters affecting the public health to promote or carry out research and investigations in connection with the prevention or treatment of human diseases. This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health. Part IX section 115 states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into Public Street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin. This provision is supplemented by Section 126A that requires local authorities to develop by-laws for controlling and regulating among others private sewers, communication between drains and sewers and between sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc. for reception or disposal of foul matter. Part XII (prevention and destruction of mosquitoes) Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests shall be deemed

nuisances and are liable to be dealt with in the manner provided by this Act. The operations and activities of the proposed project can be detrimental to human and environmental health and safety in the absence of appropriate measures. For example waste, dust, noise and air emission generated from activities and process of the proposed project can directly or indirectly have adverse impacts on human and environment.

The Act prohibits the Proponent from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.

Relevance to the proposed project: The proponent will therefore observe the public Health act to enhance environmental health and safety to the public and seek approval of the house plans by the County Director of Public Health.

3.3.9 The Physical Planning Act (Cap. 286)

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 the 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.

Relevance to the proposed project: The proposed project proponent should adhere to this act by ensuring that the proposed project is being developed as per the plans approved by the Ministry of Lands and Physical Planning in accordance to the law.

3.3.10 The Building Code 2009

This code was formulated to provide rules and guideline to be observed during construction it requires the proponent to adhere to the set rules and guidelines in the

code. The code requires building plans to be approved by county government. It also prohibits;

- ✓ Erection, or causing or permitting erection of temporary buildings (e.g. a site office, store, builder's shed etc.) to which the Regulations apply without a permit granted under Regulations and
- ✓ Knowingly occupying a temporary building which is erected in contravention to the regulations

Relevance to the proposed project: The proponent is committed to developing the proposed project in accordance to the building codes, the national standards and other international building standards and guidelines.

3.3.11 Forest Act

The Forest Conservation and Management Act of 2016 were enacted to give effect to Article 69 of the Constitution which obliges The State to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources. Enforcing the Act is the result of a move to protect the country's forests by curbing deforestation and forest degradation. The tremendous deterioration of forests became a cause for concern because of the extent of damage to the country's eco-system. Section 7 of the Act establishes the Kenya Forest Service to conserve, protect and manage all public forests. However, they face several challenges, the main one being the conversion of forestland into agriculture and settlement.

Currently, Kenya has a forest cover of 7.24% which is less than the 10 percent minimum required by Article 69(1) (b) of the Constitution and the United Nations. This has raised serious concerns about the management of Kenya's forests and their need to be addressed. While a lot of rural land is forest, it can be made into farmland and human habitable areas. Forests conversion involves the removing of natural forests to meet other land needs, such as plantation of agriculture, pasture for cattle, human settlement and mining. This process is usually irreversible. The causes of forest conversion and other forest crimes are complex. It is partly poverty driven but also associated with commercial exploitation of timber which also undermines ongoing efforts to curb deforestation and the enhancement of carbon stocks to mitigate climate change.

These laws are to benefit the country by penalizing offences and prohibiting activities outlined in Part IX of the Act. Section 64 states these offences and they include, felling, cutting, taking, burning or removing any forest produce. It is also an offence to clear, cultivate or break up land for cultivation or for any other purpose. In addition, setting

fire to, or assisting any person to set fire not any grass or undergrowth or any forest produce is punishable and is liable on conviction to a term not exceeding one hundred thousand shillings or to imprisonment for a term not exceeding six months, or to both. The purpose of this Act is to promote sustainable management of forest resources with a view to promote and to secure biological diversity, consideration for the landscape, outdoor recreation and the cultural values associated with the forest.

Relevance to the proposed project: The proponent should adhere to the Forest Conservation and Management Act of 2016 to ensure protection of the country's forests by curbing deforestation and forest degradation and to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources.

3.3.12 Wildlife Management and Coordination Act 2013

The Wildlife Conservation and Management Act, 2013 is the main statute governing all wildlife resources, and it's main aim is to improve the protection, conservation, sustainable use and management of wildlife resources. The Act revises the Wildlife (Conservation and Management) Act of 1976, and brings wildlife legislation into compliance with the Constitution. Principles of the Act: devolution, effective public participation, ecosystem approach, recognition of wildlife conservation and management as a form of land use on public, community and private land, self-sustainability (benefits from wildlife offset costs), sustainable utilization and equitable benefit sharing.

The main implementing body for the Act is the Kenya Wildlife Service (KWS), which is charged with managing and conserving wildlife resources within National parks, wildlife conservation areas and sanctuaries in Kenya. The institution is also responsible for protecting forests within its jurisdiction and supporting the conservation, rehabilitation and protection of forests and water catchments that are significant wildlife habitats. The KWS gets funding from national budgetary allocations, investments by the service, loans, donations and revenue from joint partnerships on bio prospecting.

The Wildlife Act provides restructured governance of wildlife resources in accordance with the Constitution of Kenya, 2010. Specifically, County governments have a role through the management of national reserves (Section 35) and the County Wildlife Conservation and Compensation Committees (Section 18). These committees are required under the law to establish wildlife user rights, oversee implementation of management plans on community and private lands, oversee equitable benefit sharing of wildlife resources and review compensation claims.

The Wildlife Act provides for the protection of wetlands and marine areas that are important habitats or ecosystems for wildlife conservation (Section 33 and 36). These include mangrove forests in the coastal region of Kenya. It also provides restrictions for pollution of wildlife habitats and ecosystems (Section 89). The law sets out stiffer fines and punishments for offenders. In addition to any sentence imposed, a polluter may also be required to pay the full cost of cleaning up the polluted wildlife habitat and ecosystem (Section 89, 2).

Relevance to the proposed project: The proponent should work in collaboration with KWS to ensure protection, conservation, sustainable use and management of wildlife resources. Besides that they should also act to prevent human-wildlife conflict that may be caused when:

a) When the people and their livestock move into the wildlife conservation areas to access the resources that they need and lack in their areas. The people may kill important wildlife species through poaching or defense when attacked by the wild animals.
b) When wild animals disperse from the conservation areas into the community land either to feed on their crops or on their normal migrations to their feeding or breeding areas.

   Most of the time the animals either do one or more of the following;

   i) Injure or kill people,
   ii) Eat or destroy crops on the farms,
   iii) Kill or injure livestock,
   iv) Transmit diseases or disease causing parasites to livestock, and
   v) Utilize the grazing resources meant for community livestock.

3.3 Institutional Framework

NO.	INSTITUTION	LAW ANCHORING IT	MANDATE	RELEVANCE TO THE PROJECT
1	NEMA	Environmental Management and Co-ordination Act (EMCA)	Coordinate and supervise the management of the environment in Kenya	Licensing all project listed under schedule II of the Act
2	Kenya Wildlife Service	Wildlife Conservation and Management Act (WCMA)	Conserve and manage wildlife in Kenya and enforce related laws and regulations	Solve human-wildlife conflict
3	Kenya Forest service (KFS)	Forest Conservation and Management Act (FCMA)	Conserve, protect and manage all public forests	Protecting forestland by ensuring no encroachment and deforestation practices and approving tree clearing or cutting/licensing timber harvesting and transportation
4	National Environment Tribunal (NET)	Environmental Management and Co-ordination Act (EMCA)	Hear and determine appeals arising from NEMA's decisions	Decision making on appeals by the interested/aggrieved persons to overturn NEMA's decisions on the proposed project

5	Kenyan's Ministry of Environment and Natural Resource	Environmental Management and Co-ordination Act (EMCA)	Monitor, protect, conserve and manage environment and natural resources of the country	Provide national policy directives on environmental and natural resources
6	County Environment Committee (CEC)	Environmental Management and Co-ordination Act (EMCA)	Responsible for the management of the environment in their respective counties	Ensure and monitor the proper management of the environment within the county
7	Complaints Committee on Environment	Environmental Management and Co-ordination Act (EMCA)	Investigate complaints relating to environmental damage and degradation	Investigate and provide full report on complaints relating to environmental damage and degradation associated with projects

Table 7: Institutional framework associated with the environment in Kenya

CHAPTER FOUR
4. ENVIRONMENTAL BASELINE INFORMATION

4.1 Introduction

Lamu County is in the north eastern coast of Kenya between latitude 1° 40′ and 20° 30′ South and longitude 40° 15′ and 40° 35′ East. It borders Garissa County to the North, Tana River to the South West and West, and Indian Ocean to the South and South East. It covers a surface area of 6,273.1 Km² composed of mainland, 65 Islands, 130km coastline and water mass covering 308 km². According to the 2019 census the County's population was placed at 143,920 comprising of 76,103 (53%) males and 67,813 (47%) females. It comprises of two parliamentary constituencies namely Lamu East and Lamu West constituencies and 10 county wards. Main economic activities include crop farming, livestock farming, fisheries, tourism, and mining, most notably quarrying.

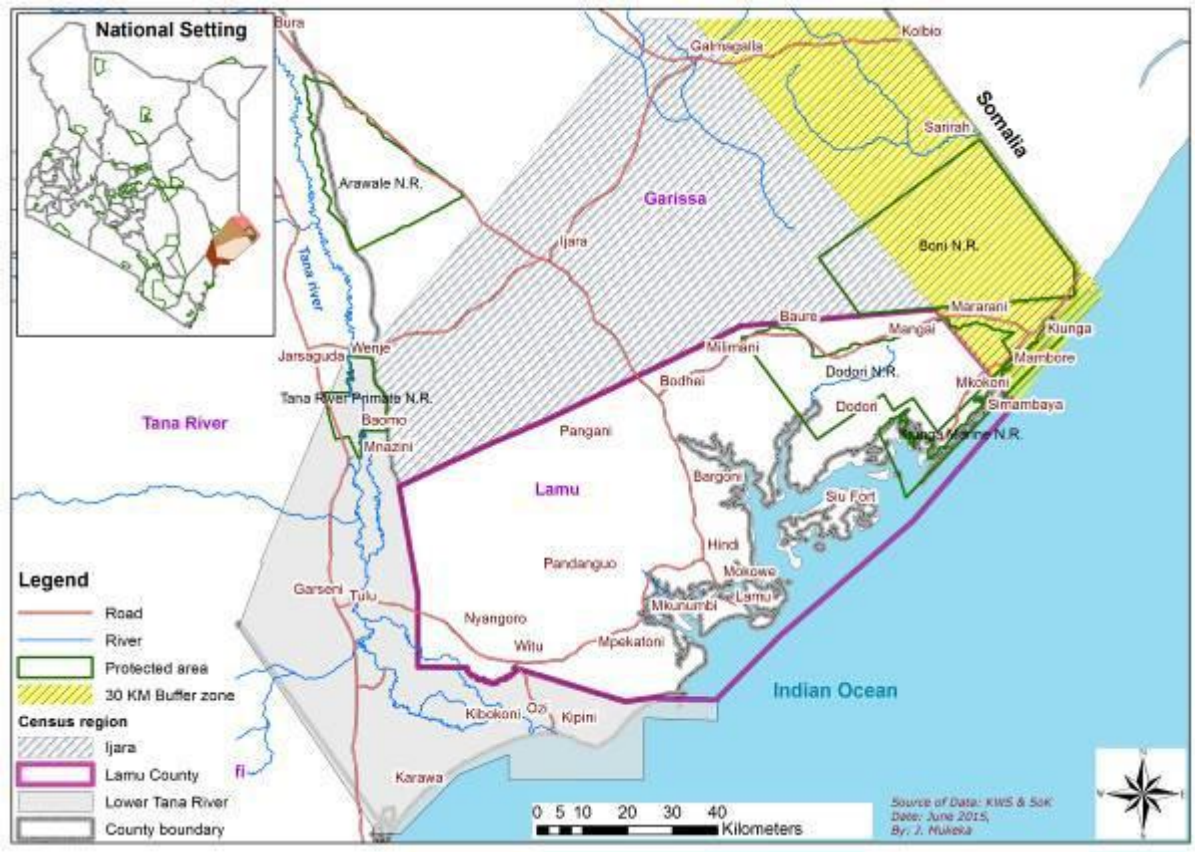


Figure 13: Lamu County map

Lamu County has different agro-ecological zones that are highly influenced by the prevailing rainfall variability patterns which somehow define the natural potential of Lamu County. As such the County can be sub-divided into two livelihood zones with

varying economic diversities which are distinct in terms of ecology, infrastructural network and population distribution. The zones are; the rich agricultural and livestock zones in the mainland (mainly settlement schemes) and the fishing and marine zones (Islands).

The difference in physiographic, climatic and other natural conditions therefore categorizes the County into four agro-ecological zones namely Coastal lowland (CL) Coconut-cassava zone (CL-3), Cashew nut-cassava zone (CL-4), Livestock-millet zone (CL-5) and Lowland ranching zone (CL-6). The areas under CL-3 and CL-4 are suitable for agricultural activities whereas those under CL-5 and CL-6 are suitable for livestock keeping.

Lamu's terrestrial and marine ecosystems are home to a wide variety of faunal and floral species ranging from micro-organisms (phytoplankton and Zooplankton) to macro-organisms (elephants, giraffes and buffaloes). Species of conservation concern in Lamu are sea turtles, dugongs, dolphins and corals. These, along with the need for mangrove conservation lead to the establishment of Kiunga-Kiwaiyu Marine National Reserve. The ecosystems are also recognized as Important Bird Areas (IBAs).

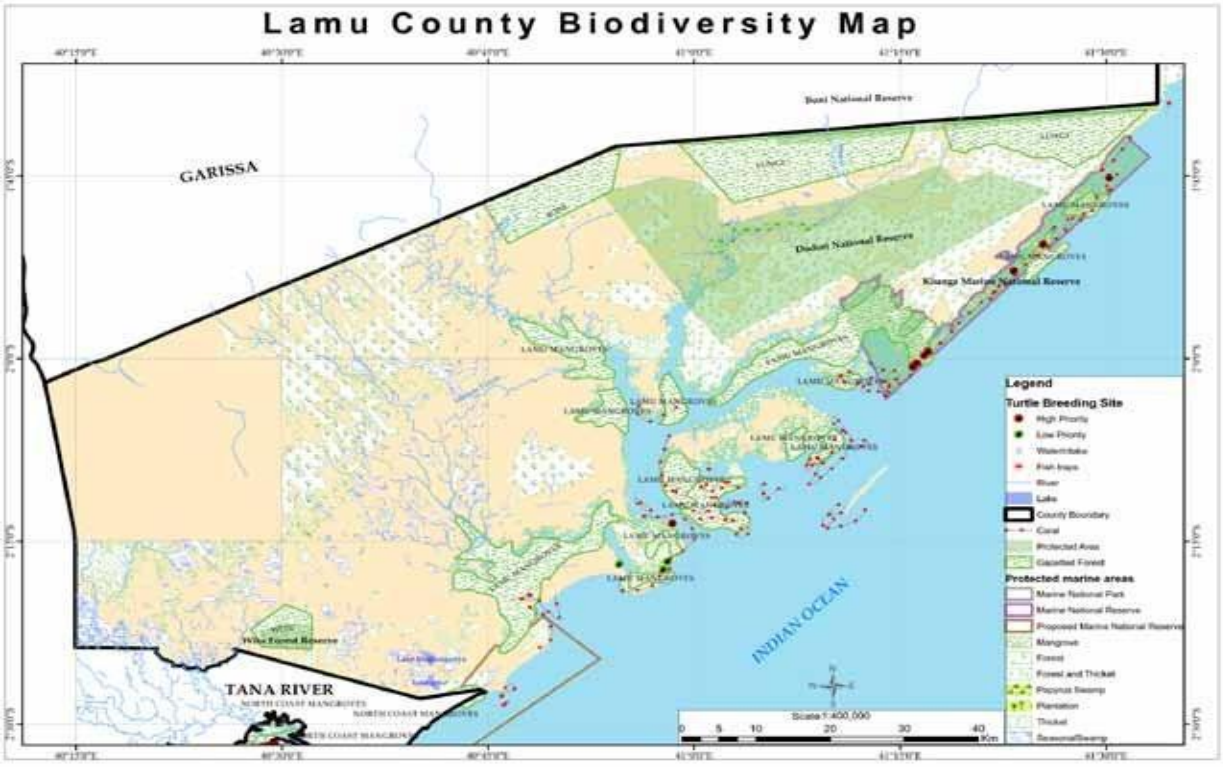


Figure 14: Lamu County biodiversity and protected areas map

Lamu's forest vegetation area covers 33.9% of the total county land surface area. The largest forest area in Lamu is the area referred to as the Boni-Dodori which has two forest blocks; Boni Forest (Boni National Reserve) mainly located in Garissa County but stretching into Lamu County and the Dodori Forest (Dodori National Reserve) wholly located in Lamu County. The two forests are at the northern limit of the East African Coastal Forest, classified by Conservation International as a 'biodiversity hotspot.'

On-going developments and land use practices coupled with societal trends have influenced rangeland management priorities particularly when considering the multiple, competing, complementary and exclusive uses. Some of the rangeland areas in Witu, Mpeketoni and Mokowe are under threat due to conversion of the areas to farming through burning of the rangeland grasses and vegetation.

There are specific areas where agriculture is practiced in Lamu County. These areas are mainly Hindi, Magogoni, Mpeketoni, Bomani, Bargoni, and at Shela and Amu areas of Lamu Island, the islands of Lamu, and at Faza and Pate areas of Pate Island. These locations exhibit higher population densities with a fast paced population growth. The main crops in these areas include fruit and nut trees such as coconut, mangoes and cashew nuts; and cereals such as simsim, maize, and bixa. Cotton, water melons and pulses, are also grown in the area. All of the agricultural activities are practiced within the herbaceous rain-fed agriculture ecosystem.

Increasingly more farmers and institutions are participating in diversification of the crops, further changing the biodiversity of the area. The growth in the population has been accompanied by expansion of agricultural areas and increased infrastructure associated with human settlement. Mpeketoni area in particular has seen a marked growth in human settlement since 2007.

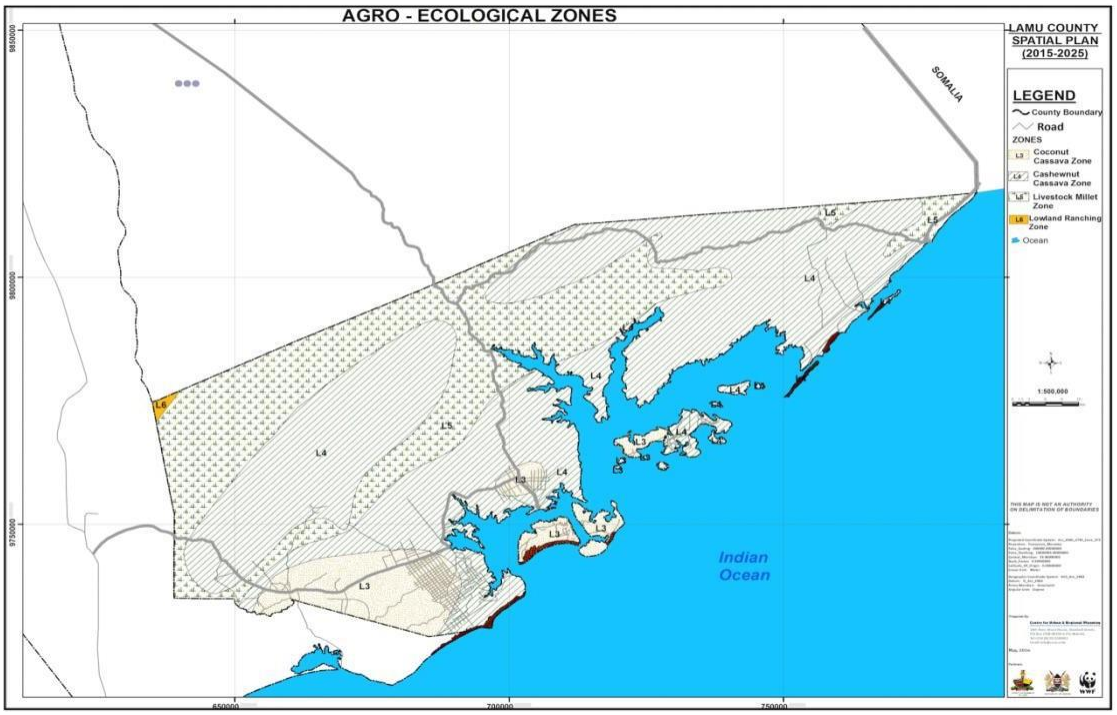


Figure 15: Agro-ecological map zone of Lamu County

4.2 Physiography and Natural Setting

Lamu County is generally flat and lies between altitude zero and 50m above sea level, making it prone to flooding during rainy seasons and periods of high tides. The main topographical features include coastal Island and Dudol plains, sand dunes and the Indian Ocean. Owing to physiographic, climatic and other natural conditions, the county is made up of two broad economic zones covering the mainland for agriculture and livestock keeping and Islands for marine activities. The main economic activities in the project area are agriculture and livestock keeping. However, a few of the residents practice artisanal fishing and crab harvesting off the coast and in the creeks.

4.2.1 Soils and geology

The principal soil types in the region include a narrow strip of coastal sands towards the north where it is permeated by narrow bands of grumosolis brown clay soils. The soil south of Lamu is composed of bi-alternate bands of loams beyond which the grumosolis are permeated by thick bands of ash and pumice soils.

The geology of the area is composed of the residual coral limestone and columns of sand. Rocky outcrops occur in the islands of Manda and Kiwayuu while sand dunes are found in Lamu island, parts of Kiongwe – Bahari Ward and Mkokoni in Kiunga Division. The tectonic processes that opened up the Indian Ocean resulted in the formation of sedimentary rocks, both along the coast line, into the ocean, and offshore. Fossil coral reef

deposits form the coastal plain, while loose sands, sometimes forming 30m high sand dunes, occur close to the shoreline. Among the mineral resources already being exploited are coral limestone for building blocks and lime manufacture, and sand for construction. The sand dunes are also an important source of fresh water.

Figure 16: Sand dunes on the Kiongwe shoreline

4.3 Climatic conditions

4.3.1 Rainfall

The rainfall pattern in Lamu County is bimodal and is greatly influenced by the Monsoon winds with the long rains falling between late March and early June with May being the wettest month. Light showers fall in July and decreasing from August. The short rains come in November and December decreasing rapidly to a minimum in January and February. January to March are usually dry months. The highest average annual rainfall in Lamu County is 1,200mm along the coast and reduces to 600mm inland at Bargoni, Pandanguo, Milimani and Basuba areas.

Generally, rains in the County are likely to be heavy every 3 or 4 years and relatively light in the intervening periods. The highest rainfall is recorded around Lake Kenyatta

settlement scheme, Hindi, immediate area surrounding Witu, and the western side of Lamu Island. The total rainfall recorded range is between 100mm -1100mm. The rest of the County receives 600mm - 700mm with some recording less than 500mm and these zones are suitable for development of ranches. Lamu lies along the Equatorial Climate Systems where the weather is characterized by two monsoon winds and warm climate. Most of the agricultural activities in Mpeketoni and the project area are rain-fed.

4.3.2 Temperature

The range of temperature is from 23ºC to 32ºC throughout the County. The mean temperature is 27.9^{0}C. The coldest months are May to July while the hottest months are December to April. Mean monthly evaporation ranges from 1650 to 2300mm/year in the north to 1300 to 2200mm/year in the south.

4.3.3 Evapotranspiration and Humidity

The mean annual potential evaporation is high at 2,327mm per year, with the highest values occurring in March and September and the lowest in May and the temperatures range between 24°C and 30°C. Generally and over the last 30 years, there has been an increase in both the annual average rainfall and mean temperature in Lamu. The hottest months are December to April while the coldest are May to July. The physiography influences settlement, road infrastructure and farming. The mean relative humidity in the County is 75%. The relative humidity is high in the coastal areas but rather low within the mainland.

4.3.4 Wind circulation

Like in other parts of the Kenyan Coast, climatic and weather patterns in Lamu are dominated by large scale pressure systems of the western Indian Ocean and two distinct monsoon winds. From November/December to early March, the North East Monsoon, a predominantly dry system, is prevalent in the area (Kaskazi). During March and April, a transition period the wind blows in an east-to-southerly direction with strong incursions of maritime air from the Indian Ocean bringing heavy rains (Kusi). In the months of May to August, the South-Easterly Monsoon influence sets in and the weather becomes stable with cooler temperatures. Between September and December, the Northeast Monsoon, dominates again.

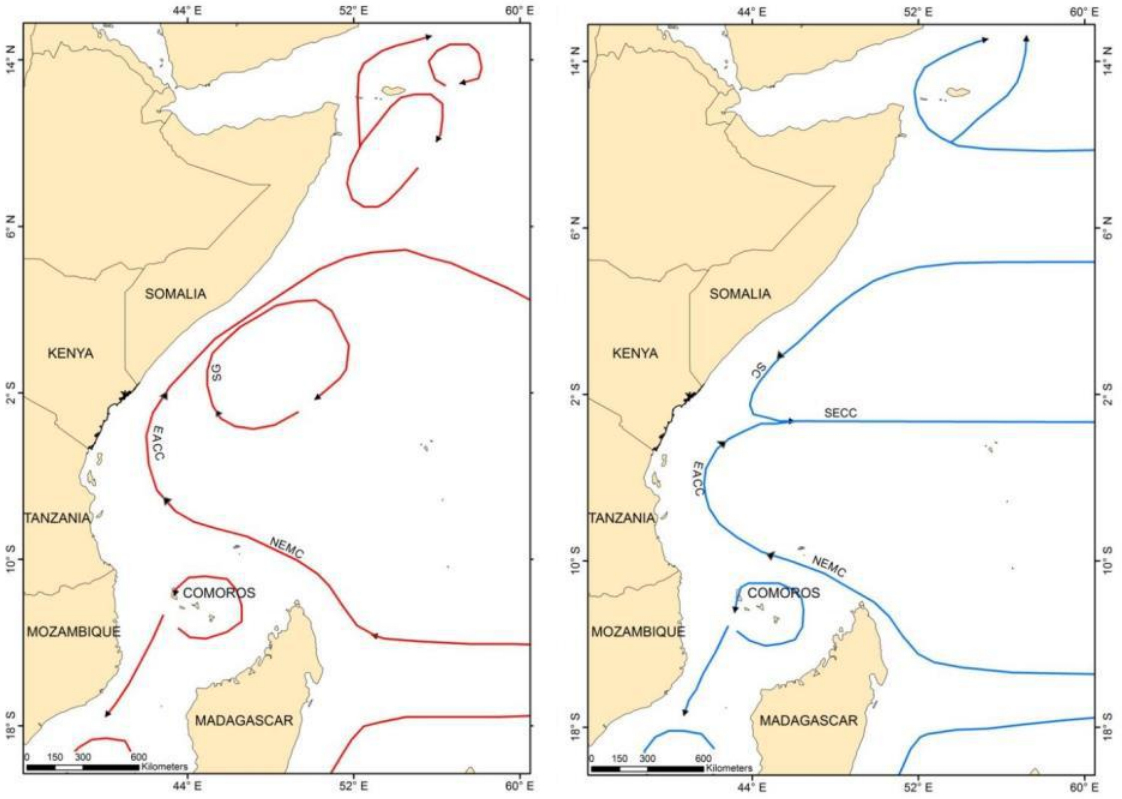


Figure 17: Schematic representation of ocean currents in the Indian Ocean during the South East Monsoon (red) and NE monsoon (blue) winds including choke point transport numbers (Source: KeNODC)

Wind strength (in knots) drops during the night and is always less at 0600hrs than at 1200hrs. However, this pattern is less pronounced in Lamu and the area tends to be the windiest place on the Coast at 0600hrs.

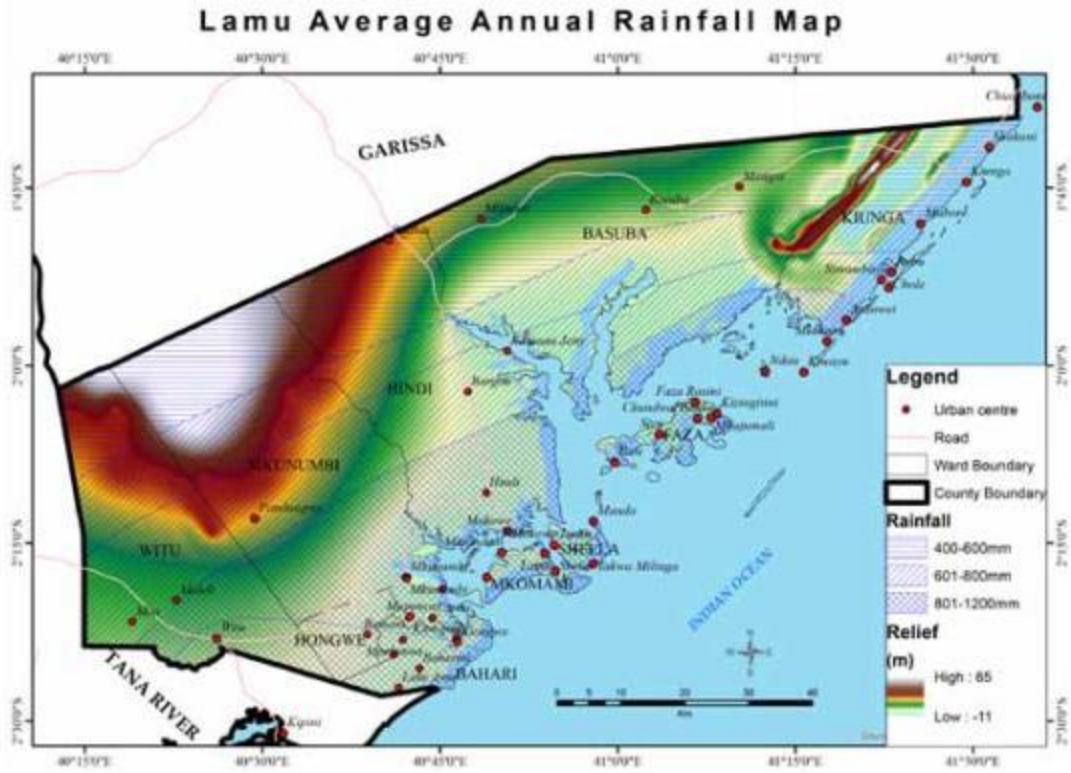


Figure 18: Lamu County average rainfall map

4.4 Vegetation and wildlife

4.4.1 Vegetation

Vegetation in the area varies with changes in soil types. Silt and sand support scrub bush, scattered palms and swamp grass. In areas less susceptible to flooding, the silty clays support thick bush consisting of palms, indigenous trees and scrubs. Grassy open swampy places dominate some parts that have drainage problems due to the low altitude. Some areas like Mkunumbi have been cleared for settlement and cultivation of maize, cassava, coconut, bananas, cotton and mangoes as the main crops.

Common vegetation includes Saliconria spp and the succulent Sanseveri spp, stunted thorny bushes of Commiphora sp and Salvadora spp. The coastline has sandy beaches, some with mangrove swamps and a great variation of marine flora. Microscopic marine plants are absent from the upper part of the inter-tidal zone except for areas of Bostrychia spp.

In the inter-tidal sand and mud, the finer sediments below water, which are subject to less wave action, have become fixed by growth of marine angiosperms and there are extensive areas of green algae and Zostera spp. Dwarf shrub thickets of halophytes

typical of the this region littoral zone are common on the mainland, and species include Ipomoea spp, Perus spp, Suaeda spp, and Tephrosia spp. Mangrove forest stands are dominated by Rhizophora mucronata occuring in the sheltered tidal waters from Lamu to Kiunga.

4.4.2 Wildlife

Previous wildlife aerial census in Lamu indicates that it has wide range of fauna. This section gives a brief insight into the species present in Lamu, Mpeketoni area and their distribution and density.

4.4.2.1 Buffaloes

Buffaloes are widely distributed in Lamu county with high concentration in Pandanguo, Pandani and Nyangoro areas. A small population is found in Simambaya area in Kiunga. Current density is recorded at 1.6 per square kilometer. The closest buffalo population spotted was in Mkunumbi area, about 20km from the project site.

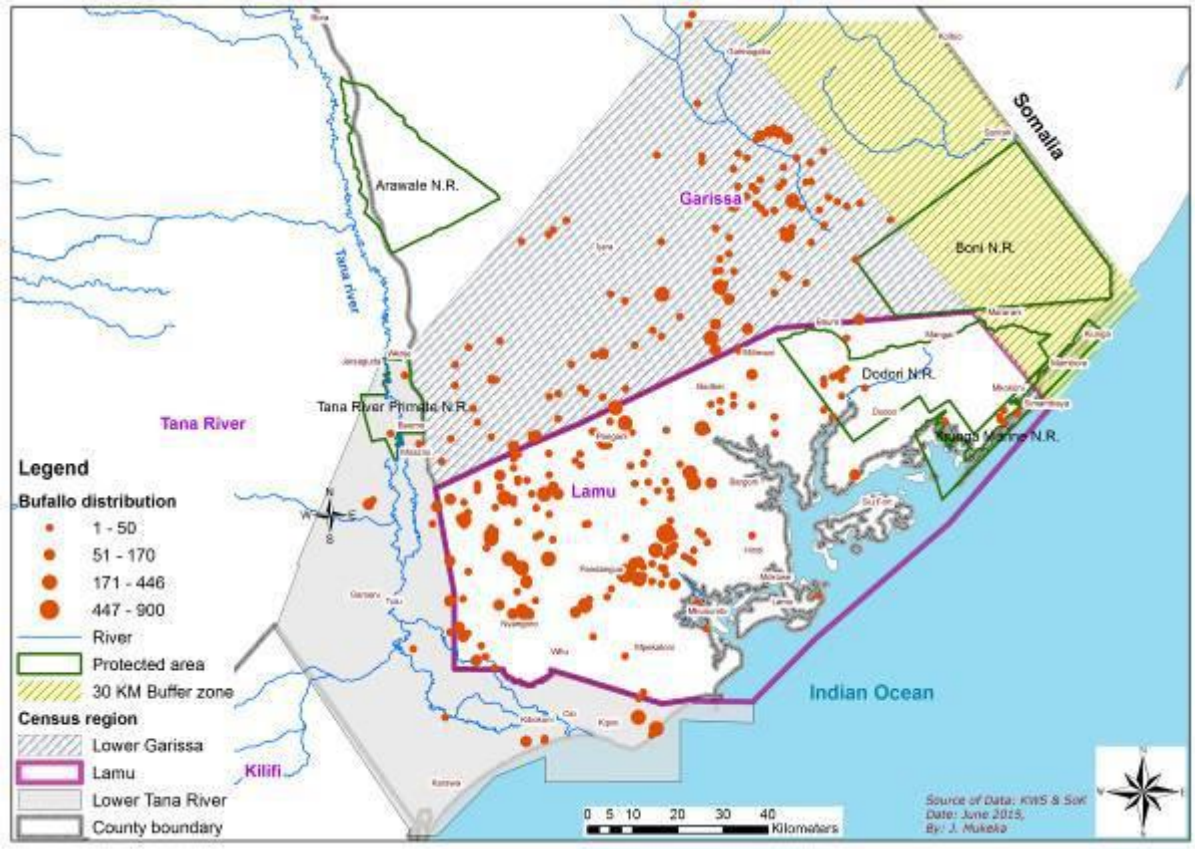


Figure 19: Buffalo distribution map in Lamu County

4.4.2.2 Topi

There are also numerous herds of Topis (7,728). The topis are in kipini conservation area near the coastal shore line, Nyangoro, pandanguo, Milimani and Pangani areas had high concentrations. Dodori national reserve also recorded a significant number of topis. Their density in Lamu is estimated at 1.3 per square kilometer.

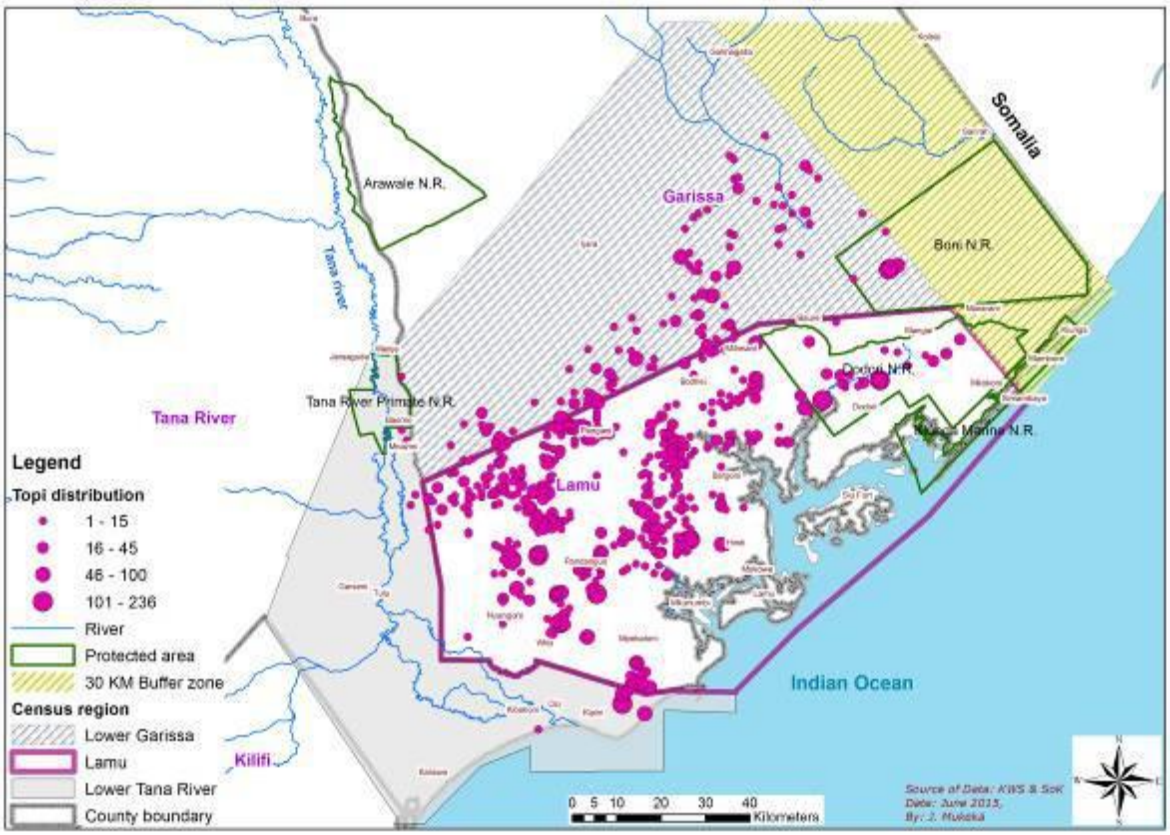


Figure 20: Topi distribution map in Lamu County

Notable large mammals include elephant, giraffe, buffalo, antelope, members of the cat family, hippopotamus, waterbuck, topi and gazelle.

Species	**No.s**
African Buffalo *(Syncerus caffer)*	9,523
Topi *(Damaliscus korrigum)*	7,728
Giraffe	1,325
Common Zebra *(Equus burchelli)*	669

Warthog *(Phacochoerus aethiopicus)*	68
Common Waterbuck *(Kobus ellipsiprymnus)*	264
Lesser kudu *(Tragelaphus imberbis)*	19
Gerenuk *(Litocranius walleri)*	76
Ostrich *(Struthio camelus)*	140
Hippopotamus *(Hippopotamus amphibius)*	78
Hirola *(Beatragus hunteri)*	14
Kongoni *(Alcelaphus buselaphus)*	7
Impala *(Aepyceros melampus)*	2
Fringe-Eared Oryx *(Oryx beisa callotis)*	3
Eland *(Taurotragus oryx)*	1
Bushbuck* *(Tragelaphus scriptus)*	9
Elephant carcass very old ()	2
Reedbuck* *()*	8
Wild dog* *(Lycaon pictus)*	1
Elephant carcass old *()*	2
Lion* *(Panthera leo)*	3
Colobus monkey* *()*	3
Secretary bird* *()*	1

Table 8: Wildlife species numbers counted during the wet season survey of 2015

Notably, human-wildlife conflict has been reported in the project area. During the dry seasons wild animals stray into farmlands in search of food and water. As a result, , the wild animals end up destroying crops in the farms. Humans retaliate by poisoning and killing the wild animals. Most wildlife migrated away from the project area due to the establishment of permanent farms.

CHAPTER FIVE
5. SOCIO-ECONOMIC BASELINE

5.1 Political and Administrative units

Lamu County is located in the northern coast region of Kenya and is one of the 5 counties which share the Indian Ocean coastline of Kenya. It lies between latitude 1° 40′ and 20° 30′ South, Longitude 40° 15′ and 40° 35′ East and is bordered by Tana River County to the southwest, Garissa County to the north, and touches the Republic of Somalia at the north east corner and the Indian Ocean to the south and east. The county has a land surface area of 6,273km² with a 130km long coastline. The area includes the mainland and over 65 islands that form the Lamu Archipelago. The Indian Ocean water mass covers an area of 308km². Some of the bigger islands are Lamu, Manda, Pate and Kiwaiyu. There are 51 islands in the area covered by Kiunga Marine Reserve.

The County has two sub-counties, Lamu East and Lamu West. The two sub-counties have a total 10 County Assembly Wards combined. Lamu West constituency has seven wards (Sheila, Mkomani, Hindi, Mkunumbi, Hongwe, Witu and Bahari) while Lamu East constituency has three (Faza, Kiunga and Busuba).

Administratively Lamu is made up of seven divisions, 23 locations and 39 sub locations.

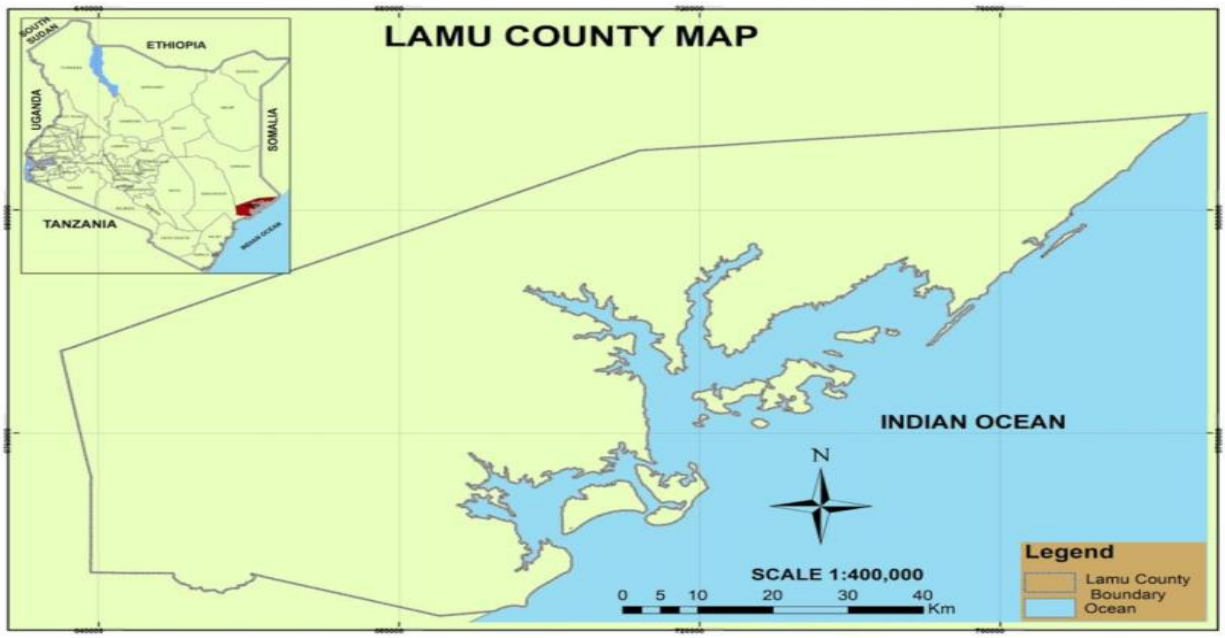


Figure 21: Lamu County map

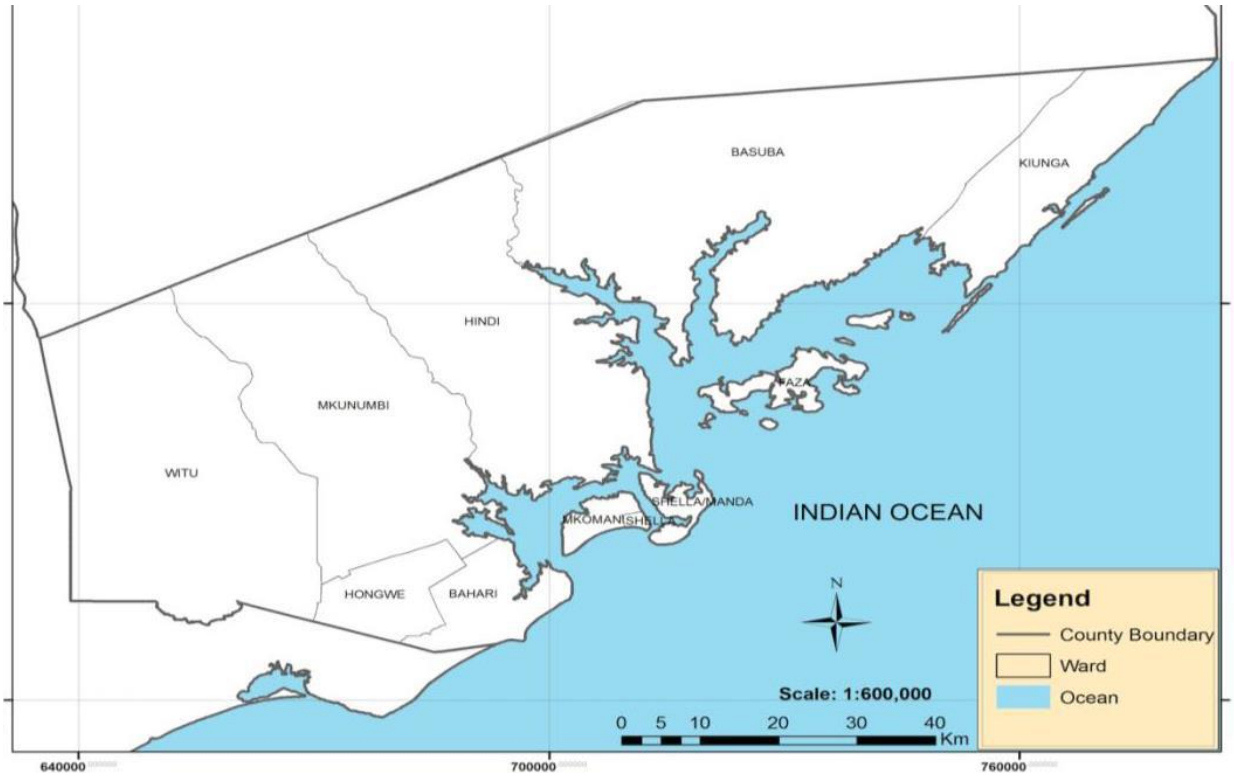


Figure 22: Map showing the administrative units in the Lamu county.

Sub-County	Division	Land Area (Km^2)	Locations	Sub-Locations
Lamu West	Amu	99.7	Mkomani	Mkomani
			Langoni	Langoni
			Matondoni	Matondoni
				Kipungani
			Shela	Shela
	Hindi	1150.8	Hindi	Hindi
			Magogoni	Bargoni
			Mokowe	Mokowe
				KIlimani
	Mpeketoni	1727.7	Mpeketoni	Kiongwe
				Central
			Bahari	Bahari
				Tewe
			Mkunumbi	Mkunumbi
			Mapenya	Mapenya

				Uziwa
			Ndambwe	Ndambwe
			Hongwe	Hongwe
				Bomani
	Witu	975.4	Witu	Witu
				Pandanguo
			Dide waride	Moa
				Chalaluma
Lamu East	Faza	79.2	Faza	Kwafani
				Kwatongani
			Pate	Pate
			Siyu	Siyu
				Shanga
			Tchundwa	Tchundwa
	Kiaingitini	17.7	Kizingitini	Pate
			Bwajumwali	Myabogi
			Ndau	Ndau
				Kiwayuu
	Kiunga	2222.6	Kiunga	Rubu/Mambore
				Mkokoni
			Basuba	Milimani
				Mangai
				Mararani
Total	7	6273.1	23	9

Table 9: Administrative Units in Lamu County

5.2 Population and Size

According to the 2019 census the County's population was placed at 143,920 comprising of 76,103 (53%) males and 67,813 (47%) female. The county's population density is 23 people per km^2. The county's population is projected to increase to 155,031 by the year 2022, comprising 80,599 (52%) males and 74,432 (48%) females.

The population consists of both indigenous and migrant people whose culture has been influenced by the Portuguese and Arab settlers. These are Swahili, Arabs, Wardea, Orma, Wasanye, Pokomo, Giriama, Somalis, Awer (Bonis) and Bajuni. There is also a significant population of Kikuyu settlers and other inland tribes.

Age group	2009 (Census)			2018 (Projections)			2020 (Projections)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	8,038	7,681	**15,719**	10,134	9,684	**19,818**	10,510	10,047	**20,557**
9-May	7,375	7,184	**14,559**	9,553	9,334	**18,887**	10,124	9,881	**20,005**
14-Oct	6,148	5,904	**12,052**	8,153	7,827	**15,980**	8,649	8,338	**16,987**
15-19	5,722	5,095	**10,817**	7,734	6,693	**14,427**	8,256	7,146	**15,402**
20-24	5,020	4,577	**9,597**	6,861	5,137	**11,998**	7,247	5,363	**12,610**
25-29	4,155	3,905	**8,060**	5,323	5,048	**10,371**	5,637	5,140	**10,777**
30-34	3,713	3,125	**6,838**	4,890	5,001	**9,891**	5,220	5,380	**10,600**
35-39	3,070	2,579	**5,649**	4,262	4,411	**8,673**	4,516	4,931	**9,447**
40-44	2,363	1,918	**4,281**	3,860	3,408	**7,268**	4,155	3,736	**7,891**
45-49	1,890	1,644	**3,534**	2,902	2,557	**5,459**	3,219	2,851	**6,070**
50-54	1,522	1,384	**2,906**	2,207	1,786	**3,993**	2,394	1,942	**4,336**
55-59	1,113	927	**2,040**	1,618	1,417	**3,035**	1,743	1,502	**3,245**
60-64	1,051	890	**1,941**	1,548	1,256	**2,804**	1,673	1,351	**3,024**
65-69	583	468	**1,051**	907	752	**1,659**	994	821	**1,815**
70-74	3,070	2,579	**5649**	678	642	**1,320**	727	692	**1,419**
75-79	228	197	**425**	295	275	**570**	313	295	**608**
80+	478	527	**1005**	366	457	**823**	369	456	**825**
85+	43	13	**56**	57	20	**77**	61	19	**80**
Total	**53,045**	**48,494**	**101,539**	**71,348**	**65,705**	**137,053**	**75,807**	**69,891**	**145,698**

Table 10: Population projection by Age Cohort.(Source: Kenya National Bureau of Statistics, 2018)

Sub County	Division	Areakm2	2009		2018		2020	
			Pop.	Density	Pop	Density	Pop	Density
Lamu West	Amu	102.4	**22,366**	218	**30,189**	295	**32,093**	313
	Hindi	1804.9	**10,700**	6	**14,,442**	8	**15,353**	9
	Mpeketoni	1360.7	**36,527**	26.8	**49,303**	36	**52,413**	39
	Witu	1235.7	**13,105**	10	**17,689**	14	**18,804**	15
Lamu East	Kizingitini	18.1	**8,346**	461	**11,265**	622	**11,976**	662
	Faza	74.8	**6,577**	88	**8,877**	119	**9,437**	126
	Kiunga	1570.1	**3,918**	2	**5,288**	3	**5,622**	4
	Total	**6474.7**	**101,539**	**16**	**137,053**	**21**	**145,698**	**23**

Table 11: Projected population densities by Sub County. (Source: Kenya National Bureau of Statistics, 2018)

The population distribution in the county is influenced by a number of factors including access to economic opportunities such as agriculture, livestock keeping, fishing and trade. This trend can be demonstrated by the fact that over 50 percent of the county's population lives in Amu and Mpeketoni in Lamu West Constituency, whereas Lamu East Constituency accounts for 17 percent of the county population. Witu is predominately a livestock zone and is occupied mainly by the Orma community. Mpeketoni, Hindi and some parts of Witu are settlement schemes and are predominantly agricultural cosmopolitan areas. Besides Lamu, the other islands of Pate, Kizingitini, Ndau and Siyu are mainly occupied by the Bajuni community. Kiunga is inhabited by the Boni and Bajuni communities.

5.3 Infrastructure and Accessibility

Lamu County has notably three major options of transport i.e. water, road and air. These options connect the County both externally and internally. Rail connection is not established within the County despite there being a need of a rail connection. The LAPSSET project is anticipated to offer this opportunity and bridge this gap of rail connection to the County once its implementation takes course. From the foregoing

statement, it is also notable that there is need to connect Lamu County with the existing rail in Mombasa port. This is in a bid to promote inter-County trading but also to realize the economic gains of product export as Lamu County has a lot to offer the world.

In a County like Lamu where road transport is very poor and external sea transport is non-existent, air transport emerges as a key transport option to link the County to other Counties of Kenya or other Countries of the world. There is currently one airport located on Manda Island (Manda Airport), and 12 airstrips in the County found in Mokowe, Witu, Mkunumbi, Pate, Siyu, Tenewi, Mangai, Kizingitini, Kiwayuu, Mkokoni, Kiunga and Mararani. The Government completed lengthening of Lamu-Manda Island Airport runway from 1.1km to 2.3km. Improvement works are already complete for the airport terminal building.

There are several jetties but the most important ones are the customs (KPA) jetties on Lamu Island and the Mokowe jetty on the mainland. The two are the busiest registering the highest number of boats carrying both passengers and goods. There are other jetties located at Mkunumbi, Kizuka, Magogoni, Kizingitini, Mtangawanda, Siyu, Matondoni among others. Lamu Island has the majority of the County's inhabitants living within Amu Heritage Town, Langoni settlement, Wiyuooni Settlement, Shella and Matondoni Village, and is linked to the main land via the Mokowe jetty.

The current popular mode of transport to Matondoni and Kipungani within the Island is by water which is often quite expensive and not safe. A good linkage to these settlements would potentially offer an alternative option of access to the main land at Kiongwe

The Island settlements are connected through one major Class E spine road where all other roads hinge. The roads are equally in a deplorable state – unpaved and often impassable during rainy seasons. All settlements within the Island from Faza village including Tchundwa, Nyabogi, Mbwajumwali, Kizingitini, Siyu and Shanga are all connected by the major road in their nucleated structure to Mtangawanda jetty.

5.4 Energy

Connectivity to electricity has been a challenge for Lamu County. The national grid used to terminate on the mainland and most households were not connected. Lamu Island used to depend on generators as its main source of electricity since it was not connected to the national grid. In 2018, the National Government through the Rural Electrification Programme established a power station to light up the island for the first time. The connecting power lines have already been laid out within the island to enhance connection to various homesteads within the island. This initiative by the Government

was a timely intervention and is aimed at improving the living standards and livelihoods of the residents of the island. However, most rural households still rely on solar energy for their power needs.

Recently, the Lamu County Assembly approved a proposed Sh20 billion wind power project which is to be set up in Kiongwe, Bahari Ward - Mpeketoni. The 1,332Ha wind farm will be located about 50km from the site of the proposed Lamu Port. The project is expected to generate about 90MW of electricity to be injected to the National grid.

Figure 23: Use of solar energy in Kiongwe village

5.5 Land Use and Ownership

The size of arable land in the county is 5,517km^2 and non-arable land is 649.7km^2 and 308km^2 is under water mass. A sizeable number of people living in the peri-urban areas of the county practice subsistence small scale farming and livestock keeping. Land ownership for agriculture and livestock keeping remains a thorny issue in the county as most of the farmers do not legally own the lands they cultivate. Majority of the households in the county do not have title deeds. Only 13,000 households have title deeds and this accounts for at least 42% of the total number of households in the county.

The most common agricultural practice/system in the County is small scale mixed farming involving crop farming, livestock keeping and agroforestry. A wide range of crops including maize, cowpeas, cassava, coconut, cashew nut, bixa, cotton, simsim, citrus, and tomatoes among others are grown in the county under rain-fed system. Crops farming produces about 314,000 tonnes of both food and cash crops annually from 69,025 ha. The county is Kenya's largest producer of cotton, simsim and bixa, producing

approximately 40% of cotton, 50% of simsim and 40% of bixa grown in the country. About 80% of crops are planted during long rains and the remaining 20% during short rains.

Most farmers have no ownership documents for their land. However, this project has kick started the process of getting over 1000 households settled and allocated land. This will boost businesses and spur growth of the agricultural sector since farmers can use their pieces of land as security to secure loans.

Source: CURP, 2016

Figure 24: Mechanized farming in Mpeketoni

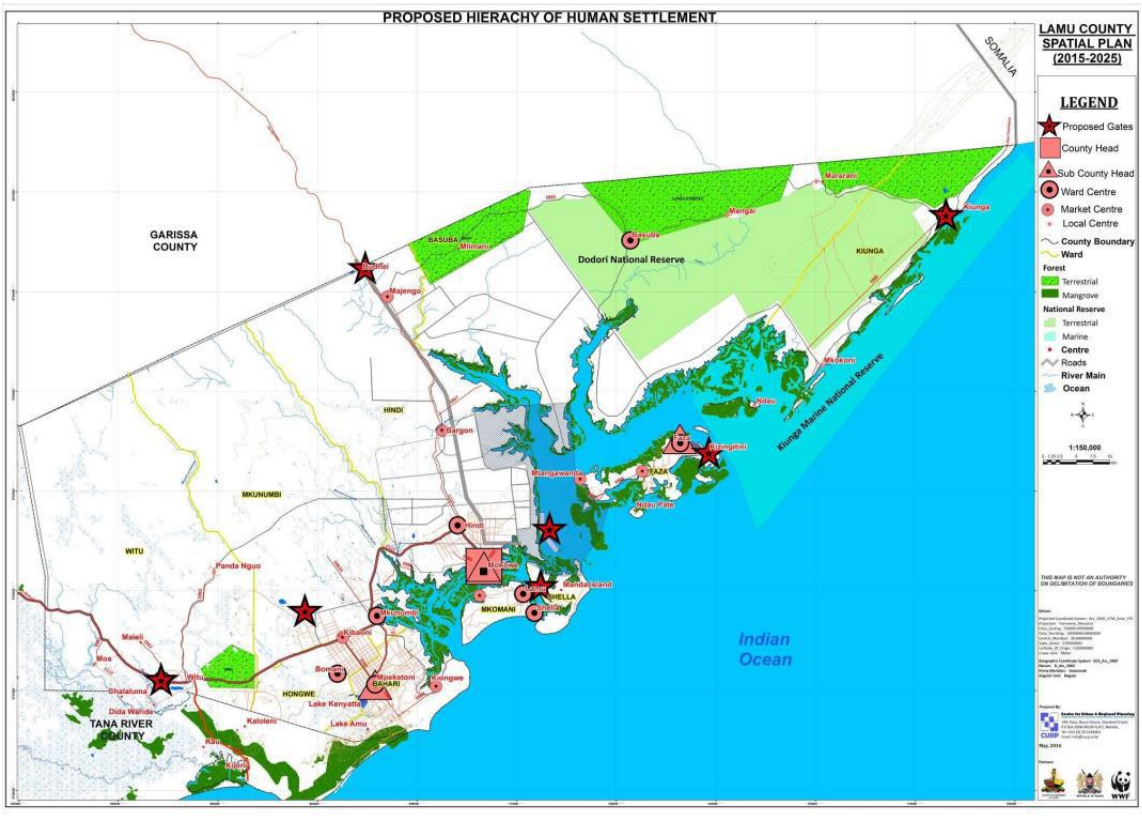
The main livestock breeds reared are Cattle, Sheep, Donkeys, Goat and Poultry. Cattle and goats are reared in 2 rearing systems: pastoralism and dairy farming. Pastoralism is mainly practiced in Hindi (Kibokoni, Kilimani and Bargoni), Mkunumbi (Ndambwe, Mkunumbi, Koreni), Bahari Ward (Mlei, Lake Amu) Hongwe war Lumshi A & B, Pangani) Witu ward (Moa, Chalaluma, Didewaride, Nagele, Kitumbini, Nairobi area). Agro-pastoralists occupying pockets of Hindi (Ndeu, Kauthara, Show ground); Mkunumbi (Mapenya, Bangure, Mwamarani, Majembeni, Mkindunu) Bahari ward (Town, Bahari, Kihongwe) Hongwe ward(Hongwe, Bomani, Umoja, Kibaoni) Witu ward(Soroko, Kona mbaya, Maleli, Katsaka Kairu,Witu mjini).

Dairy farming (of cattle and dairy goats) is practiced in all settlement scheme areas of Hindi, Bahari, Hongwe, Mkomani and Witu wards. Donkeys, a major draught animal, are reared mainly in Amu (Mkomani and Shella Manda) and Pate (Faza ward) Islands, where they are the main mode of transport.

Bee keeping for honey production is mainly practiced around the Boni forest areas of Basuba and Witu wards. There is however a high potential for bee keeping utilizing the vast mangrove forests bordering the Indian Ocean in the county.

5.6 Housing and settlement

Settlement in Lamu has been historically determined by availability of water. The most highly populated areas of the county include Witu, Mpeketoni, Faza and Lamu Island. Presently the county government is making efforts to come up with a settlement plan for Lamu. In this proposed plan, the project area has been classified as a settlement area according to the Lamu County Spatial Plan, as seen in the map below.



LAMU COUNTY SPATIAL PLAN; VOLUME II (2016 – 2026)

Figure 25: Lamu County Spatial Plan (2016-2026)

Housing conditions in the County are characterized by inadequate modern sanitary facilities and limited connection to piped water with exception of Lamu Old Town and Mpeketoni. The villages are haphazard and poorly planned making accessibility difficult and roads are quite narrow and in other areas non-existent. Housing in the County is generally inadequate and this shortage is more acute in the upcoming urban centres

outside Lamu town. The anticipated growth in population for the County occasioned by the upcoming development projects will require development of newly planned urban areas with integrated solid and liquid waste management system.

In Kiongwe, most residents are squatters farming in areas that they do not reside. The general preference is to reside in established villages because of insecurity and only attend to the farms during the rainy seasons. Most of the houses are semi-permanent, constructed using locally available construction materials such as mangrove and sisal posts and mud with grass/palm thatch for roofing.

Figure 26: Type of housing and settlement in Kiongwe village

5.7 Labour Relations

The county's total labour force (15-64 years) stands at 61,535, which represent 54 percent of the total county population (2012). The composition of this labour force is 52 percent (32,743) male and 48 percent (28,721) female. Due to cultural and religious beliefs, most of the female population is not widely engaged in paid employment although they carry out other equally productive domestic activities.

The 2015 National Adolescents And Youth Survey (NCPD 2017), indicates that in Lamu County small scale business is the most widely available employment and income generating activity. Some of the young people are employed as casual labourers, while others work in quarries. It is important to note that boda boda riding is also mentioned to be the available employment and income opportunity in Lamu County. Employment opportunity challenges in the county include lack of available and ready market for some of the items they produce, health complications and high insecurity.

As a remedy to address some of the above mentioned challenges, the government has put in place Uwezo Fund, Women Enterprise Fund and the National Youth Service. In addition to that the government also facilitates training and education to enable the target populations to access these funds and opportunities.

Potential areas to increase income and employment opportunities in the county include construction, agriculture and transport sectors.

5.8 Health

Lamu County is served by 45 health facilities of which 3 are referral hospitals, 4 health centers, 29 dispensaries, one nursing home and eight private clinics. The bed capacity in the health facilities stands at 172 with 145 beds in public facilities, 14 in mission/Non-governmental Organizations and 13 beds in private health facilities.

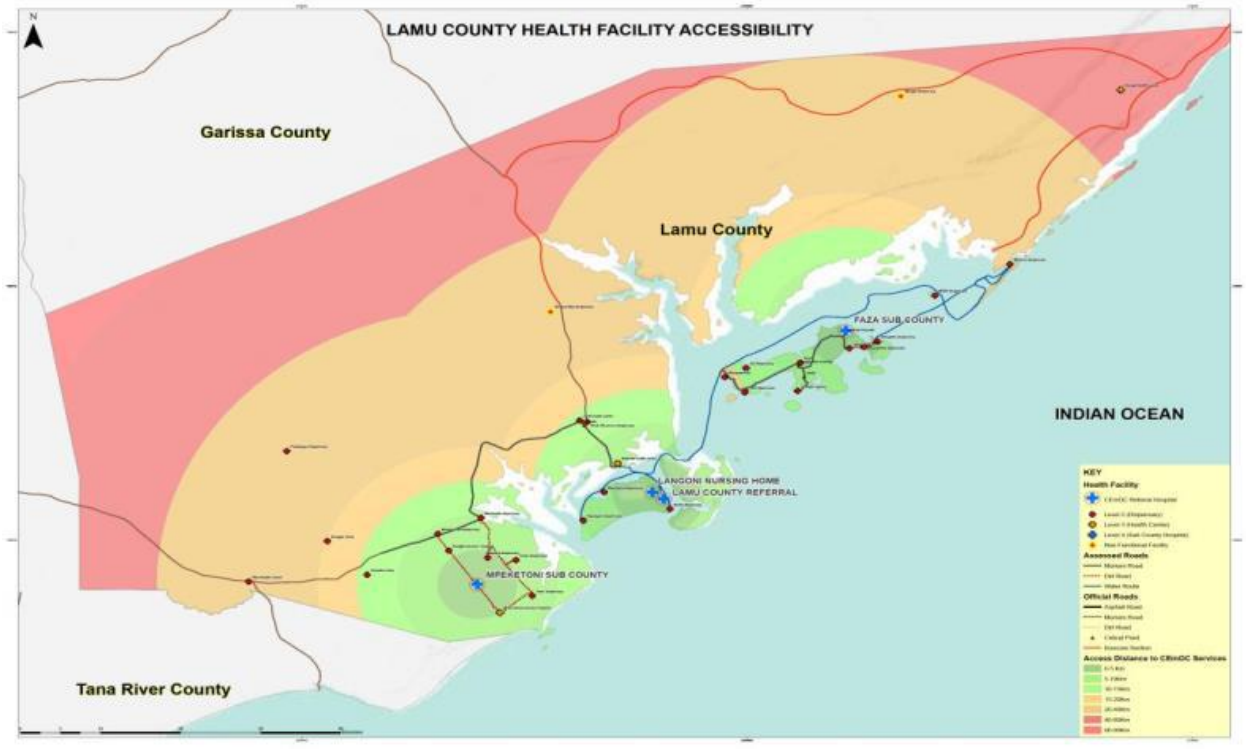


Figure 27: Lamu county health facility accessibility map

Figure 28: Tewe dispensary in Kiongwe

Kiongwe is well served with healthcare facilities including Mpeketoni Sub-county hospital.

5.9 Education and Literacy

The county's population with ability to read stands at 69.8 per cent, with 69.85 per cent having the ability to write. The population with the ability to both read and write is 67.3 percent. There are 106 primary schools of which 91are public schools and 15 schools are private. There are 5 special needs primary schools within the county (Wiyoni School for Visual Impaired, Lamu Special School, Mokowe Unit for Hearing impaired, Hongwe Special Unit for Mentally Challenged and Tchundwa Special Unit). There are 25 secondary schools in the county, 22 are public schools while 3 are private. The enrolment is 8686. The transition rate is 73%. The retention rate is 94% with a completion rate of 87%. The total enrolment for secondary school in 2014 was projected to stand at 5,934 pupils composed of 3,462 boys and 2,460 girls.

Some of the challenges facing the education sector in the county include:

- Poor performance
- Low literacy levels
- Inadequate tertiary level institutions

Figure 29: Swabaha primary school in Kiongwe village

There are various Quranic madrasa schools in Lamu County. Most of these institutions are largely found in Lamu west specifically in Lamu east and Amu division. The instructors are trained locally and some further their education in Arab countries. Some of the challenges includes: lack of teaching & learning resources, lack of funds, lack adequate of trained personnel among others.

Islamic education takes place in Mosques, Madrasas and Qur'anic schools. Usually all children, both boys and girls of primary school age, attend Qur'anic schools and get basic Islamic education. Boys may continue for many years but girls tend to leave when they reach the age of ten or eleven. Islamic education, i.e. the Qur'anic schooling and Madrasa are designed to address first and foremost the spiritual needs of the learners and to offer them avenues for growth in the Faith. Below is a photo of a Madrasa in Kiongwe village.

Figure 30: Madrasa in Kiongwe village

5.10 Nutrition Status

The STEPS Survey 2015 showed that the prevalence of overweight (BMI 25.0-29.9 kg/m2) and obesity (BMI>=30) among adults 15-69 years was high, especially among women. It reported that 17.5% of men and 38.4% of women were either overweight (BMI 25-29.9) or obese (BMI 30 or higher), and 13.7% of women and 4.3% of men were obese. According to Lamu Smart survey (2017), 2.4% of children aged below five years are overweight. The KDHS 2014 estimated a stunting rate for children below five years of 29%, wasting rate of 4% and 11% were underweight compared to the national average of 26%, 4% and 11% respectively.

Interventions implemented	**Coverage**
Target population	123,193
Promotion of good infant and young child nutrition and hygiene practices (children 0–23 months)	7,247
Vitamin A supplementation (children 6–59 months)	4,000
Therapeutic zinc supplementation (children 6–59 months)	15,422
Multiple micronutrient powders (children 6–23 months)	4,353
Deworming (children 12–59 months)	8,804
Iron folic acid supplementation (pregnant women)	3,620
Fortified staples (general population)	52,234
Iodized salt (general population)	17,247
Public provision of complementary food (children 6–23 months)	1,350
Treatment of severe acute malnutrition (children 6–23 months)	58
Management of moderate acute malnutrition (children 6–23 months)	1,032

Table 12: Lamu county nutritional interventions (Source: 2009 Kenyan Population and Housing Census, KDHS 2014)

5.11 Water supply

Water Management is as stipulated in Water Acts 2002 and 2016, and also in the Kenya Constitution of 2010 that devolves water services to the County Governments. The hydrology of the area is highly influenced by the topography and geology of the area with rivers flowing south easterly in a direction perpendicular to the Indian Ocean

coastline. Many of the streams are ephemeral draining into the limestone karsts found in the area and therefore contributing to groundwater in the area. Tana River is the largest river in Kenya and enters the Indian Ocean at Kipini in the neighbouring Tana River County. The hydrology of the Tana Delta influences the groundwater resources in the southern part of Lamu County.

Lamu Island and a significant area of Lamu's coast have a series of sand dunes that are a catchment area for groundwater that serves the settlements including Lamu Town, with fresh water through shallow wells and boreholes. These are recharged directly from rainfall and seasonal runoff. The Lamu County water wells are also served by recharge from the Tana River flowing south easterly inside Tana River County and a few kilometres away from the border.

Lamu County is classified as water scarce even though it has a significant number of water resources/aquifers. The project area is served by Lake Kenyatta as seen in the table below.

No	Resource/Aquifer	Ward	Sub-County
1	Shella Sandunes	Shella	Lamu West
2	Chomo	Hindi	Lamu West
3	Belebele	Hindi	Lamu West
4	Lake Kenyatta	Bahari	Lamu West
5	Witu	Witu	Lamu West
6	Vumbe	Faza	Lamu West
7	Mangai	Basuba	Lamu West

Table 13: Water resource/aquifer in Lamu County

No.	Water Supply Scheme	Ward	Sub-County
1	Lamu Water Supply	Mkomani	Lamu West
2	Mokowe Water Supply	Hindi	Lamu West
3	Hindi Water Supply (HIMWA)	Hindi	Lamu West
4	Mpeketoni Water Supply (LAKWA)	Bahari	Lamu West
5	Witu Water Supply (WIWA)	Witu	Lamu West
6	Faza Water Supply	Faza	Lamu East
7	Kiwayuu Water Supply	Kiunga	Lamu East
8	Milimani Water Supply	Basuba	Lamu East
9	Kizingitini Water Supply (Desalination)	Faza	Lamu East
10	Siyu Water Supply (Desalination)	Faza	. Lamu East
11	Kiunga Water Supply (Desalination)	Kiunga	Lamu East

Table 14: Water supply schemes in Lamu County

It is important to note that those not connected to the existing water supply networks mainly rely on shallow wells and water pans. In Kiongwe most residents rely on shallow wells.

Figure 31: Water wells at kiongwe village

5.12 Sanitation

According to Economics of Poor Sanitation in Kenya, Water and Sanitation Programme report, Lamu County loses 81 million KES each year due to poor sanitation. This includes losses due to access time, premature death, health care costs and productivity. This estimate does not include some costs that could be significant (such as water pollution and tourism) and is therefore likely to under-estimate the true cost of poor sanitation. The Ministry of Health county sanitation benchmarking index ranks Lamu County number 40 out of 47. Below is a pie chart of the sanitation coverage in Lamu County.

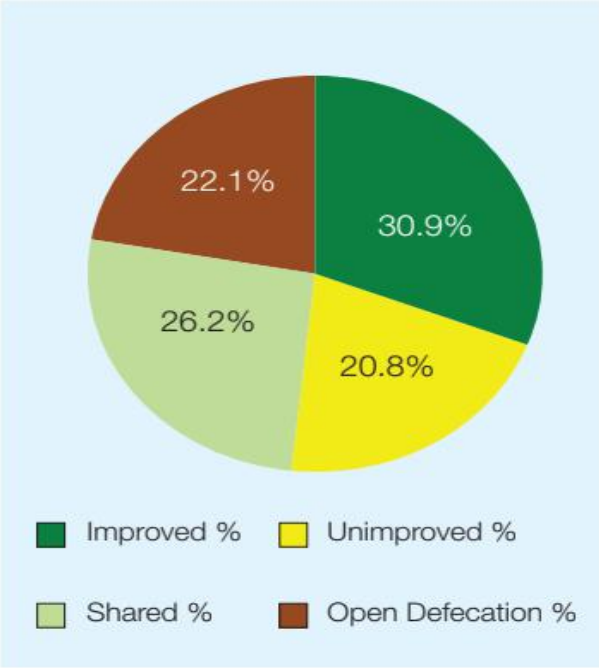


Figure 32: Sanitation coverage pie-chart in Lamu County

Presently, Lamu Island has no sewerage system. The use of on-plot sanitation systems such as pit latrines and septic tanks for disposal of effluent is prevalent. The major problem faced is the lack of a proper sludge management system, Sludge Drying Beds or Waste Stabilization Ponds for the discharge of septage by the exhaust vacuum tankers. Thus, septage from septic tanks is discharged directly to the environment such as unrestricted public utility sites. As in other areas of the county, the project area mainly uses on-plot sanitation systems for wastewater disposal. Below is a picture of an existing septic tank-soak pit system in Kiongwe.

Figure 33: Septic tanks used to manage liquid human waste at Kiongwe village

CHAPTER SIX
6. PUBLIC CONSULTATION AND PARTICIPATION

6.1 Introduction

Public participation enables evaluation of the public and neighbours views. It is an important part of an environmental impact assessment as it helps identify various concerns the various stakeholders may have of the project impacts or potential impact to the environment. This also helps in identifying the most appropriate mitigation measures that are specifically tailored to the concerns as aforesaid.

6.2 Objectives of the Public Consultations

The overall goal of the consultation process is to disseminate project information and to incorporate the views of the Project Affected households (PAHs) in the design of the mitigation measures and a management plan. An important element in the process of impact assessment is consulting with stakeholders to gather the information needed to complete the assessment.

The main objectives of public consultations were to:

- ✓ Provide clear and accurate information about the project to the beneficiary community;
- ✓ Obtain the main concerns and perceptions of the population and their representatives regarding the project;
- ✓ Obtain opinions and suggestions directly from the affected communities on their preferred mitigation measures;
- ✓ Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.

6.3 Methodology

The methodology involved both desk study (scoping) and field work. During scoping stage, the potential impacts relevant to projects of this nature were identified and categorized. The systematic investigative and reporting methodology specified in the conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted in this Study. The approach adopted included:

No.	Approach Methodology	Target Group
1	Key informant interviews	• Key persons in lead agencies • NGO & CBO leaders • Religious leaders • KWS

		• KFS • County Government officials etc.
2	Administration of questionnaire	Kiongwe residents
3	Residents focus group discussions	Kiongwe residents
4	Stakeholder meetings	• Administrative committee meeting • Project affected households committee meeting • Host community committee meeting • Kiongwe baraza village meeting
5	Observations	Visit to the proposed project s area
6	Photography	Project surrounding environment

Table 15: Adopted approach methodology table

6.4 Stakeholders Identification

To enhance maximum participation and achieve a better output, the relevant stakeholders were taken on board. This was done through stakeholder identification and involvement based on their needs, interests, relative power and potential impact on project outcome.

In this regard, two broad categories of stakeholders were identified. These include:

- ✓ *Primary stakeholders* – Those who are the beneficiaries of a development intervention or those directly affected (positively or negatively), by the project, commonly referred to as Project Affected households (PAHs);
- ✓ *Secondary stakeholder*- Those who influence development or are indirectly affected by the project, especially those stakeholders involved in project planning and implementation. These include the implementing agency, relevant government departments and local administration among others.

6.5 Consultations during the project report stage

The consultations were mainly held by key stakeholders involved at County and local levels and included discussions with County and regional officers, specialists and other knowledgeable people and key informants. These consultations were conducted as either:

- ✓ Direct, personal interviews with selected informants, or public meetings chaired by the local administrators;
- ✓ Focus group meetings with authorities and technical personnel and local authorities representatives

The Consultant made a visit to the project area for a meeting aimed at agreeing on salient issues of the project. In addition, the Consultant has been in constant touch with the project team especially on project design and project administrative issues.

Typically at this stage, the agenda for these consultations were to:

- ✓ Present the proposed project to the stakeholders;
- ✓ Introduce main project objectives and the consultancy objectives to the stakeholders;
- ✓ Present the consultant's programme to the stakeholder

6.6 Consultations during the ESIA stage

During the ESIA stage, introductory meetings were held with the local administrators at the beginning of the project. The objectives of the meetings were to:

- ✓ Introduce the Project to the local area administration;
- ✓ Obtain more information about the project area;
- ✓ Introduce the consultancy team and the scope of work;
- ✓ Obtain views of the local area administration on the project;
- ✓ Seek the needed support in mobilizing and sensitizing the community.

6.7 Public sensitization meetings

Public Sensitization and inclusion meetings were held during the ESIA. The attendance lists of the meetings are attached to the report in the appendices.

NO.	NAME	PHONE NUMBER	VILAAGE/INSTITUTION
1	Amina Abdulrahman	0700401212	Kiongwe Mjini
2	Namkuu Lali	0721291955	Kiongwe Mjini
3	Faiz Abdulrahman	0740294866	Kiongwe Mjini
4	Batuli Ali	0719602070	Kiongwe Mjini
5	Fatuma Bwanaheri	0742888658	Kiongwe Mjini
6	Omar Wazir	0792133262	Kiongwe Mjini
7	Mohammad Omar	0768119141	Kiongwe Mjini
8	Ismail Hamad	0704023332	

Table 16: Attendance lists of the host community committee, who attended the stakeholders meeting on 14th January 2021 at 2.00p, Breeze view hotel

NO.	NAME	PHONE NUMBER	VILAAGE/INSTITUTION
1	Paul Mbatia	0727366495	Interior
2	Loise Wanjiru	0715318583	Mpadaline area
3	Simon Muguro	0710490912	Tewe sub-location
4	Jedidah Wanjiru	0703659024	Mudali
5	Banice Magiri	0713167647	Tewe sub-location
6	Silveria Kerimba	0729523114	Interior
7	Joseph Gachuiri	0718584703	Interior

Table 17: Attendance lists of the administrative committee who attended the stakeholders meeting on 14th January 2021 at 4.00pm, Breeze view hotel

NO.	NAME	PHONE NUMBER	VILAAGE/INSTITUTION
1	Linus Gachoki	0723753504	Baharini
2	Reuben Maingi	0711406626	Baharini
3	Samuel Kamali	0726528031	Baharini
4	Agnes	0728369751	Baharini
5	Antony Chege	0113424253	Baharini
6	Joseph Mwangi	0729742945	Bahari
7	Abdu Wazr	0711617927	Bahari
8	Joshua Githinji	0703232186	Bahari
9	Evelyne Mwakisha	070839727206	Baharini
10	Mary	0725689135	Baharini
11	Kamilo Siad	0718072137	Baharini
12	Issa Roba	0758386994	Baharini
13	John	0740787952	Baharini

Table 18: Attendance lists of project affected persons committee who attended a stakeholders meeting on 14th January 2021 at 5.00pm, Breeze view hotel

Figure 34: Images of the stakeholders who attended the meeting/baraza held at Kiongwe village on 15th January 2021

Figure 35: Images of the stakeholder committee members (Administrative Committee, Project Affected Persons Committee and the Host Community Committee) who attended the meeting at Breeze View Hotel on 14th January 2021

6.7.1 Objective of the sensitization meetings

Consultative meetings were held in four groups that included:

i. The Administrative Committee meeting
ii. The Project Affected Persons Committee meeting
iii. The Host Committee meeting and
iv. The Kiongwe Public Baraza

The objectives of these meetings were as follows:

- ✓ Housing project awareness creation for community
- ✓ Informing the community how adverse environmental and social impacts of the project will be addressed;
- ✓ Getting feedback from the communities on their views on the project and issues of concern and;
- ✓ Inclusion of the community in the development of the project at the planning stage.

6.8 Issues from the Consultation Meetings

Presented below are the main concerns and issues that arouse from the sensitization meetings:

I. The locals were concerned with the issue of jobs for the locals during construction of the project as they felt that they should be given priority.
II. The locals were also concerned with the health and safety of workers on site. They were assured that the contractor shall be required to ensure adherence to the Safety Health and Safety laws and regulations.
III. The community members were in support of the project and were eager to see it implemented on time so that they get the expected benefit.

6.8.1 Summary of questionnaires feedback

No.	Aspects	Response(Total number 80)			Percentage (%)	Comments
		Yes	No	Abstain		
1	Project awareness	80	0	0	100	➢ Project will lead to better housing in the project area ➢ Project will create employment opportunities to both skilled and unskilled ➢ Project will boost the local economy through provision of market for construction materials ➢ Source of revenue for the government ➢ Project will provide access to better services and amenities ➢ Project is offering an opportunity for residents get titles for their land.
2	Project support	80	0	0	100	

3	Community significance	80	0	0	100	
4	Local economy significance	80	0	0	100	
5	Employment opportunities	80	0	0	100	
6	Increased land value	80	0	0	100	
7	Boost to local economic development	80	0	0	100	
8	Improve infrastructure	80	0	0	100	
9	Access to good services and amenities	80	0	0	100	
10	Improved security in the area	80	0	0	100	
11	Negative effects on business enterprises	0	80	0	100	
12	Positive aesthetic value	79	1	0	99	
13	Negative effects on residential properties	13	67	0	100	**The project will have no negative effects on residential properties existing currently since they have been considered in the planning process.**
14	Energy demand increase	78	1	1	99	
15	Increase in water harvest	78	1	1	99	
16	Increase in sand harvest	78	1	1	99	
17	Increase in timber logging	78	1	1	99	
18	Increase in coral rock brick mining	78	1	1	99	
19	Project health risks to the community	7	72	1	99	➢ Improper waste management can cause underground water pollution affecting the health of

						the residents ➢ If dust isn't mitigated it can cause air pollution that eventually may pose health risks to the public ➢ If OSHA isn't adhered to, workers and residents in the neighbored may be at risk e.g. injury and accidents to workers not using PPEs when on site
20	Project will cause environmental degradation	6	73	1	99	➢ Use of heavy machines causes soil compaction that leads to soil erosion ➢ Improper solid waste management can cause land pollution ➢ Dust in excess if not mitigated causes air pollution
21	Project will result in forest clearing	1	78	1	99	
22	Project will pose a threat to wildlife habitat	1	78	1	99	
23	Additional issues/comments	16	13	51	36	➢ local residents to be given first priority when employing workers during construction ➢ water, schools and hospitals should be given first priority in terms of provision of social

						amenities since the project area faces a big challenge of inadequate water, schools and hospitals ➢ Public and workers safety should be considered during construction ➢ proper mitigation measures should be implemented to control dust pollution and manage waste

Table 19: Summary questionnaire feedback

6.8.2 Observations

i. There is a good relationship developed between the stakeholders and the proponent.
ii. It was clear that the stakeholders had been extensively engaged in previous ESIA processes for the licensing of the wind project.
iii. The stakeholders had intact structures of representation from previous processes
iv. Stakeholders were eager to progress with the Relocation Action Plan
v. There were concerns about the resettlement process occasioned by delays in issuing of titles
vi. Majority of the stakeholders were eagerly waiting for the project to commence having been involved in the initial stages for over 5 years

CHAPTER SEVEN
7. GRIEVANCE REDRESS MECHANISM (GRM)

7.1 Introduction

A Grievance Redress Mechanism (GRM) is an instrument through which dispute resolution is sought and provided. It involves the receipt and processing of complaints from individuals or groups negatively affected by activities of a project. During project implementation issues arise that need to be addressed by the proponent. A GRM is a crucial tool that will be utilized during the construction and operation phases of the proposed project.

7.2 Objectives of the GRM

The following are the objectives of establishing a GRM:

- ✓ To address complaints and grievances and enhance conflict resolution arising.
- ✓ Ensure transparency and accountability throughout the projects and amongst the relevant stakeholders including project beneficiaries.
- ✓ Resolve any emerging environmental and social grievances in project areas.
- ✓ To promote relations between the project associated persons.

7.3 Principles of the GRM

The effectiveness of this GRM will be guided by the following principles:

I. *Accessibility:* The GRM should be accessible to everyone and at any time. It should take into consideration potential barriers such as language, literacy, awareness, cost or fear of reprisal and seek to address them.

II. *Predictability:* GRM should be time-bound at each stage, and have specified time frames for the responses.

III. *Fairness:* All the procedures therein should be widely perceived as unbiased in regards to access of information and meaningful public participation.

IV. *Rights compatibility:* The outcomes of the mechanism should be consistent with the international and national standards. It should also not restrict access to other redress mechanisms.

V. *Transparency and accountability:* The entire GRM process should be done out of public interest.

VI. *Capability:* For an effective GRM, the system needs to be endowed the necessary resources, that is, technical, financial and human resources.

VII. *Feedback:* It should serve as a means to channel citizen feedback to improve project outcomes for the people.

7.4 Legal & Judicial Redress Mechanisms in Kenya

In the event that the complainants are dissatisfied with the outcome of grievance resolution, they shall be advised to seek recourse through the following national arbitration processes.

7.4.1 The Commission on Administrative Justice (CAJ)

The Commission on Administrative Justice (CAJ), also known as the Office of the Ombudsman, is an independent commission established by the Commission on Administrative Justice Act, 2011, pursuant to Article 59 (4) of the Constitution of Kenya. It is the foremost constitutional commission whose primary function is to ensure public officers and public institutions respect sovereignty of the people of Kenya. The CAJ is mandated to address all forms of maladministration, promote good governance and efficient service delivery in the public sector by enforcing the right to fair administrative action. The CAJ investigates abuse of power, manifest injustice and unlawful, oppressive, unfair or unresponsive official conduct.

7.4.2 The National Environment Tribunal

The National Environment Tribunal (NET) is created under section 125 of the Environment Management & Coordination Act (EMCA) of 1999. It has the following functions:

I. To hear and determine appeals from NEMA's decisions and other actions relating to issuance, revocation or denial of Environmental Impact Assessment(ESIA) licenses or amount of money to be paid under the Act and imposition of restoration orders;
II. To give direction to NEMA on any matter of complex nature referred to it by the Director General;
III. In accordance with Forest Act No. 7 of 2005, NET is mandated to review decisions of the board under sections 33 and 63.

7.4.3 The Courts

The Courts have power to hear and determine disputes, primarily of criminal and civil nature. Criminal cases are those in which the State prosecutes a person or an organization for committing an act which is not in the interest if the public, and therefore considered to be an offence against the State. Civil cases originate from a person who seeks redress for a private wrong such as breach of contract, trespass or

negligence, or to enforce civil remedies such as compensation, damages or to stop some action.

7.5 The GRM Structure

7.5.1 First Level of Redress: Community Level

The main targets at this level are the communities and project beneficiaries. At every community unit, three community leaders shall be appointed and trained to handle complaints. These three community leaders shall work under the supervision of the area.

- Chief/assistant chief- All project beneficiaries shall be informed of the appointed recipients of complaints. These community level leaders shall dedicate days when they are available to receive and resolve complaints. Once they receive a complaint, they shall be mandated to register the complaint, investigate and recommend an action. If the complainant is not satisfied with the recommendation, they shall be advised to report to the second level of redress. These community leaders shall be obligated to submit quarterly complaints as required.
- Points of receipt of complaints at community level

The community members shall be advised to register their complaints at the following points:

i. The 3 appointed community leaders
ii. Chief/assistant chief of the area
iii. Head of Community Based Organizations (CBOs)

Mode of receipt and recording of Complaints

The complaints can be made in writing, verbally, over the phone, by fax or emails. The officer receiving the complaints should try to obtain relevant basic information regarding the grievance. It is anticipated that at this level, most complaints will be made verbally. The four points of receiving complaints as illustrated above shall be in possession of a standardized complaint receiving form which must be filled in for every complaint. As soon as a complaint is received, an acknowledgement form shall be issued.

After registering the complaint the Grievance Handling Team under the guidance of the area chief shall set a date to investigate the matter, after which they shall provide a recommendation. If necessary, meetings have to be held between the complainants and

the concerned officers to find a solution to the problem and make arrangements for grievance redress.

Timeline

The resolution at the first level will be done within 14 working days and notified to the concerned through a standardized disclosure form. Should the Grievance not be solved within this period it would be referred to the next level of grievance redress. However, if the complainant requests for an immediate transfer of the issue to the next level or is dissatisfied with the recommendation, the issue will be taken to the next level.

7.5.2 Second Level of Redress: County Level

The main targets at this level are the project implementers, executers, communities and project beneficiaries and their related institutions. At every county implementation level, a grievance handling committee shall be appointed and trained to handle complaints. This committee shall work under the supervision of the County Director of Environment (CDE). All stakeholders shall be informed of the existence of the grievance committee.

This committee shall dedicate days when they are available to receive and resolve complaints. Once the committee receives a complaint it shall be mandated to register the complaint, investigate and recommend an action. If the complainant is not satisfied with the recommendation, they shall be advised to report to the third level of redress. This committee shall be obligated to do a quarterly report.

Points of receipt of complaints at county level

Any aggrieved person/organization shall be advised to register their complaints at the following points:

i. The GRM Committee
ii. CDE
iii. County Commissioner
iv. County Government Office

Mode of receipt and recording of Complaints

The complaints can be made in writing, verbally, over the phone, by fax or emails. The officer receiving the complaints should try to obtain relevant basic information regarding the grievance.

After registering the complaint, the Grievance Handling Team under the guidance of the CDE shall set a date to investigate the matter, after which they shall provide a recommendation.

Where necessary, meetings shall be held between the complainants and the concerned officers to find a solution to the problem and make arrangements for grievance redress.

Timeline

At the second level, the resolution period will also take a maximum of 14 working days and the concerned shall be notified. Should the Grievance not be solved within this period, this would be referred to the next level of Grievance Redress. However, if the complainant requests for an immediate transfer of the issue to the next level or is dissatisfied with the recommendation, the issue will be taken to the next level.

CHAPTER EIGHT
8. POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS AND PROPOSED MITIGATION

8.1 Introduction

This Chapter identifies both positive and negative environmental impacts likely to be occasioned by the project. The impacts will be related to activities or operations to be carried out during the different project phases i.e. Construction, operation and decommissioning. Mitigation measures are also analyzed.

8.2 Positive impacts

8.2.1 Positive Environmental Impacts during Construction Phase

I. **Creation of Employment Opportunities**
Several employment opportunities will be created for construction workers during this phase of the project and will employ both skilled and unskilled labour. Most of the construction labour will be sourced locally and this will benefit the local residents, especially the youth who are the main victims of the high rate of unemployment in the project area.

II. **Provision of Market for Supply of Building Materials**
The project will require supply of large quantities of building materials, most of which will be sourced locally. This provides ready market for local building materials. This will in turn improve income generation for local materials suppliers, quarrying companies, hardware shops etc.

III. Increased Business Opportunities
The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.

IV. Revenue to National and County Governments
The project construction phase will generate revenue for both the national and county government. The national government will benefit from various taxes (e.g. income tax, Value Added Tax (VAT) etc.) and approval fees (e.g. NCA). The county government will gain revenue in the form of construction plan approvals, local business licenses/permits etc. All materials will be imported through the existing transports hubs which will earn revenue to the county.

V. Improved Infrastructure

The project activities will involve installation of new public utility infrastructure like roads, electricity network and water supply network, as well as improvement of existing ones. Access to education and health facilities will also be improved through construction of a school and dispensary respectively. Improvement of infrastructure has the potential to spur further development in the project area.

8.2.2 Positive Environmental Impacts during Operational Phase

I. Provision of Housing Facilities

The project will provide modern housing facilities. The county government will ensure availability of power, water supply and sanitation utilities. The project will utilize improved construction standards, materials and technology, with a shift from old construction methods such as mud and thatch buildings. This will ensure health and safety standards are maintained for the benefit of the occupants.

II. Employment Opportunities

More employment opportunities will be created during the operation phase. These will include estate management personnel, security guards, repair and maintenance technicians, waste management service providers etc.

III. Improved Security

During the occupation phase there will be need to improve the security of the project area due to increase in population occasioned by the arrival of new settlers. Part of the security apparatus to be put in place will include street lighting along the access roads as well as enhanced vigilance through the Nyumba Kumi Initiative. It is however noteworthy that there will be need to construct a new police post in the area to improve general security.

8.2.3 Positive Environmental Impacts during Decommissioning Phase

I. Rehabilitation

Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to acceptable environmental status. This will

include replacement of topsoil and re-vegetation. Landscaping will also be conducted where necessary to improve the visual quality of the area.

II. Employment Opportunities

Several employment opportunities for both skilled and unskilled workers will be created during the decommissioning phase. These will include demolition workers, technicians for disconnection of both electrical and water supply utilities, waste management service providers and transporters to move the occupants and allowing for demolition to commence.

8.3 Potential negative impacts and mitigation measures

8.3.1 Construction phase

8.3.1.1 Impacts of extraction of raw materials at points of origin

Raw materials for the construction of the proposed housing development will originate from quarries, wetlands and industries. The activities of extraction will have the following negative impacts on the environment:

- ✓ Degradation of the physical environment where mining and timber harvesting is carried out.
- ✓ Disposal of pollutants into the environment from industries manufacturing raw materials
- ✓ Threat to water resources in the case of sand harvesting

Figure 36: An abandoned quarry

Mitigation measures

- ✓ The contractor will obtain raw materials from sources that are compliant with NEMA Regulations.
- ✓ The contractor will procure quantities that are sufficient for the intended works only.
- ✓ Recycling as far as practical to stem wastage is recommended.
- ✓ The contractor shall commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the development.

8.3.1.2 Destruction of the physical environment

The construction phase of the project will cause some destruction to the physical environment. The impacts on soil will be localized and will be caused by:

- ✓ **Soil Compaction:** Construction activities are normally accompanied by some form of compaction. Compaction seals the soil on the surface hence hindering the penetration of air or water beneath the surface. This limits the aerobic activities of the organisms underneath the soil, hence affecting soil productivity. Compaction also hinders the infiltration of water into the surface hence increasing the surface run-off increasing the possibility of flooding downstream of the site. Surface run-offs eventually find their way to water sources thereby polluting them. The result in water borne diseases which affects the health adversely.
- ✓ **Excavation:** Excavation creates loose soil that is easily carried away by water or wind. This results in soil erosion and affects soil quality. Soil and wind erosion will lead to pollution of air and water sources. Air pollution results to breathing infections and thereby need for medication. Pollution of water sources can lead to water borne diseases therefore impacting negatively on the health of the residents.

Mitigation measures

- ✓ Landscaping disturbed areas.
- ✓ Planting trees and suitable indigenous grasses in the premises will be undertaken where possible and as soon as the construction is completed.
- ✓ Controlling of earthworks to prevent compacting the loose soils.
- ✓ Provide drainage channels to natural drains and rivers/streams to minimize erosion

8.3.1.3 Occupational health and safety hazards

The movement of materials in the construction site by workers and machine handling during construction may cause accidents and injuries. This has a direct effect on the health of the workers and productivity.

Mitigation measures

- ✓ Provision of adequate and appropriate PPE including safety shoes, helmets, gloves and overalls.
- ✓ Employees to be given the correct tools and equipment for the jobs assigned.
- ✓ Employees to be trained in the use of all equipment that they will be required to operate.
- ✓ The contractor will conduct periodic safety inspection and risk assessment.
- ✓ First aid services and an emergency vehicle to be readily available at site.
- ✓ Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during installation phase.

- ✓ The contractor will fully implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007.

8.3.1.4 Site sanitation

During construction a large number of workers will be employed who will require adequate sanitation facilities. This will be a concern that the contractor has to address as he engages in construction of the proposed houses.

Mitigation

The proponent will install portable toilets that will be maintained clean and ensure adequate water supply.

8.3.1.5 Air pollution

During construction phase dust will be expected from excavation of soil and movement of vehicles. If generated in large quantities dust may present respiratory hazard and also cause visual intrusion hence presenting accident risks. Dust is also a mechanical irritant to the eye. Air emissions would also be expected from exhausts of vehicles delivering material. The health impacts as a result of the air quality will reduce the productivity of workers at the site and also have financial implications during treatment and medication.

Mitigation measures

- ✓ The contractor will implement sound project management strategies to ensure that installation works are completed in the shortest possible time taking advantage of low wind velocities.
- ✓ Sprinkle dust producing materials such as ballast with water on site.
- ✓ Retain vegetation as much as possible to reduce bare areas exposed to agents of soil erosion.
- ✓ Use low Sulphur fuels to power delivery vehicles and site machinery.
- ✓ Truck drivers will maintain low speeds to avoid raising dust.
- ✓ Employees will be provided with dust masks and goggles.

8**.3.1.6 Solid waste generation**

Significant amounts of solid waste will be generated during construction phase of the project. This will include construction and domestic waste generated by debris and workers.

Mitigation measures

- ✓ Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site.

- ✓ The contractor will install segregation bins and receptacles that encourage separation of wastes at source to promote re-use and re-cycling.
- ✓ The contractor will adhere to the 3Rs principle of waste management (i.e. **R**educe, **R**euse, and **R**ecycle).

8.3.1 .7 Noise and excessive vibrations

Noise is expected from movement of vehicles and equipment. It would also arise from construction activities at the site as such loading and offloading of material, etc. Vibrations are likely to occur during excavation to lay the foundation as well as from use of heavy equipment. Noise may lead to hearing impairments which will reduce the efficiency of the employees at work and also affect their finances due to treatment and medication. Vibrations, if in excess may lead to adverse effects to human health.

Mitigation measures

- ✓ Serviceable machines will be used for excavation to ensure vibrations are kept at below risk levels.
- ✓ Construction work and delivery of raw materials will be limited to daytime on weekdays only.
- ✓ Employees using equipment that produce peak sounds shall be provided with earmuffs.
- ✓ The contractor will deploy compact machinery and fit them with mufflers and vibration dampers.
- ✓ The contractor will endeavor to comply with Noise Regulations, 2009.

8.3.1.8 Traffic impact

This will occur as vehicles bring in deliveries at the site and as workers leave or come to the site. The site will generate higher traffic than normally experienced in the project area. Considering the existing traffic which is mainly bodaboda/tuktuks, inter and intra-county PSV transport vehicles, the additional vehicles serving the project will definitely be a significant number. This has the potential to cause an increase in road accidents. Precautions have to be put in place to reduce traffic accidents and incidents.

Mitigation measures

- ✓ Heavy Commercial Vehicles (HCVs) delivering material shall observe designated speed limits for the area.
- ✓ Speed bumps should be erected on road sections passing through populated residential and market centers and near schools and worship centers.

- ✓ Proper signage and warnings shall be placed at appropriate places along the site road to forewarn other motorists of HCVs turning and transportation of abnormal loads.
- ✓ Delivery of material for the installation shall be undertaken during off-peak hours.
- ✓ All materials will be offloaded on the site and adequate space for that will be provided. Flagmen / traffic marshals shall be deployed at the entrance to guide traffic.

8.3.1.9 Increased water demand

Construction projects utilize significant quantities of water for concrete mixing laying and curing. Water will also be required for human use including drinking and sanitary needs. This could lead to strain on the available water resources.

Mitigation measures

- ✓ The contractor will ensure water conservation and in all activities.
- ✓ Water will be recycled where possible without compromising on quality and health.
- ✓ Ensure good use of water resources during construction by installing taps on all outlets, and minimize wastage by ensuring regular repair and replacement of broken or worn-out pipes and fittings.
- ✓ The contractor will put in place sound sufficient water storage reservoirs that are leak proof.
- ✓ The contractor will instill water use discipline among employees.
- ✓ The contractor will seek alternative water source apart from the reticulated supply from local water scheme

8.3.1.10 Possible collapse of buildings/structures while under construction

A building may collapse while still under construction. This can be attributed to lack of insufficient geo-technical investigations, poor structural design and subsequent poor workmanship.

Mitigation measures

- ✓ Geotechnical investigations will be executed by geotechnical engineer prior onset of construction works to acquire information regarding the physical characteristics of soil and rocks. The purpose of geotechnical investigations is to design earthworks and foundations for structures, and to execute earthwork repairs necessitated due to changes in the subsurface environment.
- ✓ All construction works will be done under constant supervision of engineers and architect.

- ✓ Construction works shall adhere to the KS Code (2009) - Building Code of the Republic of Kenya (2009 Edition).

8.3.1.11 Increased energy demand

Construction activities will use engine-driven machinery such as transportation vehicles, concrete mixers and vibrators, compressors and power generators that require fossil fuel inputs such as diesel and petrol. Their continual application will increase the demand for energy.

Mitigation measures

- ✓ Switch off engines when not in use.
- ✓ Use well serviced construction machinery that is efficient in fuel consumption.
- ✓ Maximize the use of natural lighting by limiting construction works to day time.
- ✓ Create awareness among workers on the importance of conservation of energy resources.
- ✓ Employ technologies that demand less energy consumption.
- ✓ Use energy saving lighting systems.

8.3.1.12 Insecurity

Construction sites in Kenya attract all manner of people not directly engaged in the work. These will include people hoping to secure some form of casual work, outside caterers and idlers. This introduces an element of insecurity at the construction site.

Mitigation measures

The contractor together with the proponent will undertake the following to mitigate insecurity:

- ✓ Secure the site and have security personnel manning the site.
- ✓ The contractor to give out information of suspecting conduct within the site to the local administration.
- ✓ Hire services of security firm to monitor personnel or visitor movement within and close to the site.
- ✓ Formulate and instill place of work conduct.
- ✓ The proponent will work closely with the interior ministry to ensure the government provides security during construction.
- ✓ The proponent will fence off the project land.

8.3.2 Operation phase

8.3.2.1 Increased water demand

The proposed premises will require significant volumes of water to run. Water will be needed for various household activities and uses e.g. drinking, sanitary use, laundry etc.

Mitigation measures

- ✓ The occupants will put in place structural provisions for rain water harvesting e.g. roof gutters, to supplement huge demand by the settlement.
- ✓ Water be recycled without compromising on quality and health
- ✓ Create awareness among residents on the importance of conservation of water resources
- ✓ Seek a water extraction permit from WRA if a borehole is needed to supplement the supply demand
- ✓ Put in place sound water storage reservoirs that are leak proof.

8.3.2.2 Solid waste generation

The new settlements will generate substantial volumes of solid waste from human household activities. These will include waste papers, plastics, broken glass, kitchen waste etc. The waste may accumulate to undesirable volumes if not segregated and disposed of regularly thereby becoming a nuisance.

Mitigation measures

- ✓ Use of an integrated solid waste management system (i.e. through a hierarchy of options: Reduce Reuse, Recycling and Dispose) is recommended.
- ✓ Provide a central waste receptacle.
- ✓ Dust bins to be provided at household level and be well secured from adverse weather and access by animals
- ✓ Transportation of wastes from the site to be done by a NEMA registered solid waste handler

8.3.2.3 Effluent discharge

Large volumes of waste water will be generated from kitchens, laundry activities, ablution, toilets etc. This has a potential to infiltrate and contaminate both ground and surface water sources if not well managed. This may pose a health risk for both humans and animals when they consume polluted water through diseases and poisoning.

Mitigation measures

- ✓ Provide enough and suitable washrooms and install a water tank at the washrooms with enough water supply
- ✓ Installation of septic tank/soak pit system to manage waste water
- ✓ Regular inspection and maintenance of internal sewer system
- ✓ Constant monitoring of water resources through regular sampling and testing

8.3.2.4 Storm water management

Additional construction activities are likely to generate large amounts of runoff from paved outdoor surfaces and rooftops during heavy rains. Additionally, poorly sited buildings could impede natural flow of surface runoff leading to flooding.

Mitigation measures

- ✓ Consider storm water harvesting and use in the farms for irrigation.
- ✓ Plumbing to be undertaken by competent personnel.
- ✓ Rain water will be harvested by rain gutters that will be feeding water storage tanks. The gutters will be very effective at keeping building areas clear of falling water.
- ✓ To accommodate potential increase in construction developments in the future, construction of a storm drainage network should be considered to channel runoff away from residential areas.

8.3.3 Decommissioning phase

The activities to be carried out during the decommissioning phase will include relocation of the existing population from the site, disconnection of electrical cables and fittings, disconnection of water supply and wastewater management system, demolition of buildings, transportation of demolition waste from the site and final landscaping and restoration activities.

These activities will result in negative economic, social and environmental impacts. At this stage, the proponent will prepare a due diligence decommissioning audit report and submit it to NEMA for approval at least three months in advance. All hazards such as exposed electrical wiring, residual gas in tanks, etc. to be safely removed and all hazardous materials disposed appropriately.

8.3.3.1 Solid waste generation

Significant amounts of solid waste will be generated during this phase of the project. Solid waste mostly generated will be in the form of soil, broken blocks, ceramics, timber, metal, glass, plastics and other debris.

Mitigation measures

- ✓ Debris be collected from the site by NEMA licensed waste handlers
- ✓ Some waste materials should be collected and reused/recycled where possible e.g. soil can be used to backfill foundation trenches and septic tanks/soak pits; doors and windows in good, resalable condition might substitute for new products, or be donated and or sold for use on another project – a form of beneficial reuse.
- ✓ The contractor will endeavor to comply with the provisions of Legal Notice 121 of 2006 pertaining waste management and the National Solid Waste Management Strategy.

8.3.3.2 Air pollution

During decommissioning phase dust will be expected from demolition activities and movement of vehicles. If generated in large quantities dust may present a respiratory hazard and also cause visual intrusion hence presenting accident risks. Dust is also a mechanical irritant to the eye. The health impacts as a result of the air quality will reduce the workers' productivity on the site and also have financial impacts in case they require treatment and medication.

Mitigation measures

- ✓ Truck drivers will maintain low speeds to avoid raising dust.
- ✓ Employees will be provided with dust masks and goggles.
- ✓ Install dust trappers around the site to prevent dust from spreading in the neighborhood.
- ✓ Sprinkle dusty areas with water to keep dust level low
- ✓ Trucks removing soil and other solid materials from the site should be covered to prevent spreading of dust into the surrounding areas

8.3.3.3 Occupational health and safety hazards

Demolition works at the site by workers and machine handling may cause accidents with potential to cause injury. This will affect the health of the workers and their potential to work.

Mitigation measures

- ✓ Provision of adequate and appropriate PPE including safety shoes, helmets, gloves and overalls.
- ✓ Employees to be given the correct tools and equipment for the jobs assigned.
- ✓ Employees to be trained in the use of all equipment that they will be required to operate.
- ✓ The contractor will conduct periodic safety inspection and risk assessment.
- ✓ First aid services and an emergency vehicle to be readily available on site.
- ✓ Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during installation phase.
- ✓ The contractor will fully implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007.

8.4 Impact significance matrix

8.4.1 Construction phase

IMPACTS	SHORT TERM	LONG TERM	REVERSABLE	IRREVERSABLE	LOCAL	WIDESPREAD	SIGNIFICANCE
Increased air emissions (dust and exhaust emission) During construction phase dust will be expected from excavation of soil and movement of vehicles. If generated in large quantities dust may present respiratory hazard and also cause visual intrusion hence presenting accident risks. Dust is also a mechanical irritant to the eye. Air emissions would also be expected from exhausts of vehicles delivering material. The health impacts as a result of the air quality will reduce the productivity of workers at the site and also have financial implications during treatment and medication.	√		√		√		X
Soil erosion All soil is vulnerable to erosion. And during the construction process, soil becomes loose and loses its stability. Housing development activities can cause rapid soil degradation and sedimentation. Erosion, which produces sediment, is accelerated when soil is disturbed, left bare, and exposed to rainfall.	√		√		√		

Employment opportunities Construction is one of the industries with the highest projections for new employment opportunities. Positions vary, ranging from unskilled laborer and helper jobs to roles that require extensive training, education, and skills. Artisan positions characterized by an intensive use of labor, both in on-site construction and in the production and distribution of building materials are also available.	√						+
Noise and excessive vibrations pollution Noise is expected from movement of vehicles and equipment. It would also arise from construction activities at the site as such loading and offloading of material, etc. Vibrations are likely to occur during excavation to lay the foundation as well as from use of heavy equipment. Noise may lead to hearing impairments which will reduce the efficiency of the employees at work and also affect their finances due to treatment and medication. Vibrations, if in excess may lead to adverse effects to human health.	√		√		√		X
Accidents and injuries to workers The movement of materials in the construction site by workers and machine handling during construction may cause accidents and injuries. This has a direct effect	√		√		√		X

on the health of the workers and productivity.							
Solid waste generation Significant amounts of solid waste will be generated during construction phase of the project. This will include construction and domestic waste generated by debris and workers.	√		√		√		X
Effluent generation Discharge of untreated wastewater of construction sites contaminated with silt and mud will not only cause flooding resulting from blockage of drainage but also damage the ecosystem of the downstream water bodies. Wastewater from construction sites can be divided into the following types: Construction site surface runoff; Wastewater from vehicle washing; Wastewater from site toilet, canteen and plant maintenance facilities or Wastewater from boring works.	√		√		√		X
Increased water demand Construction projects utilize significant quantities of water for mixing and casting concrete. Water will also be required for human use including drinking and sanitary needs.	√		√		√		X
Loss of habitat and clearing or damage to vegetation The destruction to the physical environment will shrink wildlife habitats leading to loss of bio-diversity and degrading the aesthetic value of the affected area.	√		√		√		X

Increased traffic This will occur as vehicles bring in deliveries at the site and as workers leave or come to the site. The vehicles use diesel or petrol which after combustion produces fumes. These are potential air polluters affecting the health of workers and neighbors and increasing greenhouse gases that cause global warming.	√				√		X

Key

O– Not significant **X-Low significance** **XX**-Significant

XXX - Highly significant **+- Positive**

Table 20: Impact significance matrix at construction phase

8.4.2 Operation phase

IMPACTS	**SHORT TERM**	**LONG TERM**	**REVERSABLE**	**IRREVERSABLE**	**LOCAL**	**WIDESPREAD**	**SIGNIFICANCE**
Increased pressure on public utilities This can be caused by increased population in the resettlement area		√	√		√		XX

Examples of public utilities include: electricity, gas, power, water and transport etc.							
Increased solid waste generation Substantial amount of solid waste may be accumulated if not segregated and disposed of regularly.		√	√		√		XX
Fire outbreaks Fire risks may arise from both inappropriate structural characteristics and unsound behavioral practices. This includes unsafe electric practices by residents, poor capacity of residents to fight fires once started, limited access to structures by firefighting equipment because of flouting of planning regulations and inadequate awareness of local government leaders of the magnitude of fire risks	√		√		√		X
Increased effluent waste generation This will be originating from Laundry, ablution, toilets etc.		√	√		√		XX
Job opportunities Some people will be employed by the project as management agents, security personnel etc.		√			√	√	+
Increased runoff There is an expected increase of surface water during heavy down pours from rooftops.		√	√		√		X

Table 21: Impact significance matrix at operation phase

Key		
O– Not significant	**X-Low significance**	**XX**-Significant
XXX - Highly significant	**+- Positive**	

8.4.3 Decommissioning phase

IMPACTS	SHORT TERM	LONG TERM	REVERSABLE	IRREVERSABLE	LOCAL	WIDESPREAD	SIGNIFICANCE
Solid waste generation Significant amounts of solid waste will be generated during this phase of the project. This will include solid waste in the form of soil, stones, tiles, timber, metal, glass, plastics and other debris.		√	√		√		XX
Occupational health and safety hazards Demolition works at the site by workers and machine handling may cause accidents with potential to cause injury. This will affect the health of the workers and their potential to work		√	√		√		XX
Creation of employment Several employment opportunities will be created during demolition activities.	√						+
Recovery of recyclable materials Recyclable materials such as timber, building stones, glasses, metal etc. can be reused or recycled where possible.							+
Rehabilitation of site Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to acceptable status. This will include replacement of topsoil and re-vegetation that will lead to improved visual quality of the area.							+
Displacement of residents Residents will be displaced from the site to give room for the decommissioning process		√	√		√		XX
Noise and excessive vibrations pollution	√		√				XX

The demolition works will lead to noise and vibrations within the project site and the surrounding areas that may affect the public negatively							
Air pollution During decommissioning phase dust will be expected from demolition activities and movement of vehicles. If generated in large quantities dust may present a respiratory hazard and also cause visual intrusion hence presenting accident risks. Dust is also a mechanical irritant to the eye. The health impacts as a result of the air quality will reduce the workers' productivity on the site and also have financial impacts in case they require treatment and medication.	√		√				XX

Table 22: Impact significance matrix at decommissioning phase

Weightings of significance in the table above range from 0-3 (denoted by number of X) whereby "0" represents no significance; "X" represents low significance; "XX" means there will be significant effect and "XXX" represent high environmental significance.

Key

O– Not significant **X-Low significance** **XX**-Significant

CHAPTER NINE
9. ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP)

9.1 Introduction

The purpose of this Construction Environmental and Social Management Plan (ESMP) is to provide a consolidated summary of all the Environmental and Social (E&S) commitments relevant for the construction phase of the housing project. The measures focus on environmental (such as air emissions, biodiversity and environmental contamination) and social aspects (such as the protection of human rights, communication with local stakeholders, safety of workers and communities). This ESMP also gives an overview about the E&S Management System that is being implemented to ensure systematic and effective execution of these commitments, including roles and responsibilities between the PIA/Implementation Consultant and the Contractor.

The ESMP can be updated as the Project proceeds through detailed design and construction to reflect the results of discussions with stakeholders and to include details of any other E&S developments. This ESMP section outlines a vital output which constitutes the final output of the environmental impact assessment exercise. The ESMP extended herein outlines the: -

- safety considerations
- Health and environmental risks associated with the project
- Detailed mitigation measures
- Estimated financial costs
- Persons responsible for implementation and monitoring.

9.1.1 Roles and Responsibilities

9.1.1.1 Project Implementing Agency (PIA)

The PIA/Implementation Consultant shall have the overall responsibility for environmental and social management during the construction phase of the Project. This includes the following responsibilities:

- Ensuring compliance with all relevant national legislation, as well as with the environmental controls and mitigation measures contained in this ESMP.
- Ensure that the design and planning is in compliance with national requirements and aligned with international best practice.
- Monitoring the performance of contractors and sub-contractors providing workforce supplies and services.

- Acting as point of contact for consultation and feedback to stakeholders and the public (stakeholder engagement).
- Training of construction workers to raise awareness in the fields of E&S topics and in general implementation of this ESMP.

9.1.1.2 Contractors

The Contractor is required to fulfil the commitments as set out in this ESMP and also to ensure that its sub-contractors fulfil the ESMP. This includes the following:

- Conduct monitoring and on-site audits to verify implementation of the ESMP and report on findings to the PIA.
- Communicate any environmental issues and incidents to the PIA immediately.
- Support the PIA with the training of the construction workers to raise awareness in the fields of E&S.

9.1.1.3 Other Entities

Counterparts such as NEMA, Lamu County Government of Lamu, County Administration, WRA, Agricultural Authorities, KWS, KFS and the KPLC shall be informed on the ESMP and involved in its implementation. These authorities hold the mandate on environmental health, security, water provision and waste management, the licensing of some of the project activities.

9.1.2 Training

The PIA will provide an Induction Training to all its employees and Contractor personnel working on the Project before early works start. This Induction Training shall be conducted for all new workers, including those that join the construction site later during construction phase. The goal of the training is for PIA employees and Contractor personnel (including sub-contractors) to understand:

- The mitigation measures included in this ESMP and how it will be implemented on site including responsibilities;
- The sensitivities of the area (if any) in which the Project will be constructed and operated;
- Occupational Health and Safety (H&S) rules at the construction site (e.g. personal protective equipment, rules of conduct, first aid);
- The Project's Grievance Mechanism and the basic worker's rights (Core Labour Standards);
- How to deal with enquiries/ questions/ grievances by the public/ local stakeholders;

- Interaction rules with the people living close to the construction site (Code of Conduct) and how to deal with unauthorized visitors to the site;
- How to deal with unforeseen incidents/emergency situations;
- The roles and responsibilities within the PIA, the Contractors, sub-Contractors and workers with respect to environmental and social issues;

The PIA shall keep records of the training sessions. The training shall be repeated as needed during the construction activities.

9.1.3 Stakeholder Engagement and Grievance Mechanism

The PIA will ensure that the local communities are informed at an early stage about the proposed project, timelines, expected impacts and communication channels. The Resettlement Action Plan should provide clear guidelines on this process and it should be adopted at all stages of project implementation. The PIA will also seek for feedback from the communities about the Project. As part of its community liaison process, the PIA will implement a Grievance Mechanism to ensure that all stakeholder comments, suggestions and objections are captured and considered. It will allow the affected community and the workers to express their concerns and any complaints directly to the PIA. Contact details and information on the procedure, including grievance form, will be distributed to the local communities. It is envisaged that in general, grievances will be responded to within 20 working days after receipt.

All comments and complaints will be investigated by the PIA and appropriate action taken as necessary. Records of all complaints and actions will be maintained on site.

9.1.4 Project Planning and Design

The Project should be planned and designed by the PIA with the following considerations as guidelines:

- Avoid forests, protected areas or ecologically sensitive areas.
- Avoid culturally sensitive areas (e.g. places of worship, holy trees, and cemeteries).
- The design of the Project should:
    - ❖ Ensure that routine maintenance and operations can be implemented by the community/beneficiaries.
    - ❖ Apply low-maintenance solutions in the design of buildings, e.g. based on other buildings of the same type in the region.
    - ❖ Account for proper ventilation and adequate resistance to severe weather or natural disasters.
    - ❖ If feasible, develop a maintenance plan with the beneficiaries of the building.

- Plan the Project to make use of local resources to avoid construction traffic and associated impacts to the communities.
- Plan the Project so as to minimize use of natural resources (material, water, land).
- Plan the Project in a climate-friendly way so as to minimize its carbon footprint and tap into the mitigation potential of the building and construction industry.
- Engage with the persons living in the area around the Project site (including neighbours, local decision makers) early in the planning process and throughout construction activities to inform them about the planned construction and also seek for their feedback around potential sensitivities (protected areas, places of worship, holy trees etc.). Site visits and discussions with the local population should be conducted throughout the design and planning phase. A grievance redress mechanism will be designed and established for workers and the public during the planning phase already.
- Hire both unskilled and skilled workers, if available, from the local communities to encourage social growth and development in the region.
- Conduct Induction Training for workers as outlined in this ESMP before start of construction.
- Establish core E&S procedures already at the planning stage. This includes:
    - ❖ Incident Reporting (fatal accidents, medical treatment cases; first aid cases; restricted work injuries; near misses; environmental events)
    - ❖ Grievance Redress Mechanism (one combined mechanism for workers and community
    - ❖ Recruitment Procedure for the upcoming construction phase.
    - ❖ Training Procedures/ Training material as outlined above (Occupational H&S; Community H&S; environmental sensitivities)
    - ❖ Work site/ construction site risk assessment and corresponding Construction H&S Plan

9.2 Construction phase

This table outlines the impacts, mitigations measures, allocation of responsibilities and cost pertaining to prevention, minimization and monitoring all potential impacts associated with the construction phase of the project.

Table 23: ESMP construction phase

Environmental/social impact	Proposed mitigation measures	Persons Responsible	Monitoring/ Indicator	Cost (Ksh)
▪ Dust pollution (Generated during excavation, vehicle movement and uncovered trucks delivering sand and site clearance)	▪ Workers to be provided with adequate personal protective equipment like dust masks and goggles ▪ Trucks transporting materials should be covered to prevent dust pollution ▪ Sprinkle dusty areas with water in order to keep dust level low ▪ Install dust trappers around the site ▪ All personnel working on the project will be trained prior to starting construction on methods of minimizing air pollution during construction. ▪ Control speed and operation of construction vehicles	Contractor	▪ Air quality monitoring ▪ Workers wearing protective clothing and earmuffs ▪ Lack of complaints	100,000
Air emissions (Generated from vehicles and fuel machines on site)	▪ Decreasing the number of trips carried out by the vehicles by delivering materials in bulk to minimize air pollution ▪ Vehicles used during construction phase should be kept in good working condition to prevent them from emitting excessive emissions	Contractor	▪ Vehicle/Machine working state/condition	To be merged in construction operations

Noise Pollution (Caused by movement of vehicles, construction equipment and loading and offloading of materials)	▪ Construction works and material delivery to be done only during the day(8am-5pm) ▪ Machinery that makes excessive noise should fixed with silencers. ▪ Locating noisy activities away from sensitive neighbors like school, restaurant, working offices etc. ▪ workers to be provided with adequate personal protective equipment like ear muffs ▪ construction machines should be well maintained and regularly serviced ▪ Machinery, vehicles and instruments that emit high levels of noise will be used on a phased basis to reduce the overall impact. These equipment's such as drills, excavators and cement mixers will be used when the least number of residents are expected to be affected, for example during periods where most residents are at work or school.	Contractor PIA	▪ Noise levels ▪ Lack of complaints	70, 000
Traffic Management	▪ Proper signage put in place to notify neighbor of activity and presence of heavy vehicles and to direct traffic ▪ Assign traffic marshals to ensure strict adherence to traffic rules	Contractor PIA	▪ Monitoring number of traffics incidences	30,000

	▪ Erect speed control measures at sensitive spots such as speed bumps.		▪ Presence of site Notice Board	
Soil Erosion, soil compaction and clearing of vegetation	▪ Minimize clearing of unnecessary areas at the construction site and protect such areas during construction by temporary fencing off ▪ Controlled access for heavy machinery and designate storage areas. ▪ Revegetation and landscaping upon completion ▪ Provide drainage channels to natural drains and rivers/streams to minimize erosion ▪ Control earthworks to prevent compaction of loose soils that may hinder water and air penetration ▪ There should be designated path ways and drive ways for movement within the compound to avoid unnecessary compaction	Contractor PIA Site engineer	▪ Ratio of area cleared against designated area to be cleared ▪ Percentage of landscaped areas	40,000
High energy demand (Construction activities will use machines that require fossil fuel inputs such as diesel and petrol and generators whose application will	▪ Create awareness among workers on the importance of conservation of energy resources ▪ Employ technologies that demand less energy consumption ▪ The project proponent and contractor shall ensure responsible electricity use at the	Contractor PIA	▪ Machines' conditions ▪ Fuel consumption	40,000

increase the demand for energy)	construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. ▪ Proper planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the proponent shall monitor energy use during construction and set targets for reduction of energy use ▪ Switch off engines when not in use. ▪ Use well serviced construction machinery that are fuel efficient ▪ Maximize the use of natural lighting by limiting construction works to daytime.			
Solid waste (Solid waste in the form of soil, stones, timber, metal, glass, plastics and other debris)	▪ Reuse or recycle construction materials where possible to reduce amount of waste e.g., building stones, timber etc. ▪ waste generated be collected by a NEMA approved solid waste handler ▪ Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time ▪ The site should have waste receptacle with bulk storage facility at convenient points to prevent littering	Contractor PIA	▪ Amount of waste on site, handling and disposal ▪ Presence of well-maintained receptacle and central collection point	100,000

Large amount of water consumption (Mixing and casting concrete, dust area sprinkling, human use e.g., drinking and sanitary use)	▪ Ensure water conservation in all activities ▪ Water be recycled without compromising on quality and health ▪ Ensure good use of water resources during construction by installing taps on all outlets ▪ Put in place sound water storage reservoirs that are leak proof. ▪ Instill water use discipline among employees. ▪ Sea water can be used for activities that do not require fresh water and are not likely to cause pollution.	Contractor PIA	▪ Presence of a water meter and automatic water taps ▪ Amount of water used	To be prioritized in construction operations
Occupation Health and safety	▪ Designate adequate first aiders to respond accident and incidence ▪ Provision of adequate PPE (safety shoes, gloves, helmets) ▪ Give employees correct tools and equipment for the assigned job ▪ A well-stocked first aid kits to be maintained by qualified personnel ▪ The site shall be fenced off and provided with security at the access gates to reduce potential accidents and injuries to the public ▪ Buildings under construction should be covered with dust and debris arrestors during construction.	Contractor	▪ PPE compliance ▪ Number of accidents and incidences recorded ▪ Presence of a well- stocked first Aid kit Box ▪ Presence of security guards on the site	80,000

	▪ Moving parts of machines should be guarded to protect workers from injury. ▪ The contractor shall conform to all the stipulations of the Occupational Health Safety Act, 2007. The Act requires the designation of a Health and Safety representative when more than 20 employees are deployed		▪ Presence of a register on the site	
Fire Prevention	▪ Provide necessary fire prevention equipment on site in line with applicable regulations.	Contractor		
Labour Rights	▪ Ensure that workers have access to and are aware about the Grievance Mechanism ▪ Ensure legal labour standards as per the Kenyan constitution and the ILO regulations (child/forced labour, no discrimination, working hours, recommended wages) are met ▪ Provide housing conditions in accordance with all applicable health and safety regulations and norms by ensuring the provision of adequate space, supply of water, adequate sewage and garbage disposal system, appropriate protection against heat, cold, damp, noise, fire and disease-carrying animals, adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural	PIA	▪ Grievance Mechanism in place and grievances recorded ▪ Provide hygienic, adequate facilities for workers, ensuring toilets and changing rooms are separated to male and	

	and artificial lighting, and in some cases basic medical services. ▪ Ensure the workforce has access to primary healthcare on site, providing prescriptions. ▪		female employees	
Environmental contamination/ spills	▪ Collect and segregate wastes and ensure safe storage and in line with legal requirements. ▪ Ensure disposal through waste contractors licensed for treatment/removal/recycling of each of the waste types. ▪ Ensure appropriate and safe storage of contaminants such as fuels, construction materials and wastes. Provide absorbent and intervention materials in sufficient quantities and at relevant locations for intervention in case of leakages/spills. ▪ Implement appropriate secondary containment and spill controls for maintenance or refueling works. ▪ Ensure appropriate containment and disposal of construction wastewater, including sanitary water. ▪ Ensure immediate cleaning of any spills and remediation of contaminated areas after construction.	Contractor PIA	▪ Waste collection areas existent, waste inventories ▪ Water disposal compliant with legal requirements ▪ Safe storage of hazardous materials, Spill remediation equipment in place. ▪ Containment and spill controls in place ▪ Workers trained	

Site Clearance- Vegetation removal and habitat disturbance	▪ Limit vegetation clearing to areas within the site boundary where it is absolutely necessary. ▪ Avoid clearing mature trees. ▪ Avoid off-road vehicle traffic. Use existing roads. ▪ Ensure revegetation of cleared areas where possible after construction using native species.			

9.3 Operation phase

Table 24: ESMP Operation phase.

Environmental/social impact	Proposed mitigation measures	Persons Responsible	Monitoring/Indicator	Cost (Ksh)
Solid waste generation and management (Generated from domestic waste)	▪ Waste generated should be collected by a NEMA approved waste handler and disposed at a County and NEMA approved site. ▪ The site should have waste receptacle with bulk storage facility at convenient points to prevent littering during occupation ▪ Dust bins be provided at household level and well protected from adverse weather and animals ▪ Use 3Rs-Reduce, Reuse, Recycle	Proponent Management	Amount of waste on site. Presence of NEMA registered waste management company Presence of well-maintained waste handling bins and waste receptacle	100,000
Liquid waste generation and management (Generated from laundry, ablution, toilets etc.)	▪ Provide enough and suitable washrooms and install a water tank at the washrooms with enough water supply ▪ Installation of septic tank/soak pit system to manage waste water ▪ Regular inspection and maintenance of household sewer system ▪ Connection to a sewer line or septic tank where available	Contractor Management nt	Presence of an approved sewer line and or septic tank Frequency of reported sewage system blockage/damages	80,000
Insecurity	▪ Restrict of secondary business	Proponent	Number of insecurity	80,000

	▪ Ensure secure perimeter wall where applicable ▪ Provide a single entry that is manned 24 hours ▪ Adequate security lighting at strategic points	Management	incidences reported Presence of day and night security guards	
Storm water impacts	▪ Provide roof gutters to harvest rain water and direct storage tanks ▪ Construct drains to standard specifications ▪ Develop a storm water drainage system and linkage to natural drains	Proponent Contractor	Absence of flooding and dampness in the building	Part of/covered in the project cost
Increased social conflict	▪ Encourage formation of community policing and formation of neighborhood associations ▪ Increased economic activities-employment generations and income earnings	Proponent Management Neighborhood Associations		
Fire preparedness	▪ Educate residents on how to handle/use fire-fighting equipment in case of fire emergency ▪ Ensure all firefighting equipment is regularly maintained, serviced and inspected ▪ Fire hazards signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence	Management	Fire signs put up in strategic places Availability of firefighting equipment	50,000

Occupational Health and Safety	▪ Train employees on how to respond accident and incidence occurrence ▪ Install a well-stocked first aid kit maintained by a qualified personnel ▪ Report any incidents of and treat and compensate the affected workers ▪ Provide sufficient and suitable sanitary conveniences which should be kept clean.	Management	Presence of first aid kit content/equipment Washrooms' hygienic condition(gents & ladies separated)	70,000

Increased water demand (This is due to human use e.g. drinking, sanitary use, laundry etc.)	▪ Encourage water to be recycled without compromising on quality and health ▪ Put in place structural provisions for rain water harvesting to supplement huge demand by the settlement. ▪ Create awareness among residents on the importance of conservation of water resources ▪ Put in place sound water storage reservoirs that are leak proof. ▪ Seek a water extraction permit from WRA and if a borehole is needed to supplement the supply demand ▪ Install water-conserving plumbing fixture ▪ Install a discharge water meter in the premises to check on total water usage	Management Contractor	Presence of water meter Water usage Presence of water-conserving plumbing fixture	50,000

Increased energy demand	▪ Erect a meter in the premises to check on total kilo watts used and for billing ▪ Create awareness among residents on the importance of conservation of energy resources. ▪ Use energy saving lighting systems. ▪ Switch off lights that are not in use ▪ Use of natural lights for lighting purposes ▪ Use of natural ventilations from windows and doors and avoid using air conditioner that use electricity	Proponent Management	Presence of KPLC meter Electricity bills Energy usage	50,000
Washrooms	▪ Provide sufficient and suitable sanitary conveniences and Install a water tank at the washrooms with enough water supply ▪ washrooms that should be kept clean and that are easy to maintain ▪ Provide water tank with sufficient water supply for the washrooms	Management	Water availability in washrooms Hygienic condition in washrooms	50,000

9.4 Decommissioning phase

This table outlines some basic mitigation measures that will be required to be undertaken once all operational activities of the project have stopped. The impacts, mitigations measures, allocation of responsibilities and cost pertaining to prevention, minimization and monitoring all potential impacts associated with the decommissioning and closure phase of the project.

Table 25: ESMP Decommissioning phase.

Environmental/social impact	**Proposed mitigation measures**	**Persons responsible**	**Monitoring/Indicator**	**Cost (Ksh)**
Noise pollution	▪ Machinery that makes excessive noise should fixed with silencers. ▪ Demolition works to be done only during the day ▪ Workers to be provided with adequate personal protective equipment like ear muffs ▪ Locating noise activities away from sensitive neighbors like school, restaurant, working offices etc.	Contractor Proponent	Noise levels Lack of complaints	50,000
Air pollution	▪ Workers to be provided with adequate personal protective equipment like dust masks ▪ Sprinkle dusty areas with water to keep dust level low	Contractor	Air quality monitoring Workers wearing PPEs	50,000

	▪ Install dust trappers around the site to prevent dust from spreading in the neighborhood. ▪ Trucks removing soil and other solid materials from the site should be covered to prevent material dust into the surrounding areas ▪ Vehicles used should be kept in good working condition and should not be source of excessive fumes			
Solid waste generation (Demolition waste)	▪ Waste generated should be collected by a privately contracted waste collection company. ▪ Excavation waste should be collected reused or backfilled ▪ Debris should be collected by NEMA licensed waste collection company.	Management Contractor	Absence of debris Presence of NEMA approved waste handler	200,0000
Un-disconnected services e.g. Power, water, sewer etc.	▪ Ensure disconnection of all services ▪ Remove all surface and underground cables and wiring	Contractor	Absence of cabling	100,000
Occupation healthy and safety	▪ Provide personal protective equipment to employees to avoid accidents and incidences	Contractor Proponent	Workers on site using protective equipment	80,000

	occurrence(safety shoes, gloves, helmets) ▪ Train workers on personal safety and how to handle equipment and machines available at the site ▪ Fence off the site and enforce proper access control to ensure no unauthorized persons enter the site ▪ Install a well-stocked first aid kit maintained by a qualified personnel ▪ Mark area under demolition with Danger tapes and other signs to control access. ▪ Moving parts of machines should be guarded to protect workers from injury. ▪ The contractor shall conform to all the stipulations of the Occupational Health Safety Act, 2007. The Act requires the designation of a Health and Safety representative when more than 20 employees are deployed		Number of accidents and incidences recorded Presence of a First Aid kit Box Proper and clear signage on the site	

9.5 Environmental Monitoring Program

Environmental monitoring shall be undertaken to:

- To ensure that the recommended mitigation and enhancement measures as embodied in the ESMP conditions are implemented;
- To undertake regular monitoring of specific parameters in compliance with existing environmental quality standards; and
- To determine the effectiveness of the ESMP and make recommendations for any corrective or additional mitigating measures.

9.5.1 Monitoring Plan

A monitoring plan shall be developed based on the mitigation/enhancement measures identified for significant environmental impacts and those that are moderately significant but can have critical effects if not mitigated. The environmental monitoring plan proposed including the key parameters to be monitored is presented in each of the ESMP tables. This covers both the pre-construction/construction and operation stages.

The key parameters to be closely monitored are the following:

- Soil erosion and sedimentation of water bodies during construction
- Changes in water quality during construction
- Air quality and noise impacts during both construction and operation
- Tree planting and re-vegetation of critical areas

Based on the anticipated impacts, the frequency of monitoring will be more constant and rigid during the construction phase. Monitoring during the operation phase will be closely coordinated with the regional office of the NEMA. The baseline information generated during the ESIA will generally serve as the benchmark data.

CHAPTER TEN
10. CONCLUSION AND RECOMMENDATIONS

10.1 Overview

From the foregoing analysis, the social and economic rating for this project is highly positive. Evaluation of alternatives has already shown that options are limited and costly. Already the proponent has sunk a substantial amount of money in the project up to design stage and relocation action planning. We take cognizant that the proponent has undertaken a Bahari Wind farm project ESIA in the same premises and recommend integration of this ESIA with the existing action plans particularly in respect to resettlement and environmental management.

Further delay of the project is denying all stakeholders the anticipated benefits of the investment. On the other hand, redesigning or relocation will lead to loss of time and money that is already tied in the preliminary costs of the project. The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project. The proposed development will have positive insitu and ex-situ impacts on socio-economic dimension of the area, enhance human health and well-being, and promoting integration of communities. The project will further boost the diminishing housing supply in the Lamu County.

During the preparation of this report for the proposed houses construction it is observed and established that most of the negative impacts on the environment are rated low and short term with no significant effect. The positive impacts are highly rated and will benefit all stakeholders and the neighboring communities and Lamu County at large. The project proponents have proposed to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements.

10.2 Conclusion and Recommendations

This study is recommendable and should be approved by NEMA for issuance of an ESIA license subject to annual environmental audits after it has been completed and occupied. This will be in compliance with the Environmental Management and Coordination Act of 1999 and the Environmental Impact Assessment and Audit regulations, 2003. Above all the proponent should carry out Environmental Audit after the project is completed.

The proponent should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report and the statutory requirements.

This ESIA concludes that the project is compatible with the land use and will contribute positively to human well-being. With good management and implementation of the EMP, adverse impacts will be well mitigated and the positive impacts enhanced.

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APPENDICES

1. Copy of NEMA Approval Letter for ESIA TOR
2. Copy Licenses of ESIA Experts
3. Copies of Proposed House Plans
4. Stakeholder Meeting Attendance lists
5. Copy of K.R.A PIN
6. Copy of Certificate of Incorporation
7. Copy of Approved Wind Power PDP
8. Copies of Questionnaires
9. Summary Bill of Quantity for the Proposed House Plans