ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED TWO-STRAND SOLAR POWERED ELECTRIC FENCE IN NAIBUNG'A CONSERVANCY, LAIKIPIA COUNTY

Proponent:

NORTHERN RANGELANDS TRUST,
PRIVATE BAG, ISIOLO

Report Prepared by:

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MA EPM, MSc OSH ***(EIA & EA Lead Expert)***

Project Location (GPS Coordinates): **N $0^0$21' 41.946''; E 037^0 4' 14.796''**.

Certification

Certification by the EIA Lead Expert

I hereby certify that this Environmental Impact Assessment Study report for the proposed Two-Strand Solar Powered Electric Fence project in Naibung'a Community Conservancy in Laikipia County has been compiled wholly by me and that the contents are factual and conform to the guidelines contained in the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2003

Name: James Thiaine

NEMA Reg. No. 0810

Signature:

Date:

Certification by the Proponent

I hereby certify that the contents of this Environmental Impact Assessment Study report are true and therefore confirm that we shall implement the Environmental Management Plan and other EIA recommendations. I further affirm my commitment to best environmental practices and active participation in environmental management.

Name:

Signature:

Date:

Designation:

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Acknowledgement

The Environmental Impact Assessment Lead expert would like to take this opportunity to thank various persons who provided support, information and assistance in preparation of this ESIA study report. The expert is particularly thankful to Paul Sosaito (Naibung'a Community Wildlife Conservancy Manager) Mathew Naiputari (Chairperson Naibung'a Lower Conservancy), Wilson Sintaroi (Chairperson Naibung'a Upper Conservancy), Charles Ngugi (EIA Lead Expert) and Muricha Obadiah (Community Development expert) for the support accorded in the preparation of this study report.

List of Acronyms

CFA	Community Forest Association
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoMMS	Conservancy Management Monitoring System
DOSHS	Directorate of Occupational Safety and Health Services
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMC	Environmental Management and Coordination
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
GPS	Global Positioning System
ILRI	International Livestock Research Institute
kV	Kilovolt
MCA	Member of the County Assembly
MP	Member of Parliament
KWS	Kenya Wildlife Service
NCA	National Construction Authority
NEMA	National Environment Management Authority
NPR	National Police Reservist
NRT	Northern Rangelands Trust
NWS	National Wildlife Strategy
OSHA	Occupational Safety and Health Act
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
ToR	Terms of Reference
WIBA	Work Injury Benefits Act

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Executive Summary

a) **Project Description**

The proposed project involves establishment of a two high strand wire Solar Powered Electric fence in Naibung'a Community Conservancy of a length of 92.68 kilometres. The proposed fence that will constructed around three main human settlements of Kimanjo, Il Polei-Dol Dol and Koija within the Naibung'a Conservancy. The fence around Kimanjo settlement will have a length of 32.8 kilometres while the fence length around Koija settlement will have a length of 18.71 kilometres. The fence around Il Polei-Dol Dol settlement area will have a length of 41.17 kilometres. The two strand electrified fence will have strands at 5.5.ft and 6 ft.

The objective of the proposed project will be to resolve a long standing elephant-human conflict. The proposed fence will exclude elephants, while allowing other smaller fauna and livestock to pass under the same.

b**) Key findings**

The EIA study has established that the proposed project has numerous potential positive impacts including provision of employment opportunities for local people, improved human safety, reduced elephant – human conflict, support to area economic growth and opportunity for tourism growth. The key potential adverse impacts include possible human injuries, generation of solid waste, restriction of elephants and giraffes movements, disturbance of soil integrity and removal of vegetation.

The project negative impacts as well as mitigation measures are summarized in table 1 below.

Table 1. Summary of potential impacts and mitigation measures

Aspect	Potential environmental, socio-economic, health or safety impact	Mitigation Measures
Excavation (earth) works	Soil disturbance, dust generation, soil erosion	• Limit earthworks and substructure works to approved plan • Backfill all dug out areas • Plant trees in open spaces to protect the soil
Removal of vegetation	Soil erosion, negative aesthetic impact, loss of microhabitat	• Maximize on open spaces to minimize on vegetation removal • Protect vegetation from further destruction • Sensitize local community on vegetation conservation • Carry out revegetation/reseeding especially in fenced out areas
Generation of solid wastes	Adverse aesthetic impacts on land; Land and water pollution; health and safety impacts	• Disposal of solid wastes in accordance with Laikipia county waste laws and EMCA waste regulations • Provision of suitable solid waste receptacles • Engagement of a NEMA licensed solid waste collection company • Workers and community sensitization on environmental protection and wastes management • Use of an integrated solid waste management system including prevention, source reduction, recycling and composting • Provide suitable waste holding areas awaiting off-site disposal
Fencing out certain areas from elephant access	Reduction of range for elephants and giraffes	• Ensure that key habitats are not fenced in including migration corridors, water points and breeding areas
Restriction of access to water resources by elephants and giraffes	Intensification of human-wildlife conflict	• Ensure that key water sources for wildlife are not fenced in. • Consider alternative water points for elephants and giraffes if any current watering point must be fenced in
Leaving out some settlements unfenced	Intensification of conflict in areas left out	• Consider fencing in all settled areas or re-plan the conservancy so that human settlements are concentrated in few larger areas • Develop a Resettlement Action Plan if any resettlement has to be done
Injuries to people and livestock from electric shock	Intensification of conflict between people and wildlife; damages to the fence	• Sensitize the community on dangers of electric fence • Provide safe gates for human and livestock (camels) access • Have a standby maintenance team
Use of water and energy	Increased demand for water & electricity	• Consider expanding water sources including rainwater harvesting • Undertake water and energy conservation measures

		• Identify opportunities for water reuse and/or recycling • Monitor energy and water consumption with a view to efficient use. • Sensitize local community and workers on energy and water conservation
Generation of noise, dust, gaseous emissions	Adverse health and safety impacts; air pollution; wildlife disturbance	• Carrying out construction and other works only during the day • Adherence with the Building Code, Development approval conditions and EMCA (Noise and Excessive Vibration Pollution Control Regulations and other applicable legislations. • Adequate warnings and cautionary signage • Provision of appropriate personal protective equipment to workers • Use of safe working procedures and adequate supervision • Creation of safety awareness to workers • Optimize on manual labour as opposed to mechanical labour • Comply strictly with the Naibung'a conservancy wildlife safety guidelines
Occupational and public safety hazards	Occupational injuries	• Adhere to provisions of OSHA 2007 and WIBA 2007 • Provide workers with PPE, sensitize workers on use and enforce usage • Ensure site safety signage • Appoint a site safety supervisor • Provide first aid kit and ensure staff are trained on first aid administration • Safety sensitization for workers • All machinery and equipment used to be serviced regularly • Provide fire fighting appliances
Construction works and presence of people in the area	Wildlife disturbance and insecurity	• Ensure that all strangers in the area are documented with the conservancy security office • Adhere to the Naibung'a Conservancy wildlife safety guidelines • Sensitize the workers on wildlife safety regulations • Provide physical security at the site
Presence strangers in the area	HIV and drug abuse	• Sensitize construction workers and the community on HIV prevention. • Develop and implement alcohol and drug abuse policy • Encourage voluntary testing and counselling
Disruption sand harvesting	Loss of revenue to the community	• Provide high road crossings with danglers in areas where sand is harvested.

1.0 Introduction

Naibung'a Conservancy covers approximately 466 km^2 and is situated in Laikipia North, bordering Isiolo and Samburu counties to the North. To the west it is bounded by the Ewaso Nyiro River and to the east by KuriKuri and Makurian group ranches. South of Naibung'a are large privately owned ranches, some of which are fenced to exclude elephants. The ecology of Naibung'a is mostly categorized as a savannah grassland/woodland mosaic, dominated by *Acacia spp*. The area contains extensive hills in the Upper and Central Units and flattens out through the Lower Unit to the Ewaso Nyiro to the west.

The Naibung'a conservation area comprises of three community conservancies namely Naibung'a Upper Community Conservancy, Naibung'a Central Community Conservancy, and Naibung'a Lower Community Conservancy. The three conservancies are independently managed. Each conservancy comprises of three community group ranches as follows: (1) Naibung'a Upper Conservancy – Il Polei Group Ranch, Munishoi Group Ranch, and Morupusi Group Ranch; (2) Naibung'a Central Conservancy – Musul Group Ranch, Kijabe Group Ranch, and Nkiloriti Group Ranch; and (3) Naibung'a Lower Conservancy – Tiamamut Group Ranch, Koija Group Ranch, and Il Motiok Group Ranch.

The people of Naibung'a are predominantly Mukogodo Maasai, with smaller ethnic groupings also recognized and loosely associated with the separate group ranches. Agro-pastoralism remains the main livelihood for the majority of the community, although alternative revenue streams include sand harvesting, small-scale agriculture, micro-businesses and employment through NRT, government, NGO's and other organizations. Tourism also provides employment and community income through a few lodges (Ol Gaboli, Koija Starbeds, Lewaso Cottages, and Lentile Sanctuary) and there is a desire to increase the tourism capacity in the conservancy. Wildlife conservation is also emerging as key land use form in most areas of Laikipia and Samburu, with the establishment of community and private conservancies.

In an effort to resolve a long standing elephant – human conflict, the Northern Rangelands Trust is supporting the Naibung'a conservancy (which is one of its member conservancies) to construct a two high strand Solar Powered Electric fence around three settlements in the conservancy that will target elephants, while allowing other fauna and livestock to pass underneath.

Under the Environmental Management and Coordination Act 1999, activities in natural conservation areas and those involving endangered wildlife such as elephants must be subjected to Environmental Impact Assessment and a report be submitted to NEMA.

In preparing this EIA Project report, the EIA lead expert has followed the guidelines specified in the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2003 and Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

2.0 Terms of Reference

The Terms of Reference for conducting Environmental and Social Impact Assessment Study of the proposed Naibung'a Solar Powered Electric fence project in Naibung'a Community Conservancy in Laikipia County were prepared, submitted to NEMA and approved.

The objectives of the ESIA study were to -

(a) identify the anticipated environmental impacts of the proposed project and the scale of the impacts;

(b) identify and analyze alternatives to the proposed project;

(c) propose mitigation measures to be taken during and after the implementation of the project; and to

d) develop an environmental management plan with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing the measures

3.0 Methodology

The following methodology was used in conducting the ESIA study of the proposed solar powered electric fence project in Naibung'a Community Wildlife Conservancy.

a) Screening

This entailed the determination of the need for EIA. The proposed Naibung'a solar powered electric fence project in Naibung'a Community Wildlife Conservancy was found to fall under the category of projects that must be subjected to EIA study. This is because the proposed project will be implemented in a conservation (environmentally sensitive) area and the proposed project actions are likely to affect elephants, which is an endangered species.

b) Scoping and Development Term of Reference

Scoping was done for the proposed fence project. This entailed determination of key issues for the ESIA study. A scoping report was developed and terms of reference done. The terms of reference were subsequently submitted to NEMA for review and approval of the ToR obtained.

c) Literature review

Relevant literature including project documents and applicable regulations were reviewed during the preparation of this report. The relevant legislation, reports and journals were reviewed as part of the ESIA study.

d) Baseline study

This involved study and description of the existing characteristics of the baseline environment on which the proposed project is to be implemented. It involved the study of the area bio-geophysical environment and the socio-economic environment.

e) Review and analysis of alternatives

This entailed a review and analysis of the alternatives to the proposed project. This was aimed at determining better ways of avoiding or minimizing environmental impacts while still realizing the project goals. The review of alternatives provided opportunities for environmental enhancement. The alternatives reviewed were alternative fence alignments, designs, fence types, human-wildlife conflict mitigation methods and the "no project" alternative.

f) Impact analysis

This was the main stage and involved a detailed identification, prediction and evaluation of the potential environmental and socio-economic impacts of the proposed project. The impacts of the project were analyzed for the construction, operation and maintenance and the decommissioning phases.

f) Public and Stakeholders Participation

This was done at all main stages of the ESIA right from scoping, analysis of alternatives, environmental baseline survey, impact analysis and even at the preparation of the project EMP. Affected and interested stake holders including the local Naibung'a community, area leaders, local political leaders, the Laikipia County Government, conservation bodies and the Kenya Wildlife Service participated in the ESIA study and gave their views and inputs.

Public participation was done by way of interviews and questionnaires, community and stakeholder meetings and a stakeholder's workshop in Laikipia.

The photograph below shows one of the meetings with key stakeholders during the EIA in Naibung'a conservancy.

Figure 1: Key stakeholders participating in a discussion during EIA process

g) Identification of mitigation measures

This involved participatory identification of mitigation measures to be undertaken for the identified negative impacts at all stages of the project cycle. An EMP was made as a framework for mitigation of impacts and for monitoring environmental performance.

h) Preparation of the ESIA Study report

This report was prepared in accordance with the EIA terms of reference and in line with the guidelines specified in the Environmental (Impact Assessment and Audit) Regulations of 2003 for preparation of EIA study reports.

4.0 Project Objective

The objective of the proposed project will be to resolve a long standing elephant–human conflict in the project area thus improving wildlife and human safety.

5.0 Project Location and Land Ownership

The proposed project will take place in Naibung'a Community Conservancy on land title Nos. Laikipia/Ilndigiri/7 owned by Nkiloriti Group Ranch, Laikipia/Ilndigiri/3 owned by Musul Community, Laikipia/Ilndigiri/13 owned by Koija Group Ranch, Laikipia/Ilndigiri/12 owned by Tiamamut Group Ranch and Laikipia/Ilndigiri/8 owned by Kijabe Group Ranch in Mukogodo, Laikipia North Sub-County of Laikipia County. The proposed project site is at ***GPS Coordinates: N 0° 21' 41.946'' E 037° 4' 14.796''.*** However, the proposed project being a fence, the ***GPS coordinates*** for other sites that the fence will cover include: **N 0° 28' *36'.492''*, E 037° 0' 10.656'', N 0° 31' 53.736'' E 036° 57' 7.926''** and ***N 0° 35' 23.105''***.

The land is owned by the group ranches that comprise the Naibung'a Conservancy, which is the conservation entity. Naibung'a Conservancy (registered as Naibung'a Conservation Limited) is one of the member conservancies of the Northern Rangelands Trust (NRT). NRT is supporting the conservancy in undertaking the proposed project.

The land is held under a communal title for each group ranch, with all members holding a title. Attached to this report are land ownership documents (copies of title deeds).

The diagram below shows the location of Naibung'a conservancy in the context of neighbouring conservation areas of northern Kenya.

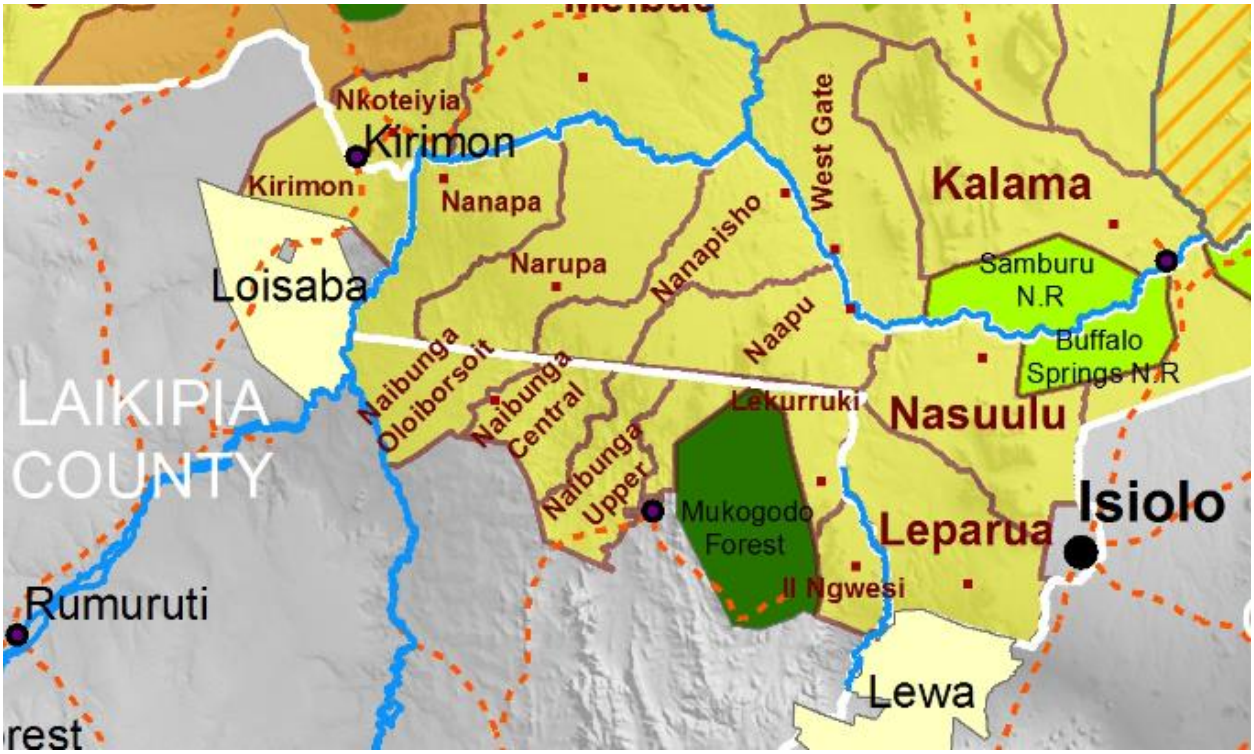

Figure 2. Location of Naibung'a in relation to neighbouring conservation areas

6.0 Baseline Environmental Setting

6.1 Physical Environment

6.1.1. Climate

Laikipia County experiences a cool temperate climate, with mean annual temperatures of between 16°C and 26°C. The county receives an average of 400mm and 750mm rainfall annually. Rainfall is highly variable both spatially and temporally. The seasonal distribution of rainfall is mainly influenced by the Northeasterly and Southeasterly winds and the Inter-Tropical Convergence Zone (ITCZ). The long rains occur between March and May, short rains in between October and November, and the 'Continental rains' in between July and August.

6.1.2 Soil and topography

There are two main soil types in Laikipia County, sandy well-drained red soils (oxisols) and poorly drained black cotton soils (vertisols). The oxisols are found on the eastern part of the County, mainly on the steep slopes and areas of high elevation. Vertisols, are characterized by impeding drainage, high clay content and high levels of calcium carbonate, and are mainly found in the western part of the County. The soil found in the project site is mainly sandy which is well drained. The topography of the proposed project location is mainly plains; however, there are portions that comprise of hills and large rock outcrops.

6.1.4 Biodiversity

The key wildlife species in the conservancy where the project is located are; elephant (*Loxodonta africana*), wild dog, lion *(Panthera leo)*, gerenuk, oryx, buffalo *(Syncerus caffer caffer)*, reticulated giraffe *(Giraffa camelopardalis)* and Grevy's zebra *(Equus grevyi*), Lesser Kudu and Greater Kudu (*Tragelaphus strepsiceros*), cheetah, leopard, jackal, baboons, regular zebra, and over 400 bird species.

With respect to vegetation, the types include trees such as *Acacia spp*, which is the most common tree species in the area; shrubs, herbaceous plants such as wild basil, grass and fleshy plants of the cactus (*Opuntia stricta*) family. Common species include *Boscia coriacea*, *Acalypha indica, Grewia tembensis*, and *Cordia spp*. Others include *Acacia tortilis, Acacia mellifera* and *Cadaba farinosa*. There is also significant presence of invasive *Opuntia spp* in the area.

The photograph below shows some of the vegetation type in the Naibung'a conservancy where the proposed project will be undertaken.

Figure 3: Vegetation at one of the sites in the project area

6.1.5 Water resources

Water sources in Naibung'a conservancy comprise dams, boreholes and rock catchments. Specifically, these sources include Musul dam, Kimanjo dam, sand dams, Ewaso Nyiro River, Munisoi dam, Il Motiok, Il Polei dam, Kusum dam and Dol Dol dam.

6.2 Social Economic Environment

6.2.1 Land Use and economic Activity

Agro-pastoralism remains the main livelihood for the majority of the community, although alternative revenue streams include sand harvesting, small-scale agriculture, micro-businesses and employment through NRT, government, NGO's and other organizations. Tourism also provides some employment and community income through a few lodges (Ol Gaboli, Koija Starbeds, Lewaso Cottages, and Lentile Sanctuary) and there is a desire to increase the tourism capacity in the conservancy. Conservation of wildlife is also emerging as a major form of land use in the area with the establishment of conservancies.

6.2.2. Infrastructure

a) Roads

The area is not well served by a good road network. Access to the area requires good four-wheel drive vehicles through the Nanyuki – Kimanjo road.

b) Sewerage

The area is not serviced with sewerage connection. People mainly use pit latrines as a method of human waste disposal.

c) Energy

The sole source of energy for the Naibung'a community is wood. The proposed project intends to harness solar power for the Naibung'a solar powered electric fence project.

d) Education Institutions

Education institutions found in neighborhood of the proposed project location include primary and secondary schools. These include Kimanjo primary, Sheraton primary, Ngabulo primary, Nkiloriti primary, Naiparere primary, Ewaso primary, Tiamamut primary, Il Motiok primary,Il Polei primary, Kurum primary, Saramba primary, Pisha primary, Kurikuri primary, Dol Dol primary, Kiwanja ya Ndege primary; and Kimanjo Day Secondary school and Ewaso secondary. Others include Dol Dol secondary, Il Polei secondary, Kurum secondary and St. Francis secondary school.

e) Health Facilities

Health Facilities in the neighborhood of the proposed project location include Kimanjo Sub-County Hospital, Naiparere dispensary, Ewaso dispensary, Il Motiok dispensary, Il Polei dispensary, Kurum dispensary and Dol Dol Health Centre.

f) Communication Network Connectivity

Telephone network for Safaricom is fairly strong in the proposed project site.

g) Security

The area is relatively secure with Police patrols that are reinforced by conservancy rangers. Security institutions found in the environs of the proposed project location include Kimanjo Police station, Ewaso police post, Il Polei police station and Dol Dol police station.

6.2.3 Human-wildlife Conflict situation

Human-wildlife conflict, especially elephant-human conflict is significant in Naibung'a Conservancy with cases of elephant attacks on people. In terms of human injury and death, elephants are the greatest danger to the residents of Naibung'a. According to NRT records, in the period October 2009 to September 2019, there were 9 human deaths and 4 human injuries resulting from attacks by elephants in Naibung'a Conservancy (Thomas, 2020). The people with highest risk of attacks by elephant include women collecting water in the evening or early morning, children traveling to and from school in the early morning or evening and people traveling home

from town in the evening or late at night. Reports from the community indicate that the worst human-elephant conflict occurs in the Koija area.

6.2.4 Human settlements

There are three main human/community settlements in the Naibunga'conservancy. These include Kimanjo, Koija and Il Polei-Dol Dol. The proposed solar powered elephant exclusion fence will encircle each of the three human settlements to minimize elephant-human conflicts.

The Naibung'a conservancy has a conservancy management plan (2017-2021) that lays out land use designations for dry and wet season grazing, conservation and settlement across Naibung'a Conservancy. The proposed project is intended to be aligned to the conservancy management plan.

The figure below shows the human settlements in Naibungá Conservancy.

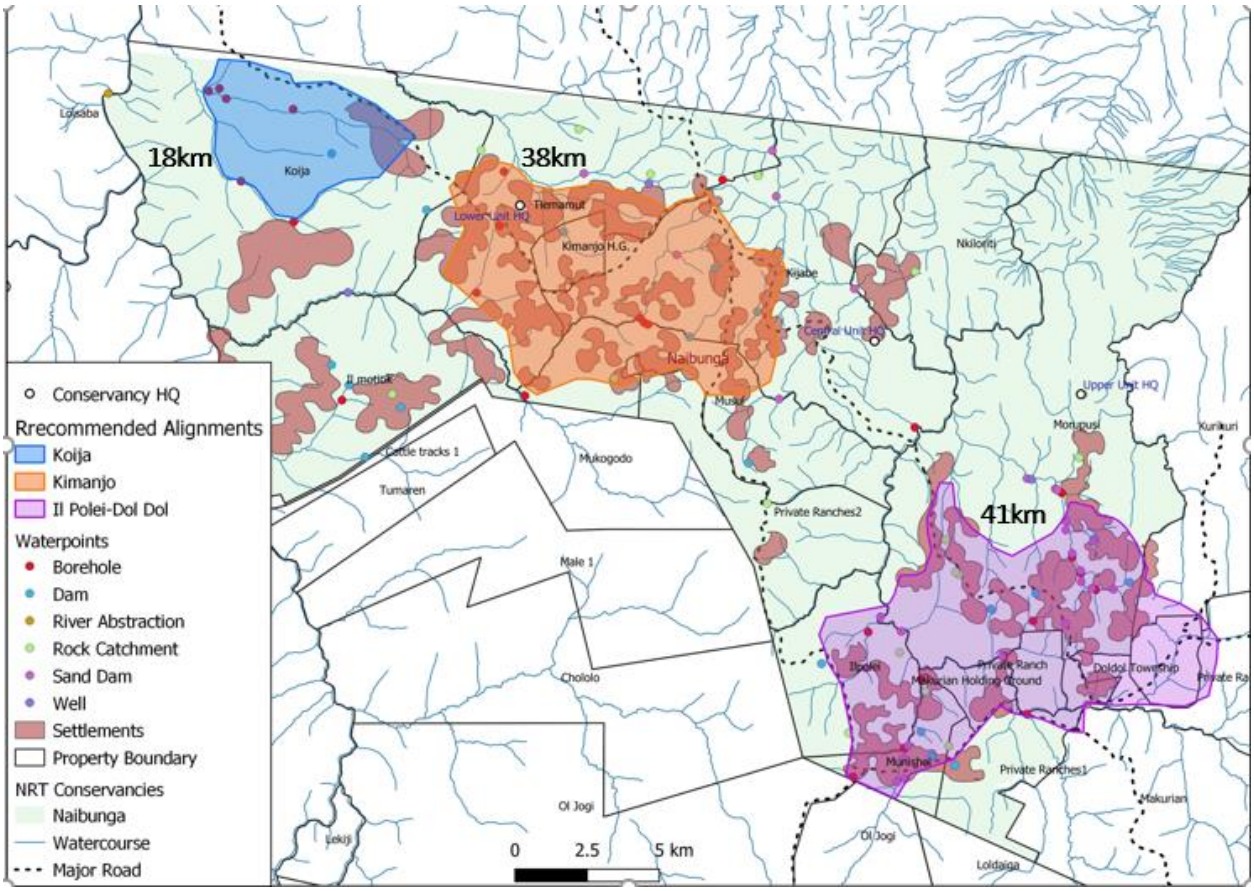

Figure 4. Human settlements in Naibungá Conservancy

7.0 Policy Institutional and Environmental Regulatory Framework

7.1 Policy Framework

7.1.1 The Constitution of Kenya 2010

The Constitution of Kenya (2010) recognizes that communities and private landowners are key stakeholders in wildlife management. Under Article 69 (1) of the Constitution of Kenya, the State shall—

(a) ensure sustainable exploitation, utilisation, 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; and

(h) utilise the environment and natural resources for the benefit of the people of Kenya.

According to 69 (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.

According to Article 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.

Relevance to Project: Proposed project is in line with Article 69 of the Constitution, particularly on encouraging of public participation in the management, protection and conservation of the environment.

7.1.2 National Environment Policy 2013

The National Environmental Policy acknowledges that the survival and socio-economic wellbeing of Kenyans is ultimately intertwined with the environment. Moreover, Kenya's environmental resources contribute directly and indirectly to the local and national economy through revenue generation and wealth creation in such productive sectors as agriculture, fisheries, livestock, water, energy, forestry, trade, tourism and industry. The goal of the National Environmental Policy is better quality of life for present and future generations through sustainable management and use of the environment and natural resources. According to the policy, the right to development will be exercised taking into consideration sustainability, resource efficiency and economic, social and environmental needs. The policy states that environmental resources will be utilised in a manner that does not compromise the quality and value of the resource or decrease the carrying capacity of supporting ecosystems. The national environment policy requires that where benefits will accrue from utilisation of biodiversity, these will be shared in order to promote conservation and sustainable use of biodiversity.

The National Environment Policy states that the government will encourage and support the establishment of private and community based conservation areas in order to win more space for wildlife.

Relevance to project: *Proposed project is in line with the National Environmental Policy as it seeks to provide security for wildlife protection thereby enhancing environmental conservation.*

7.1.3 Revised Draft National Wildlife Conservation and Management Policy (2017)

This draft policy acknowledges that wildlife is a public resource found in public, communal and private land. The policy notes that although Protected Areas (national parks, national reserves and national sanctuaries) set up around representative ecosystems and species has been the cornerstone of Kenya's conservation strategy; due to diminishing wildlife space, sustainable conservation and management of wildlife will require establishment of more sanctuaries and conservation areas on private and community lands. Among other policy statements for Wildlife Conservation and Management on Private and Community Lands, the Government shall support landowners and communities to set aside wildlife conservation areas and sanctuaries within the framework of approved land use plan of the area.

Relevance to project. *The proposed project is in line with the government's commitment to support landowners and communities to set aside wildlife conservation areas within the framework of approved land use plan of the area.*

7.1.4 National Wildlife Strategy 2030

This strategy states that the exponential increases in human population in Kenya and changes in land use, including human settlements, urbanization, large infrastructure projects and agricultural expansion, are edging out wildlife in the critical wildlife dispersal areas. In an effort to transform wildlife conservation in Kenya, the National Wildlife Strategy has identified four core pillars, made up of seven goals, supported by 21 strategies, and 70 priority activities.

The four core pillars include –

- Pillar 1 – Resilient Ecosystems
- Pillar 2 – Engagement by all Kenyans
- Pillar 3 – Evidence based Decision Making
- Pillar 4 – Sustainability and Governance

One the key goals of the strategy is to increase the awareness and appreciation of wildlife by all Kenyans and motivate them to support and take action that enhances their participation in conservation. The NWS 2030 is not just about protecting nature from people–by safeguarding biodiversity and the few remaining wild places - but it is also about increasing linkages between people and the environment, by saving — or even creating — natural spaces.

Relevance to project: *The proposed project is in line with strategic pillars of establishing resilient ecosystems and engagement by Kenyans in wildlife conservation and management.*

7.1.5 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES establishes a worldwide system of controls on international trade in threatened animals and plants and specimens derived from them. It does this by requiring such trade to be authorized and restricted by government-issued permits or certificates.

Under Article II of CITES, Appendix I shall include all species threatened with extinction which are or may be affected by trade. Trade in specimens of these species must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorized in exceptional circumstances.

Appendix II shall include:

(a) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and

(b) other species which must be subject to regulation in order that trade in specimens of certain species refer referred to in sub-paragraph (a) of this paragraph may be brought under effective control.

Appendix III shall include all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the co-operation of other Parties in the control of trade. Under Article II (4), the Parties shall not allow trade in specimens of species included in Appendices I, II and III except in accordance with the provisions of the present Convention.

Relevance to project: *The solar powered electric electrified fence is meant to prevent elephants from accessing human settlement areas.*

7.1.7 Convention on Biological Diversity

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

Under Article 3, States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.
Under Article 8 (f), contracting Parties shall rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies.

Relevance to project: *The solar powered electric electrified fence will provide an opportunity to minimize human-elephants conflict, thereby enhancing biodiversity.*

7.2 Institutional Framework

7.2.1 The National Environment Management Authority (NEMA)

This is the government authority charged with the general supervision and coordination of all environmental matters in the Kenya. NEMA is the principal instrument of the government in the

implementation of all policies relating to the environment. The authority is a creature of the Environmental Management and Coordination Act (EMCA) that came into effect on January 14, year 2000. Among others, the functions of NEMA are to:

a) Coordinate various environmental management activities undertaken by lead agencies;

b) Promote the integration of environmental considerations into development actions with a view to ensuring proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of quality of life;

c) Advise the government on legislative and other measures for the management of the environment or the implementation of various international conventions, treaties and agreements in the field of environment;

d) Identify development actions for which environmental audit and monitoring must be conducted under the Act;

e) Cooperate with relevant lead agencies on environmental education and enhancement of public awareness on environmental protection.

Under EMCA, NEMA may delegate any of its powers on the performance of any of its functions to County Environment Committees; NEMA officers; and its employees or agents.

Relevance to project: *NEMA is the EIA licensing authority for proposed development project.*

7.2.2 The National Construction Authority (NCA)

This Authority was created by the National Construction Authority Act of 2011. The functions of the NCA as specified in section 5 (2) of the Act are to:

- promote and stimulate development, improvement and expansion of the construction industry;
- undertake or commission research into any matter relating to construction industry;
- prescribe the qualifications or other attributes required for registration as a contractor under this Act;
- assist in the exportation of construction services connected to the construction industry;
- provide consultancy and advisory services with respect to the construction industry;
- promote and ensure quality assurance in the construction industry;

- encourage the standardization and improvement of construction techniques and materials;
- initiate and maintain a construction information system;

Relevance to project: *The project and the contractor are supposed to be licenced with NCA before construction begins.*

7.2.3 Laikipia County Government

This is the special jurisdiction under which the proposed project lies. All efforts must be made to abide by all the laws, and other legislation regulating the construction of the proposed project.

Relevance to project: *The Laikipia County Government has the mandate to approve development plans and control development in the county. The proposed project will have to adhere to the Laikipia County laws.*

7.2.4 The Directorate of Occupational Safety and Health Services (DOSHS)

This is department under the Ministry of Labour and Social Services tasked with enforcement of the occupational safety and health.

Relevance to project: *Developer and contractor will need to abide by DOSHS requirements including registration of the construction site with DOSHS.*

7.2.5 The Kenya Wildlife Service

According to the Wildlife Conservation and Management Act, 2013, the functions of the Service shall be to –

(a) conserve and manage national parks, wildlife conservation areas, and sanctuaries under its jurisdiction;

(b) provide security for wildlife and visitors in national parks, wildlife conservation areas and sanctuaries;

(c) set up a county wildlife conservation committee in respect of each county;

(d) promote or undertake commercial and other activities for the purpose of achieving sustainable wildlife conservation;

(e) collect revenue and charges due to the national government from wildlife and, as appropriate, develop mechanisms for benefit sharing with communities living in wildlife areas;

(f) develop mechanisms for benefit sharing with communities living in wildlife areas;

(g) advise the Cabinet Department on matters pertaining to wildlife policy, strategy and legislation.

(h) coordinate the preparation and implementation of ecosystem plans;

(i) prepare and implement national park management plans;

(j) assist and advise in the preparation of management plans for community and private wildlife conservancies and sanctuaries;

(k) undertake and conduct enforcement activities such as anti- poaching operations, wildlife protection, intelligence gathering, investigations and other enforcement activities for the effective carrying out of the provisions of this Act;

(I) conduct and co-ordinate, all research activities in the field of wildlife conservation and management and ensure application of research findings in conservation planning, implementation and decision-making;

(m) advise the National Land Commission, the Cabinet Secretary and the Council on the establishment of national parks, wildlife conservancies and sanctuaries;

(n) promote and undertake extension service programmes intended to enhance wildlife conservation, education and training;

(o) identify user rights and advise the Cabinet Secretary thereon;

(p) grant permits;

(q) establish forensic laboratories;

(r) monitor the compliance of terms and conditions of licences; and

(s) perform such other functions as the KWS Board may assign the Service or as are incidental or conducive to the exercise by the Service of any or all of the functions provided under this Act.

Relevance to project: *KWS is has the mandate to undertake and conduct enforcement activities such as anti- poaching operations, wildlife protection, intelligence gathering, investigations and other enforcement activities for the effective carrying out of the provisions of this Act. Naibung'a Conservancy should continue to work closely with KWS in the implementation of the project at all project phases.*

7.3 Legislative and Regulatory Framework

7.3.1 The Environmental Management and Coordination (Amendment) Act (EMCA) 2015

The Environmental Management and Coordination (Amendment) Act 2015 is an act of parliament to amend the EMCA 1999 (The Principal Act). EMCA provides for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA

provides every person in Kenya with the right to a clean and healthy environment. The Act defines the role of Environmental Impact Assessment (EIA) as a tool to maintain environmental integrity. Under the Act, projects likely to impact negatively on the environment must be subjected to EIA. Section 58 (1) of the Act states that **"***Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of the project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule to this Act, submit a project report to the Authority [NEMA) in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee***"***.*

Part (2) of section 58 states **"***the proponent of any project specified in the second schedule shall undertake a full environmental impact assessment study report to the Authority prior to being issued with any licence by the Authority; provided that the authority may direct that the proponent forego the submission of the environmental impact assessment report in some cases.*

The second schedule of the Act details the types of projects for which an EIA must be carried out. Category 13 of the Second Schedule has listed the following natural conservation areas as among those that must be subjected to EIA Study.

(a) Establishment of protected areas, buffer zones, and wilderness areas.

(b) Commercial exploitation of natural fauna and flora.

(c) Introduction of alien species of flora and fauna into ecosystems.

(d) Actions likely to affect endangered species of flora and fauna.

(e) Wetlands reclamation and or any projects likely to affect wetlands.

(f) Projects located in indigenous forests including those outside of gazetted forests.

(g) Projects that affect any areas designated as environmentally sensitive areas

Relevance to project: *Application for EIA is required for the proposed establishment of a solar powered electric fence as it falls under natural conservation areas.*

7.3.2 The Environmental Management and Coordination (Waste Management) Regulations, 2006

Under Regulation 4 (1), no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated public receptacle. Under

Regulation 6, a waste generator shall segregate waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as shall be provided by the relevant local authority. Under Regulation 18, every generator of hazardous waste shall ensure that every container or package for storing such waste is labeled in easily legible characters, written in both English and Kiswahili. The label shall contain the following information:

a) The identity of hazardous waste;

b) The name and address of the generator of waste;

c) The net contents;

d) The normal storage stability and methods of storage;

e) The name and percentage of weight of active ingredients or half-life of radioactive material;

f) Warning of or caution statements which may include any of the following as appropriate-

(i) The words **"**WARNING**"** or **"**CAUTION**"**;

(ii) The word **"**POISON**"** (marked indelibly in red on a contrasting background); and
(iii) The words **"**DANGER! KEEP AWAY FROM UNAUTHORIZED PERSONS**"**;
and (iv) a pictogram of skull and crossbones

g) A statement of first aid measures, including the antidote when waste is inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately

Relevance to project: *Project wastes must be managed in accordance with the requirements of waste management regulations.*

7.3.3 The Environmental Management and Coordination (Water Quality) Regulations,

2006

These regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purpose. Under Regulation 4 (1), every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and shall be immaterial whether or not the water resource was polluted before the enactment of these Regulations. Regulation 4 (2) states that no person shall throw or cause to flow into or near a resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. In Regulation (5), all sources of domestic water shall comply with the standards set out in the First schedule to these Regulations. According to Regulation (6), no person shall –

a) Discharge any effluent from sewage treatment works industry or any other point sources without a valid effluent discharge license issued in accordance with the provisions of this Act; and

b) Abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an EIA license issued in accordance with the provisions of this Act.

7.3.4 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations

According to Regulation 3.(1), except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. According to regulation 3 (2), in determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

(a) Time of the day;

(b) Proximity to residential area;

(c) Whether the noise is recurrent, intermittent or constant;

(d) The level and intensity of the noise;

(e) Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,

Under Regulation 4. (1) Except as otherwise provided in these Regulations, no person shall-

(a) Make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment;

(b) Cause to be made excessive vibrations that exceed 0.5 centimeters per second beyond any source, property boundary or 30 metres from any moving source**.**

Relevance to project: *Project must control noise and excessive vibrations at all project phases and comply with the limits specified in the regulations.*

7.3.5 The Physical and Land Use Planning Act, 2019

Under section 57 (1) of this Act, a person shall not carry out development within a county without a development permission granted by the respective county executive committee member.

Relevance to project: *Development permission for the proposed project will need to be obtained from the Laikipia County Government Planning Department.*

7.3.6 The Occupational Safety and Health Act, 2007

Under Section 6 (1), every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. Under section 6 (3), every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed, and on the basis of these results, adopt preventive and protective measures to ensure that under all conditions of their intended use, all chemicals, machinery, equipment, tools, and process under the control of the occupier are safe and without risk to health and comply with the requirements of the safety and health provisions in this Act. Under 6 (4), every occupier shall send a copy of a report of risk assessment carried out under this section to the area occupational safety and health officer. According to Section 6 (6), it is the duty of every occupier to register his workplace unless such workplace is exempted from registration under this Act.

Relevance to project: *Proponent must register the construction site and the solar powered electric fence with the Directorate of Occupational Safety and Health Services. Proponent must also ensure safety and health is maintained at all project phases.*

7.3.7 The Wildlife Conservation and Management Act, 2013

This Act provides for the conservation and protection of wildlife resources in the country.

According to section 39 of the Act, any person or community who own land on which wildlife inhabits may individually or collectively establish a wildlife conservancy or sanctuary in accordance with the provisions of this Act.

Under Section 40 (1) Communities, landowners, groups of landowners and existing representative organizations may establish a community wildlife association and register under the appropriate law or in the case of an individual owner may be registered as a recognized wildlife manager by the County Wildlife Conservation and Compensation Committee. (2) The object and purpose for which an association is established is to facilitate conflict resolution and cooperative management of wildlife within a specified geographic region or sub-region. (4) The Service shall keep an up to date record of all approved associations, wildlife managers and wildlife user activities that the associations and managers are involved in.

According to Section 43 (1), Where the County Wildlife Conservation and Compensation Committee is concerned that the management of a wildlife conservancy or sanctuary is below the standard expected from the management plan or there is a request for assistance from the registered user, the County Wildlife Conservation and Compensation Committee shall work with the registered users with regard to discussing and monitoring the management situation and making suitable recommendations.

Under section 44 (1), every national park, marine protected area, wildlife conservancy and sanctuary shall be managed in accordance with a management plan that complies with the requirements prescribed by the Fifth Schedule.

(2) In preparing and adopting a management plan, the Service shall consult with the county wildlife conservation committee. In the case of protected areas, the formulation and implementation of management plans shall involve the participation of neighbouring communities.

(3) The Cabinet Secretary shall, by notice in the

Gazette, publish the approved management plans in respect of national parks, marine protected areas, wildlife conservancies and sanctuaries;

(4) No development will be approved in the absence of management plans approved in subsection.

According to section 70, (1) every person has the right to practice wildlife conservation and management as a form of gainful land use. Under subsection (3) the party shall ensure that the wildlife is maintained in a healthy, natural, and secure state: Provided that this practice shall be carried out where the land is suitable for such practice, subject to the terms and conditions of the licence issued by the Cabinet Secretary.

According to section 72, (1) Utilisation and exploitation of wildlife resources by any person whether individual land owner or in a conservation area, and wherever else shall be practiced in a manner that is sustainable and in accordance with regulations made under this Act.

Under section 74 (1) Land owners shall facilitate the ease of movement of wildlife from one area to the other considering their migratory nature that attaches to the resource.

(2) Any benefits accrued as a result of subsection (1) may be shared among relevant parties on a case by case basis, whether county, conservancy or individual land owner.

According to section 79, except as, or to such extent as may be specifically provided in this Act, no person or entity shall undertake any wildlife-use activity otherwise than under and in accordance with the terms and conditions of a licence issued or permit granted under this Act.

Relevance to project: *This EIA is in line with the requirements of Section 26 of the Act*.

8.0 Project Description, Activities and Processes

8.1 Project description

8.1.1 Fence alignment

The proposed project is a two strand solar powered electric fence with a recommended total length of 92.68 kilometres, covering an area of 143.49 square kilometres, or 30.8% of the Naibung'a conservancy. The fence is designed such as to encircle each of the 3 main settlement areas of the Naibung'a conservancy. The fence around Kimanjo settlement will have a length of 32.8 kilometres while the fence length around Koija settlement will have a length of 18.71 kilometres. The fence around Il Polei-Dol Dol settlement area will have a length of 41.17 kilometres

According to the project feasibility plan, the fence will be built in 3 phases as follows -

Phase 1 – Kimanjo fence. This will be the first one as there is a high density of elephants in very close proximity with people in this region. This area also has many human settlements.

Phase 2 – Il Polei-Dol Dol. This is the longest fence and is prioritized as it protects the important municipal areas of Il Polei and Dol Dol where human settlement is very dense.

Phase 3 - Koija. This fence the shortest but will be the last to be built.

The map below shows the areas to be covered by the 3 phases of the proposed solar powered electric fence.

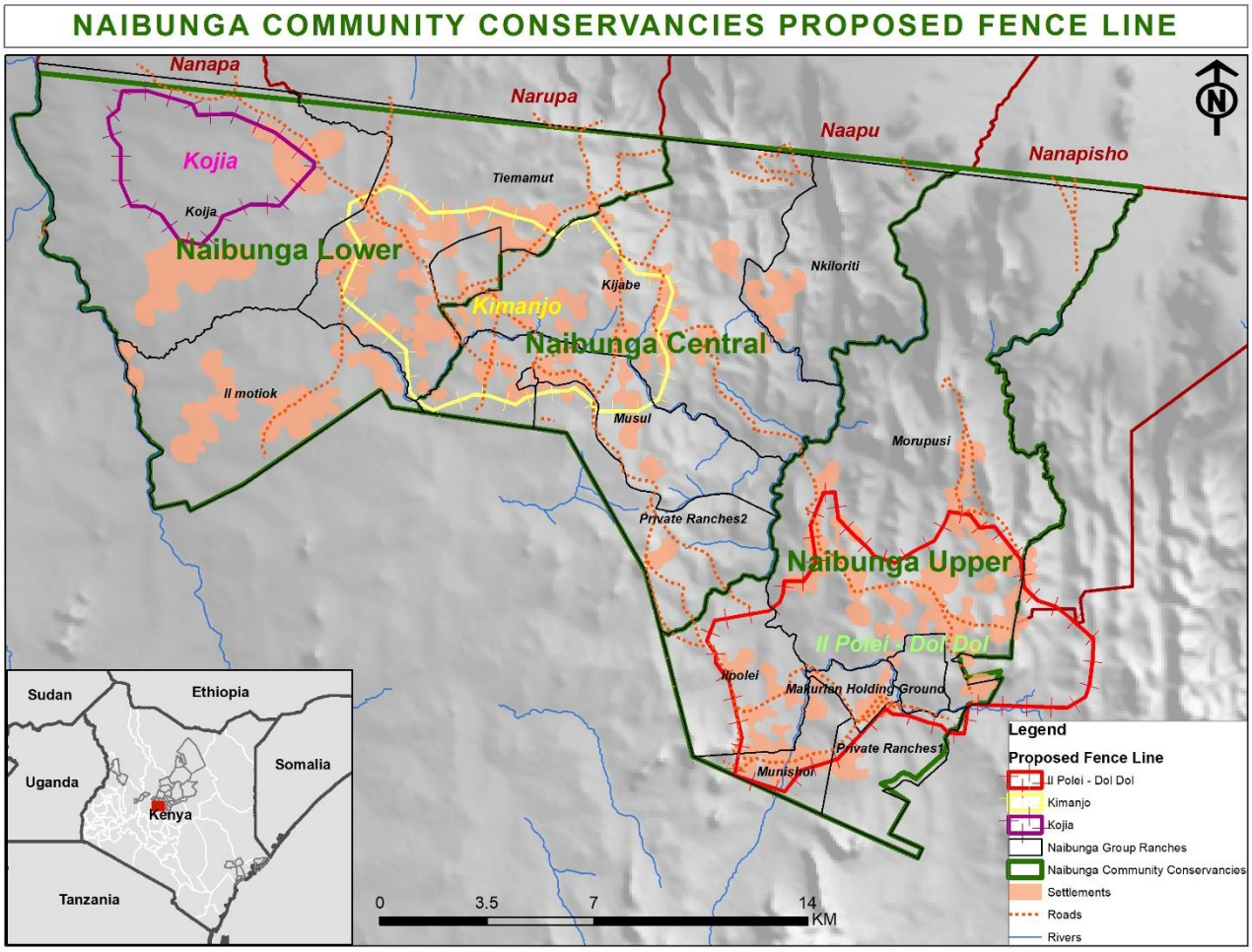

Figure 5. Proposed fence alignments (areas to be fenced)

8.1.2 Fence design

The proposed design involves the following elements -

(a) 2-strand electrified fence with strands at 5.5.ft and 6 ft. This height allows for livestock, people and other wildlife to pass under the fence. The wires will be anchored on well treated blue gum poles (6-7 diameter with length 10 ft).

(b) Outriggers at 4ft length, leaving over 3ft bottom access for small animals. The outriggers will initiate from the top strand and extend horizontally from the bottom strand. These are to prevent elephants from accessing the strands and being able to short or break the fence.

(c) Earth wire buried 1.5m in front of fence posts. This ensures the elephant is standing on the earth wire when they touch the live wires, so that the maximum possible shock is delivered.

(d) Outriggers rigged down the posts. This is critical to prevent elephants from accessing the posts to push the fence over. These may be live wires running down either side of the post

with outriggers extending off them or a series of semi-circular loops mounted to the post by insulators and kept live by a descending live wire, from which outriggers can be rigged.

(e) Power station every ~ 7 km. This is to attempt to maintain a minimum voltage of 7 kV along the entire fence.

(f) Solar panels raised on high posts to mitigate theft.

(g) Power equipment housed in a locked and water-proof container or box to mitigate theft. (viii) At least two gates in each fence, adjacent to main roads, for the passage of camels

(h) Danglers for road crossings on all main roads and smaller roads up to a maximum frequency of one track-crossing per kilometer. This is to allow for sand harvesting trucks to access *luggas*. These will not be required in all sections of fence.

(i) Danglers for *lugga* crossings. This is to prevent elephants from using *luggas* to enter the fenced areas. Other wildlife can pass either side of the *lugga*.

(j) All danglers to have joints/weights. This is used on Ol Jogi and prevents the danglers from tangling and causing maintenance issues.

The fence design diagram is appended to this report.

8.1.3 Proposed maintenance structures

Maintenance has been constantly reiterated as the most critical component of this project for long term success. From stakeholder consultation, the following model appears to be the best suited to this project:

a) Two fence maintainers for every 7km of fence who cover the section daily. This person is selected as the best labourer from the local labourers employed to construct that fence section and is then offered the job of fence maintainer, including training.

b) The fence maintainers report to a fence supervisor who is responsible for one entire circular fence (3 supervisors in total). This person is provided with a motorbike and fuel so they can cover their entire section effectively.

c) The fence supervisor reports to a fencing committee that is created within the Naibung'a Conservancy management structures.

d) Data on fence outages, breakages and maintenance requirements is collected continually, then analyzed and reviewed by stakeholders (Chairmen, KWS, NRT) on a monthly basis. This ensures maintenance issues can be identified and rectified rapidly and all stakeholders are involved, maintaining ownership of the fence.

The other consideration for fence maintenance regards fence-breaking elephant. As the majority of fence breaking incidences will be done by a few elephants, there should be emphasis placed on monitoring and management of these key individual elephant. This should be based on a KWS/conservancy ranger team, with support from relevant NGOs for tracking and monitoring purposes, as needed.

8.2 Activities and Processes

The activities to be undertaken in the project implementation include -

a) Community sensitization about the project

This has been ongoing up to the time of the ESIA study. Consultative meetings have been held with the relevant stakeholders including members of the local community, conservancy leadership, KWS, and other interested and affected parties.

b) **Construction works**

This will entail construction works for the proposed fence and its components as per the design.

c) Maintenance works

There will be a repairs and maintenance component of the fence project including personnel, materials and equipment.

8.3 Inputs, products, by-products and wastes

The table below summarizes the project inputs, products, by-products and wastes.

Table 2. Inputs, products, by-products and wastes

Inputs	Products	By Products	Wastes
Water	Proposed fence and its associated structures	Dust	Left over materials
Cement		Noise	Human wastes
Sand		Vibrations	Construction waste
Metal			Domestic waste
Solar batteries & panels			
Wood (posts)			
Wire			
Fuel			

9.0 Analysis of Project Alternatives

The following project alternatives have been considered in design of the proposed project. The alternatives considered were alternative alignments, alternative fence designs, alternative fence types, alternative conflict mitigation methods and the no-project alternatives.

a) Alternative alignments

Two possible alignments were considered as briefly described below –

(i) Fencing around the six small settlements instead of three main settlements

This option would entail fencing around each of the six settlements in the conservancy including Kimanjo (32.7 km of the fence), Il Polei-Dol Dol (42.3 km), Koija (24.5 km), Il Motiok (14 km), Musul (7.9 km) and Nkiloriti (6km, totaling to 127.4 km and covering a fenced in area of 177 square kilometres or 38 % of the conservancy. The smaller fences around six settlements requested were excluded based on a desire to avoid fencing each centre separately and instead maintain a more landscape scale, conservancywide approach to fencing for settlement planning and elephant exclusion. Additionally, the Il Motiok, Nkiloriti and Musul centres are relatively small compared to Kimanjo, Il Polei and Dol Dol, making them a lower priority given the cost limitations of fencing.

The disadvantage of not fencing around the six small individual settlements is that the lack of a fence for each individual group ranch will likely cause tensions. This is an important consideration and may have to be mitigated through implementing other non-fence based solutions to the human-elephant conflict in areas that are not fenced. This is especially true of Nkiloriti and Il Motiok, although the topography around the Nkiloriti centre makes fencing difficult anyway (Thomas, 2020).

(ii) Fencing around 3 main larger settlements

This is the preferred option and entails fencing around each of the 3 main settlement areas of the Naibung'a conservancy i.e. Kimanjo settlement (32.8 km), Koija (18.71 km) and Il Polei-Dol Dol (41.17 km), totaling to 92.68 kilometres and covering an area of 143.49 square kilometres, or 30.8% of the Naibung'a conservancy. The following are the advantages of this option –

- Financially, it is easier to build and maintain a shorter fence.
- Fencing a less comprehensive area pushes the community to be more considerate with settlement planning.
- For wildlife conservancy status to be maintained, a sufficient area must be left outside the fence for the wildlife.
- Having one fence per unit may build cohesion at the Unit level and ultimately at the conservancy level

(iii) Fencing around Dol Dol Town only

This is also a possible option of mitigation human-wildlife conflict. This option would be cheaper and would secure Dol Dol town and thus spur development of the town. However, this fence would not mitigate human-elephant conflict in the wider conservancy. Moreover, KWS has proposed a shorter multi-strand electric fence around Dol Dol Township and this will address human-wildlife conflict around the town.

b) Alternative Designs

Various designs exist for wildlife exclusion fences. These include multi-strand electrified fence as compared to the proposed two-strand fence. The disadvantage of multi-strand electric fence is that it will exclude livestock, people and non-targeted wildlife, hence interfering with area ecology and livestock grazing. This will trigger more conflicts. A multi-strand fence is also a very expensive option compared to the proposed two-strand that will only exclude elephants and possibly giraffes (though inadvertently).

(c) Alternative fence types

Various fence types are possible for this project. These include woven-wire fence topped with barbed wire, ordinary barbed wire fence, live fence, Jackleg or buck and rail fence and electric fence. An electric fence is the most effective elephant exclusion fence.

d) Alternative human-elephant conflict mitigation methods

Instead of the proposed solar powered elephant exclusion electric fence around community settlements, other ways of mitigating human-elephant conflicts could be considered. Since elephants attack children when going to school, the conservancy or the community could consider investing in school buses. For women who get attacked while fetching water, alternatives could include piped water supply to the community or provision by bowsers. The limitations of these options are cost and that these options do not eliminate the source of conflict.

(e) No Project alternative

This means that the proposed project does not take place and status quo is maintained. The advantage with this option is that no resources would be expended on the project and the adverse environmental impacts would be avoided. However, the opportunity to resolve human – wildlife conflict and enhance wildlife protection/conservation would be lost. Moreover, the environmental and socio-economic benefits anticipated from the proposed project including employment, human safety and tourism growth would be lost.

10.0 Potentially Affected Environment

The following components of the environment will be potentially affected by the proposed project as described below.

a) Vegetation

Vegetation will be affected both positively and negatively by the proposed project. There will be some selective vegetation clearance to pave way for the solar powered electric electrified fence. Around the human settlements where the elephants will be excluded trees that are normally destroyed by elephants such as *Acacia spp* will thrive.

b) Fauna (wild animals)

Wildlife will also be affected positively and negatively by the proposed project. From a positive perspective, the solar powered electric fence will curb retaliatory killing of elephants by people. The solar powered electric fence will also minimize human-wildlife conflict. From a negative perspective, however, the fence will limit the available range for elephants and giraffes.

c) Soil/land

There will be soil disturbance at the construction phase of the project. This will expose soil to agents of denudation. Land will also be recipient of waste from construction workers and can be polluted if the waste is not well managed.

d) Water

Water will be affected by the proposed development through consumptive utilization. Water will definitely be required during the construction, operation and maintenance phase and will be consumed by people.

e) Air

Some activities will affect the quality of air at the construction, operation and maintenance as well as the decommissioning phase of the project cycle. These activities include construction work that will generate dust, trucks delivering material or carting away waste material will generate exhaust

emissions and decommissioning activities that can generate dust. Any open burning of waste or accidental fires will cause pollution of the air.

e) The human (social environment)

The human environment will be affected both positively and negatively. There will be numerous benefits including prevention of human attacks by elephants, more comfortable grazing, opportunity for small scale farming of crops and employment opportunity at construction and maintenance phase. There will also be potential negative occupational safety and health impacts. It is important to note that there is no intended relocation or resettlement of any persons as a result of the project.

11.0 Stakeholders Consultation and Participation

Consultation of the local community and of other stakeholders was done at four levels, namely:

a) At the fence feasibility study phase.
b) Interviews with members of the community and stakeholders using questionnaires and checklists
c) Community participation meetings on human-wildlife conflict mitigation were held at Twala Cultural Manyatta, Murupusi Group Ranch office, Nkiloriti, Kijabe/Musul, Oloiborsoit headquarters, Koija and Tiamamut
d) A joint workshop was held at the Laikipia County Governor's meetings hall with KWS, Laikipia County and national government officials and Naibung'a community. In this joint workshop, both Naibung'a two strand electric fence proposal and the KWS Dol Dol town fencing project were presented to stakeholders, discussed and views and inputs sought.

11.1 Views obtained at feasibility study

During the feasibility study of the proposed project, comprehensive consultation of stakeholders was done by the consultant undertaking the feasibility study. Table 3 below summarizes the feedback, views and inputs of stakeholders consulted at the feasibility study stage.

Table 3. Views and inputs from stakeholders at feasibility study stage

Stakeholder Consulted	Views and inputs
Chairmen of various conservancy units	• Consider fencing around the six community settlements
Scouts	• Water points are a hot-spot of conflict. • Worst human-elephant conflict is in the Lower Unit, in Northern Tiamamut group ranch and Koija ground ranch • Community will support the fence and will be willing to take on the responsibility of maintenance.
Ministry Land, Environment & Natural Resources	• Resettlement may be needed but will have to depend on community support for the project. • Good settlement planning makes for better service provision; reference to the Solio settlement scheme was made as a showcase. • Strong community leadership will be necessary for project success. • Maintenance mechanisms are crucial. • Water provision for wildlife outside the fence needs to be considered
KWS	• KWS has a plan to fence Dol Dol which is at the EIA stage. There are materials for this fence on site in Dol Dol. This KWS project and the proposed project could be amalgamated, based on which project reaches implementation first. • KWS is interested to increase capacity in the region, possibly including new KWS post at the Naibunga Lower Unit HQ. • Education of people regarding behaviour towards wildlife, specifically elephant, can be very effective for mitigating conflict and has been very successful in other regions. • Maintenance is very important. • Water access for elephants outside the fence is very important- concurrent water projects for wildlife outside and people inside is advisable. Otherwise, alignment has to ensure sufficient water outside. This is particularly important at the Tiamamut Dam, north of Kimanjo. Recommend this be left outside and times be arranged for people and livestock to access it when elephant are not there. • EIA must be completed and must involve extensive community consultation
Rhino Ark	• Maintenance is the most important element. The Rhino Ark maintenance model; 1 fence attendant for every 7 km (selected as the best builder every 7 km of construction) reporting to a fence supervisor with a motorbike who covers ~50km. Supervisors report to fence committees. Data is collected on fence functioning and

	maintenance continually with data analysis and review by stakeholders on a monthly basis. • Community engagement and ownership is critical. Drawing labour for construction from local community helps with this. • Up to 80% of fence outages can be caused by people. • At least 8kV required for elephants. • EIA community consultation is not sufficient on its own- continual consultation and dissemination of proposed project is important for success.
Space for Giants	• Short fences with outriggers are most effective against elephant. This design with gates for people and livestock may be preferable. • A few fence-breaking elephants cause the majority of fence breaks, and teach other elephants. • Maintenance must be daily or more. • Energiser needed every 5-10 km to maintain a minimum effective voltage of 7kV. • Community ownership will be key. • Consider using school buses and matatus/rangers for water collection to mitigate conflict instead. • Approximate costs for proposed fence design.
MKT	• Short fence with outriggers and gates may be most effective. Alternatively, consider using a short fence for sections that are not heavily traversed by people and a high fence where people and livestock need to pass. • 3 strands will be needed; LLN (neutral can be buried). • Approximate costings for construction and maintenance
Ol Jogi	• High fence as proposed is a suitable design and is being implemented in some places on Ol Jogi successfully. • • Post protection is needed with outriggers covering the whole post. This can be achieved with live wire rings around the posts or descending live wires with outriggers. • KWS rangers on Ol Jogi could be reposted to Naibunga to aid with human wildlife conflict response. • Weights/joints on danglers for road & lugga crossings will help to avoid tangling and maintenance issues.
Mpala	• Maintenance will be the key issue. • Concern regarding the Daraja, Il Motiok and Waso settlements. • Cost estimates regarding construction and maintenance.
Lewa	• The lower the fence, the better (5-5.5 ft lower strand recommended).

	• Elephants will pass underneath a high fence as they have been seen doing on Lewa. • Buried ground wire 1.5m in front of fence to maximize shock. • Outriggers extending horizontally off the bottom strand. • • Danglers are needed at lugga crossings to make the fence effective. • Cost estimates

11.2 Views from interviews and questionnaires

Table 4 below shows the view and inputs obtained from local community members and stakeholders using questionnaires and interviews.

Table 4. Views and inputs from stakeholder interviews and questionnaires

Identity and contacts	Organisation/Designation	Views/inputs
Daniel Nyausi Lepanyan ID No. 27561932 Tel No. 0723 658 870	Area MCA, County Assembly of Laikipia	• No objection to the project • People will be able to plant some trees since the presence of elephants and other animals that destroy trees will be controlled • Project will make it possible for people to grow crops in the fenced in area. • Project should cover more areas in future and to rotate to some more new areas in the future.
Rose A. Malenya ID No. 8707816 Tel No. 0733 660234	Senior Warden, KWS Laikipia Station	• No objection to the project • Project will create employment, contribute to a peaceful environment and reduction in human-wildlife conflict • Project will restrict movement for people and animals to designated gates only. • Consult the community and agree on positioning of gates to allow ease of access

		• The fence will allow the communities to venture into alternative livelihoods in a peaceful and conflict free environment
Esther Mwamure, ID No. 20585846 Tel No. 0701267293	Deputy County Commissioner, Laikipia East	• No objection to the project • Project will create job opportunities, enhance food security and reduce human-wildlife conflict. • Fence will of course restrict free movement of people • Ensure public participation, restoration of affected soil and proper environmental waste disposal • Wananchi should be sensitized on taking care of the fence to avoid electrocution
H.E John Mwaniki ID No. Tel No. 0722 811103	H.E The Deputy Governor, County Government of Laikipia	• No objection to the project • Project benefits include job creation, reduced human-elephant conflict, improved settlement and reduced spread of *Opuntia spp.* • Have an effective maintenance system of scouts and engineering
Naiptari Matthew ID No. 25278070 Tel No. 0723504961	Chairman, Naibung'a Lower Conservancy	• No objection to the project • Destruction of trees by elephants will reduce due to elephants being kept off the areas • Human-wildlife conflict will drastically fall • Potential negative impacts include possible injuries to people especially children who might play with the wires, and animals like giraffes • Employ personnel to ensure people do not play with the fence to avoid possible death and to protect the fence.

Ian Keshine Francis ID No. 30349619 Tel No. 0704584585	Community member and Board Member, Naibung'a Conservancy Trust	• No objection to the project • Project will create employment for community members • It will keep elephants out of human settlements thus reducing human attacks. • It will contribute to proper settlements (people will not have to been moving due to distraction of their lives by elephant attacks) • Consider the height of the electric wires for human safety • Locals to be considered in the tendering process
Piranto Mosiany ID No. 27561854 Tel No. 0713227238	Manager, Naibung'a Conservancy	• No objection to the project • There will be increased vegetation due to reduced elephant defoliation • There will be reduced deaths and property damage related to elephants conflict
Peter Meshami ID No. 10317393 Tel No. 0726420323	Community member and chairperson, Tiamamut Group Ranch	• No objection to the proposed project • There will be casual employment for the community members • Project will reduce human-wildlife attack • Electric fence should be high for human safety
Solomon Kaporo ID No. 26533641 Tel No. 0723589414	Community member and Chairman, Naibung'a Conservancy	• No objection to the proposed project • There will be safety of the community as well as safety of community property and resources. • Establish a monitoring unit of the fence • Put in place a security report centre • Project will promote peace between the community and wildlife.

George K. Ole Mugie ID No. 6587529 Tel No. 0720227297	Community member and Chairman, Nkiloriti Community Land	• No objection to the proposed project • Human Wildlife conflict will be reduced • Household life will be secured internally • Environmental household will be secured by tree pods for livestock feeding • More water points needed and monitoring scouts for project sustainability
Samson Monto ID No. 11647521 Tel No. 0728488126	Village elder, Kijabe in Naibung'a Conservancy	• No objection to the proposed project • Human-wildlife conflict will be significantly reduced in the conservancy • Separating humans and wildlife will protect settlement areas from destruction by elephants • People will be able to engage in subsistence farming which is currently not happening. • Project will be beneficial to the community and protect wildlife
Noah Marwa ID No. 34432989 Tel No. 0716159802	Manager, Nasaruni Rural Sacco Ltd	• No objection to the proposed project • There will be reduced human-wildlife conflict • There will be prevention of encroachment of wildlife into homesteads • Project is generally good • Proper monitoring measures should be put in place involving the community for ownership
Richard Kapinoi Lesita ID No. 23461121 Tel No. 0758501478	Community member	• No objection to the proposed project • There will be reduction of human-wildlife conflict • Human safety will be improved

		• The community will be able to undertake small scale subsistence farming • Project will improve tourist attraction • Congestion of elephants in enclosed areas will lead to increased destruction within those areas • Consider reducing area coverage of the fence
Richard Kaparo ID No. 25873853 Tel No. 0728582573	Area Chief, Ildigiri Location, Dol Dol	• No objection to the proposed project • Fence will reduce Human-Wildlife Conflict • There will be reduction of property destruction • School children will be able to attend school without fear of elephants • Ensure maintenance of the fence through constant patrol/monitoring • Ensure fence is short to serve purpose (lower abit) • Ensure there is enough water inside the fenced in areas for humans, and outside the fenced area for wildlife • Consider mobility for close monitoring of the fence
Tom Putmoi ID No. 20960138 Tel No. 0724223264	Chairman, Musul Community Land	• No objection to the proposed project • Project will ensure safety and property and resources • Project will reduce human-wildlife conflict and improve area security • Ensure proper fence management and constant monitoring
Lesonkoi Stephen Stanley ID No. 25588251	Chief, Oloiborsoit Location, Dol Dol	• No objection to the proposed project • There will be planned settlement • There will be planned grazing areas • Project will reduce human-wildlife conflict

Completed questionnaires are appended to this report.

11.3 Joint Stakeholders Workshop at Laikipia County Governor's Hall

A joint meeting bringing together KWS, Naibung'a Community Conservancy, Group Ranch Chairmen, Local Leaders, Naibung'a Community members, private farms, National Government officers and NRT was held at Laikipia County Governor's Hall on the 11th of March 2021. The meeting was chaired by His Excellency the Deputy Governor, Laikipia as well as the Laikipia County Commissioner.

KWS presented the Dol Dol township fence project proposal while NRT and Naibung'a conservancy presented the proposed two-strand solar powered fencing project around 3 settlements in Naibung'a Conservancy.

The photographs below shows the joint workshop in Nanyuki.

Figure 6. Joint stakeholders' workshop in Nanyuki on the proposed project

Proceedings of the meeting are appended to this ESIA project report.

12.0 Potential Environmental and Social-economic Impacts

The following were the potential impacts identified from the assessment.

12.1. Impacts during construction phase

12.1.1. Positive Impacts during planning and construction phase

a) Creation of employment

The proposed project will create employment opportunities for local community members and the construction contractor. Short-term employment opportunities have already been created for the project consultants and design team. The local community members will be hired to provide skilled and unskilled labour at the construction phase.

b) Business opportunities

Construction of the proposed fence will provide business opportunities for material suppliers, transporters and food suppliers.

c) Generation of Revenue for the Government

The proposed project will generate revenue to government including the County Government of Laikipia and National Government through levies and taxes.

12.1.2. Negative Impacts during construction phase

a. Solid waste generation

During construction, solid waste including excavated soil, construction material left over, packaging, waste and human waste will be generated. Such wastes if not properly managed can adversely affect the quality of the otherwise sensitive environment. The volume of waste generated will however not be significant.

b) Soil disturbance

During the construction phase, earthworks for fencing posts will have a direct impact on the soil. Construction activities will predispose soil to agents of erosion and affect soil physics. This impact will however be short-term and not significant.

c) Vegetation removal

At construction phase there will be removal of vegetation along the proposed fenceline. Vegetation removal has negative aesthetic impact and destroys the habitat for wildlife. It also exposes soil to water and wind erosion. This impact will however be short-term, small scale and not significant.

d) Noise, dust, gaseous emissions pollution

The construction works, delivery of building materials and instances of idling engines from trucks and the use of construction machinery/equipment will generate noise and dust within the construction site and the surrounding area. Elevated noise levels will potentially disturb the wildlife. These impacts will be short-term and not significant, considering that the plans are to optimize on human labour.

e. Increased Resource Consumption

Various resources will be required for construction including water, fuel and construction inputs.

f. Risk of work accidents and occupational health and safety concerns

There will be occupational health and safety hazards arising from noise, dust, manual materials handling, wildlife, weather extremes and other hazards.

g. Wildlife disturbance and insecurity

Construction works and presence of people in the conservancy will cause disturbance of wildlife. Wildlife disturbance can make them irritable and affect their behavior. Some of the construction workers and strangers could pose a threat to wildlife security. This will however be a short-term impact and confined to the construction phase.

h) HIV and drug abuse

Construction industry typically entails strangers coming to an area as construction workers. Some of the workers may have wayward ways that may lead to HIV cases as well as drug and substance abuse.

12.2. Impacts during Operation and Maintenance phase

12.2.1 Positive impacts at operation and maintenance phase

(a) Mitigation of human-elephant conflict

The proposed solar powered electric fence establishment will exclude elephants from human settlements thus prevent attacks to people and livestock by elephants. This will help mitigate human-elephant conflict and positively contribute to conservation (peaceful co-existence between humans and elephants) as it will enhance human safety and change peoples' perception of elephants. By preventing elephants from accessing settled areas, the project will thus protect the elephants from retaliatory attacks. This will be a significant positive impact.

(b) **Employment opportunities**

The proposed project will create employment opportunities to the local community members who will be hired as fence repair and maintenance personnel.

(c) Opportunity for tourism growth

Reduction of human-elephant conflict will boost elephants conservation. The enhanced wildlife conservation will boost tourism attraction to the Naibung'a Conservancy. This will contribute to national economic growth and development.

d) Regeneration of vegetation

The proposed fence will exclude elephants from areas around human settlements. This will allow trees that are normally damaged by elephants such as Acacia *spp* to thrive. This will enhance habitat for other wildlife and enhance biodiversity conservation. According to Thomas (2020), the main ecological effect of exclusion of megafauna (elephant and giraffe) is significant bush encroachment.

e) Contribution to general area development

Reduction of human-elephant conflicts means that people will be more settled to undertake their economic and developmental activities including schools attendance, small businesses and access to water resources.

f) Support to Agriculture

Exclusion of elephants by the fence will make it possible to grow crops in the area where the elephants will have been excluded. This will help improve food security in the community.

g) Support to peace, human safety and security

Through mitigation of human-wildlife conflict, the proposed fence project will contribute to peace and security in the area since the conflicts are a trigger to insecurity in the wider area.

h) Reduction of the spread of invasive *Opuntia spp*

Elephants feed on the invasive *Opuntia spp* and also propagate its spread. By restricting access by elephants to certain settled areas of the Naibung'a conservancy, the proposed two strand electric fence project will help in mitigating the spread of invasive *Opuntia spp.*

12.2.2. Potential negative impacts during operation and maintenance phase

a) Generation of waste

There will be generation of small quantities of waste from the project at the operation and maintenance phase include obsolete material generated during repair and maintenance of the fence.

b) Occupational health and safety impacts

There will be adverse occupational health and safety impacts at operation and maintenance phases. This will come in form of manual materials handling, exposure to elements of weather, possible attacks from wildlife and contact with electrical energy during repairs and maintenance of the fence.

c) Reduction of range for elephants and giraffes

Although the targeted areas to be fenced in are primarily human/community settlement areas, elephants and giraffes use them as range. Erection of the solar powered fence will thus limit access to the fenced in areas by elephants and giraffes, thus reducing their available range and the resources therein. Some of the fenced in areas could be part of the migratory routes for elephants although clear corridors will be left out. Fencing an area for settlement essentially prevents that area from being utilized in a conservation or tourism capacity. This means fence alignment should consider the current designated conservation areas and ensure space is left outside the fence for development of the area's tourism potential in the future (Thomas, 2020).

d) Injuries to people and livestock from electric shock

There could be injuries to people especially children, as well as livestock (camels) by electric shock arising from the solar powered fence.

e) Change in wildlife behaviour

There could be changes in feeding behavior of livestock and other wildlife in response to the exclusion of elephant within the fenced in areas. However, as the area that will be fenced in is human-dominated and mostly settled, these findings may not be applicable to this project.

f) Restriction of access to water resources by elephants and giraffes

If water resources used by elephants or giraffes are fenced inside the settled areas such that the elephants and giraffes will no longer access them, this will adversely affect the wildlife and exacerbate human-wildlife-livestock conflict. According to the feasibility study report of this project, this is especially critical in a few areas, including the Dol Dol dam and the dam north of Kimanjo, which are heavily utilized by elephant.

g) Intensification of conflict in areas left out

It is possible that if any human settlement such as Il Motiok, Nkiloriti and Musul are left out during the construction of the fence, human-elephant conflict could intensify around these settlements.

h) Impact on sand harvesting

Naibung'a Conservancy and its community relies on sand harvesting as a supplementary source of income. These trucks often use small tracks to access luggas for harvesting and do not always use main roads. This activity could therefore be easily disrupted by a fence. This should be accounted for and high road crossings with danglers should be built with relative frequency in areas where sand is harvested.

12.4 Decommissioning phase

Decommissioning is the permanent withdrawal from a site or close down or a restoration. Potential impacts at decommissioning largely mirror those at the construction phase. In case, decommissioning is to be done, suitable mitigation measures will be undertaken. In addition, environmental restoration of the site will be done. The positive impact of decommissioning will be free ranging of elephants and giraffes, but will result in intensification of human-elephant conflict.

Table 5 below outlines potential negative impacts at decommissioning phase and the possible mitigation measures.

Table 5. Negative impacts at decommissioning phase and mitigation measures

Aspect/Impact	Mitigation measures
Generation of waste	• Ensure wastes are disposed of in accordance with EMCA (Waste Management Regulations • Identify opportunities for recycling and re-use
Occupational safety and health impacts	• Comply with provisions of OSHA 2007 • Provide staff with PPE • Provide first aid facilities • Implement safe working procedures
Loss of employment	• Identify alternative income sources for people dependent on the conservancy
Environmental degradation	• Find out alternative ways to restore the degraded environment

Intensification of human-elephants conflict	• Implement alternative (non-fence) ways of mitigating the human-elephant conflict

12.5 Statement of Impact

The ESIA study has found that there are four potential significant adverse impacts from the proposed establishment of Naibung'a solar powered electric project in Naibung'a community conservancy. These include reduction of range for elephants and giraffes (fencing out conservation), restriction of access to water resources by elephants and giraffes, intensification of conflict in areas left out and injuries to people and livestock (camels) from electric shock.

The identified environmental and social impacts can however, be adequately mitigated by implementing the mitigation measures spelt out in the Environmental Management Plan.

13.0 Impact Mitigation and Environmental Management Plan

This EIA has identified potential negative environmental and socio-economic impacts arising from the proposed development, which make it mandatory to incorporate and undertake mitigation measures at all phases of the project cycle, right from the design stage. The EIA has also identified the need to undertake measures to monitor implementation of mitigation measures throughout the project cycle.

The matrix below specifies the Environmental Management Plan (EMP) for the proposed Solar Powered Electric Fence project in Naibung'a community conservancy. It is worth emphasizing that the mitigation measures specified in the EMP must be undertaken at all phases of the project right from planning and commencement up to the decommissioning phase.

Table 6. Environmental Management Plan

Aspect	Potential environmental, socio-economic, health or safety impact	Mitigation Measures	Project Phase	Responsibility	Cost estimate (KES)	Monitoring and achievement indicators
Excavation (earth) works	Soil disturbance, dust generation, soil erosion	• Limit earthworks and substructure works to approved plan • Backfill all dug out areas • Plant trees in open spaces to protect the soil	Construction, and decommissioning phases	Project proponent, contractor and construction workers	In project budget	• Tree planting done • No evidence of soil erosion
Removal of vegetation	Soil erosion, negative aesthetic impact, loss of microhabitat	• Maximize on open spaces to minimize on vegetation removal • Protect vegetation from further destruction • Sensitize local community on vegetation conservation • Carry out revegetation/reseeding especially in fenced out areas	Construction, operation and maintenance phase and decommissioning phases	Project proponent, contractor and construction workers	Approx 200,000 for reseeding	• Vegetation cover
Generation of solid wastes	Adverse aesthetic impacts on land; Land and water pollution; health and safety impacts	• Disposal of solid wastes in accordance with Laikipia county waste laws and EMCA waste regulations • Provision of suitable solid waste receptacles • Engagement of a NEMA licensed solid waste Collection company • Workers and community sensitization on	Construction, operation, decommissioning phases	Project proponent, building contractor	Approximately 10,000/- per truckload	• Waste receptacles • Waste disposal contracts • Waste tracking records

		environmental protection and wastes management • Use of an integrated solid waste management system including prevention, source reduction, recycling and composting • Provide suitable waste holding areas awaiting off-site disposal				
Fencing out certain areas from elephant access	Reduction of range for elephants and giraffes	• Ensure that key habitats are not fenced in including migration corridors, water points and breeding areas	Planning and construction phase	Conservancy management; Conservation partners	In project budget	• Conflict records
Restriction of access to water resources by elephants and giraffes	Intensification of human-wildlife conflict	• Ensure that key water sources for wildlife are not fenced in. • Consider alternative water points for elephants and giraffes if any current watering point must be fenced in	Planning and construction phase	Conservancy management; Conservation partners	In project budget	• Free access to water by elephants and giraffes
Leaving out some settlements unfenced	Intensification of conflict in areas left out	• Consider fencing in all settled areas or re-plan the conservancy so that human settlements are concentrated in few larger areas • Develop a Resettlement Action Plan if any resettlement has to be done	Planning and construction phase	Conservancy management; County Government of Laikipia, Ministry of Lands	Approx. 100 Million for any resettlement	• All settlements fenced in • RAP report
Injuries to people and livestock from electric shock	Intensification of conflict between people and wildlife; damages to the fence	• Sensitize the community on dangers of electric fence • Provide safe gates for human and livestock (camels) access	Planning, construction, operation and maintenance phases	Conservancy management; building contractor	In maintenance budget	• Incident (injury records) • Community sensitization records

		• Have a standby maintenance team				
Use of water and energy	Increased demand for water & electricity	• Consider expanding water sources including rainwater harvesting • Undertake water and energy conservation measures • Identify opportunities for water reuse and/or recycling • Monitor energy and energy use with a view to efficient use. • Sensitize local community and workers on energy and water conservation	Design, Construction, maintenance/operation and decommissioning phases	Project proponent and building contractor	Approx. 1 Million	Water and energy use records
Generation of noise, dust, gaseous emissions	Adverse health and safety impacts; air pollution; wildlife disturbance	• Carrying out construction and other works only during the day • Adherence with the Building Code, Development approval conditions and EMCA (Noise and Excessive Vibration Pollution Control Regulations and other applicable legislations. • Adequate warnings and cautionary signage • Provision of appropriate personal protective equipment to workers • Use of safe working procedures and adequate supervision • Creation of safety awareness to workers	Construction, operation and decommissioning phases	Project proponent, contractor and workers	In health and safety budget (Approx 100,000)	• No wildlife related incidents • Physical observation' • Health and safety records

		• Optimize on manual labour as opposed to mechanical labour • Comply strictly with conservancy wildlife safety guidelines				
Occupational and public safety hazards	Occupational injuries	• Adhere to provisions of OSHA 2007 and WIBA 2007 • Provide workers with PPE, sensitize workers on use and enforce usage • Site safety signage • Site safety supervisor • Provide first aid kit and ensure staff are trained on first aid administration • Safety sensitization for workers • All machinery and equipment used to be serviced regularly • Provide fire fighting appliances	Construction, Operation and maintenance phase	Project proponent and contractor	In health and safety budget	• Health and safety records
Construction works and presence of people in the area	Wildlife disturbance and insecurity	• Ensure that all strangers in the area are documented with the conservancy security office • Adhere to the Naibung'a Conservancy wildlife safety guidelines • Sensitize the workers on wildlife management regulations	Construction, operation and decommissioning phases	Project proponent; contractor	Security budget (Approx. 20,000 per month	No security incidents

		• Provide physical security at the site				
Presence strangers in the area	HIV and drug abuse	• Sensitize construction workers and the community on HIV prevention. • Develop and implement alcohol and drug abuse policy • Encourage voluntary testing and counselling	Construction, operation and decommissioning phases	Project proponent; contractor	No additional costs for the awareness	HIV prevalence rate
Disruption sand harvesting	Loss of revenue to the community	• Provide high road crossings with danglers in areas where sand is harvested.	Planning (design) and construction phase	Project proponent; contractor	In project budget	Unrestricted access to luggas by sand harvesters
Fence maintenance	Loss of fence benefits	• Have in place a fence maintenance programme with sufficient resources including people for monitoring and technicians for repairs	Operation and maintenance phase	Project proponent;	Maintenance budget	Patrol and maintenance records

14.0 Project Cost

The project budget for construction is Kshs 44,454,375 while the maintenance budget is estimated at Kshs 822,857 per pear. A detailed project budget is available.

15.0 Knowledge Gaps and Uncertainties

The gaps and uncertainties encountered during ESIA study of the proposed two strand solar powered electric fence in Naibung'a Conservancy were -

a) Limited secondary sources of the baseline environment

There was limited literature sources about the baseline environment hence the experts largely relied on the feasibility study report and limited literature sources. This challenge was managed through conducting in-depth baseline study while in the field. However, more data on human-wildlife conflict in the area would have been useful.

b) Transport challenges

The areas is poorly served with roads and accessing some sections of the area was a major challenge. The study team had to be use a four-wheel vehicle.

c) Long-term impacts fencing in the Laikipia Samburu Ecosystem

Due to intensification of conflict, fencing is becoming common in Laikipia and Samburu ecosystem. This obviously has restriction on free movement of wildlife in the wider landscape. However it is being necessitated by increasing human population and shrinking habitat for wildlife to enable co-existence between wildlife and the human population. The long-term impacts of fencing in the ecosystem is an area of study in future. Although the short to medium terms benefits are obvious, the long-term impacts needs further research.

16.0 Conclusions and Recommendations

The EIA established that the key potential benefit of the proposed project is the mitigation of the human-elephant conflict that is rampant in the Naibung'a area. There will be improved human and wildlife safety and security.

The key potential negative impacts include reduction of range for elephants and giraffes (fencing out conservation), restriction of access to water resources by elephants and giraffes, intensification of conflict in areas left out and injuries to people and livestock (camels) from electric shock.

The identified environmental and social impacts can however, be adequately mitigated by implementing the mitigation measures spelt out in the Environmental Management Plan. The EMP must be implemented right from the planning and design stage up to the final stage of the project cycle. The project proponent should comply with the conditions issued by the relevant authorities including NEMA, KWS and the County Government of Laikipia.

17.0 References

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18.0 Appendices

1. Lead Expert Practicing License
2. Copies of Land Title deeds in the group ranches comprising the project
3. Engineering designs for propose fence infrastructure
4. Certificate of Registration of Naibung'a Conservancy
5. Stakeholder consultation questionnaires
6. Proceedings of the stakeholders consultation workshop on the project and workshop programme
7. Maps of Naibung'a and the project areas
8. Naibung'a Conservancy Management Plan (2017-2021)
9. Attendance records for community engagement meetings on the project