ENVIRONMENTAL IMPACT ASSESSMENT PROJECT REPORT

FOR

THE PROPOSED GAME/SECURITY TRENCHES AT OLE NAISHU RANCH, LAIKIPIA COUNTY

GPS COORDINATES: lat 0.130220°long 37.195657°

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SUBMITTED TO: NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY JANUARY 2017

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EXECUTIVE SUMMARY

Introduction

The EIA was commissioned in December 2016 by the management of Ole Naishu (2000) Ltd to assess the negative and positive environmental impacts of the proposed digging of trenches to act as game/security trenches along the eastern boundary of Ole Naishu ranch. As a planning as well as a decision-making tool, this Environmental Impact Assessment (EIA) project report has in a comprehensive manner identified, predicted and evaluated these potential social and environmental impacts.

The EIA did not only concentrate on establishing impacts of the proposed project in the project site but also considered the surrounding environs, and the long-term effects of the proposed activity on environmental and socio-economic conditions of the project area. The EIA is in fulfillment of part VI, section 58 of the Environment Management and Coordination Act (EMCA), 1999, which has clearly stipulated provisions for EIA.

Legal Background

The Environment Management and Co-ordination Act (EMCA), 1999, is the legislation that governs EIA studies in Kenya. The second schedule of the Act lists the projects that are supposed to undergo EIA studies in accordance with section 58 (1-4) of the Act. EMCA 1999 makes it mandatory for any proponent of a project, "to, 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 in the Act, submit a project report to the National Environment Management Authority (NEMA), in the prescribed form, giving the prescribed information, accompanied by the prescribed fee".

EIA Approach and Methodology

The EIA techniques and methodologies applied for this study have been adapted and refined from various methodologies and case studies used for projects elsewhere without losing sight and focus on the unique conditions and settings of the project area. Stakeholders' comments and input in the implementation of the project were sought from community members, the project management and local administration representatives. Environmental and biodiversity data was obtained through environmental site visits, direct observation and review of relevant literature.

Background to Ole Naishu

Ole Naishu is a livestock ranch sitting on 30,000 acres of land in Umande location of Laikipia East sub-county. It borders other notable ranches and conservancies namely Lolldaiga in the west, and Borana in the north east. It also borders Makurian Group Ranch to the north and community settlements to the east and southern parts. The project area is located in the larger Laikipia plateau, an area of rolling low hills, and the variety of rangeland resources suitable for ranching, ecotourism and conservation activities. Livestock production remains the core activity at Ole Naishu. The ranch

currently has about 2,600 heads of cattle and 150 sheep. Ole Naishu ranch management has effectively adopted holistic rangeland management to ensure coexistence of livestock production and wildlife conservation. The ranch is also used as a training ground for BATUK under the Defence Cooperation Agreement between the United Kingdom and Kenya

Project Background and Description

The proposed project will essentially entail digging of a trench along the eastern boundary of the ranch. The trench, which will measure about 4ft x 8ft, will cover about 15 Kilometres along the alignment of the existing electric fence line. There will be minimal vegetation clearance as the ditch will be established along the space created to act as fire break and access road for security patrol. Cut off drains will be developed at strategic intervals to drain excess surface runoff during rains.

The electric fence was constructed to mitigate human wildlife conflicts but has since been rendered ineffective by frequent vandalism by people and wildlife. The trench is thus expected to reinforce the fence by providing an effective barrier that is relatively less prone to sabotage. Its location along the inner section of the boundary is expected to effectively deter wildlife from coming into contact with the electric fence and also livestock from the neighbouring pastoral community from accessing the ranch after breaching the security fence. The use of game/security trenches in other ranches and private farms within Laikipia and protected areas has been found to be effective, especially in control of large mammals. Such facility has been applied in the protection of the Rumuruti Forest; Mt. Kenya Forest Reserve; and in private properties like Laikipia Ranching in Laikipia West and in the Former Ereri Farm in Laikipia East. The main challenge associated with trenches fencing is maintenance especially through soil erosion and undergrowth.

Most importantly the construction of the trench was necessitated by the dire need to address the following concerns which have brought forth adverse socio-economic and environmental costs;

- 1. Extensive trespassing for illegal grazing and logging
- 2. Human wildlife conflicts
- 3. Theft of livestock
- 4. Theft of ranch property and British Army equipment.

The Project is estimated to cost Kshs. 16,924,880.00 which will cover the digging of trenches and costs associated with running the machines. The submission fee amounts to Kshs16, 925, calculated as 0.1% of the total project cost

Analysis of Project Alternatives

Alternatives analysis in EIA is designed to bring environmental, economic and social considerations into the "up-stream" stages of development planning-project identification and earlier-as well as the later stages of site selection, design and implementation. The development of scenarios involved analyzing the current situation,

discerning the relations and links to the environment, influencing factors, existing and potential strengths, opportunity and threats.

In the assessment of the project alternatives, this study considered several scenarios namely: status quo or "no action" scenario;

- Status quo or no action scenario;
- Live barrier fence.
- Use of stone walls
- Rehabilitation of the electric fence

Positive and Negative Impacts of the Proposed Project

An environmental analysis of the proposed project unveiled several likely positive and negative impacts. A standard checklist was used to guide the EIA team in the identification of possible impacts accruing from the proposed project. A Leopold's Matrix generated through subjecting the various project activities to a checklist that listed the impacts in terms of biophysical and human environments was used to complement the checklists. The identified impacts were then subjected to a criterion that was used to determine their characteristics and significance.

The tables below present the potential positive and negative impacts of the proposed project divided into the planning and design, construction and operations phases.

Project Phase	Project	Project Activities	Positive impact
	Components		
Planning and	Environmental	-Consultations with	-Determination of alternative
Design Phase	Impact Assessment	community members and	designs and trench alignment.
		key stakeholders.	-Integration of environmental
		-Determination of high	considerations in project
		priority areas.	implementation and
			management
			-Incorporation of community
			and stakeholders views for
			enhanced planning, re-
			designing
			and implementation
			-Incorporation of legal
			considerations and
			requirements in the project
Construction	Development of	-Excavation of trenches	-Reinforcement to the existing
Phase	trenches for game		electric fence
	control and security		-Cost effectiveness
			-Employment creation to the
			local population
Operations Phase	Commissioning of	Actual use of the	-Alleviation of human-wildlife
	the trenches	trenches to prevent game	conflicts as a result reduced

Anticipated positive impacts

movement	into	the	incidences of crop raids by
community		and	wildlife.
unauthorized	entry	into	-Enhanced security in the area
the ranch			through hindering the use of
			the ranch as a refuge for cattle
			rustlers.
			-Reduced tensions between
			the Ranch and the
			neighbouring communities.
			-Improved physical security in
			the ranches/conservancies
			-Conflict mitigation and
			reduced hostilities the ranch
			and pastoralists
			-Enhanced biodiversity
			conservation due to restricted
			access to unauthorized
			persons e.g. illegal charcoal
			producers and poachers.
			-Improved agricultural
			productivity.
			-Effective fence operations
			due to timely detection of
			deficiencies

Possible negative impacts and the proposed mitigation measures

Project Phase	Project	Project Activities	Negative Impacts	Proposed Mitigation
	Components			Measures
Planning and Design Phase	Environmental Impact Assessment	-Consultations with community members and key stakeholders. -Determination of high priority areas.	-Misunderstandings between stakeholders and possible conflicts with neighbouring communities due to reduced access to the Ranch. -Lack of cooperation and misunderstanding amongst various stakeholders	-Enhanced consultations and stakeholders' scope of coverage during EIA study. -Provide requisite technical and socio-economic facts about the proposed project -Sustain the consultation process through establishing reliable communication mechanisms.
Construction Phase	Development of trenches for game control and security purposes.	-Clearing of the excavation sites. -Excavation of trenches using mechanized means. -Placement of soil from the excavation along the trench alignment.	-De-vegetation -Soil erosion -Alteration of landscape quality.	-Develop the trenches along already cleared areas (i.e. existing firebreak and security patrol access road) -Clear only the necessary areas. -Avoid densely vegetated areas. -Maintain dense vegetation

	-Substandard excavation works	around the area to prevent soil erosion. -Carryout the excavation of trenches during the dry season to prevent soil erosion as a result of storm water/surface runoff. -Ensure use of appropriate machinery and equipment. -Institute a stringent monitoring system is put in place to inform the excavation activities conform to the desired specification and design. -Engage qualified personnel in the project activities.
	Increased soil and debris from the excavation activities	-Use mounds of soil and debris as strategic reinforcement to the trenches. -Ensure the soil is well lined along the trench configuration to prevent unsightly heaps of soil.
	-Possible accidents and injuries to workers during excavation activities.	-Keep a general accident inventory at the site -Provide and enforce use of protective clothing and equipment such as gloves, boots, aprons, ear protection, etc. -Ensure occupational health and safety awareness creation before and continuously on the job -Provide a First Aid Box and have trained first aiders on site. -Provide secure camps where necessary to house workers during the night to avert wildlife attacks.
	-Noise and air pollution	-Ensure use of well serviced machinery and equipment -Noisy machines shall be switched off when they stop onsite. -Limit construction to day time only.

				-Observe the Noise
				Regulations strictly
				-All workers should wear
				dust masks
			-Disruption of natural	-Plan construction time in
			serenity and game	response to movement of
			movement	wildlife within the areas to
				avoid or minimize
				disturbance and conflict
				-Employ humane
				approaches in
				translocation/movement of
				game in accordance to
				relevant wildlife logislation
				where necessary.
				-Ensure the trenches do
				not intenere with the
				natural wildlife dispersal
Quanting	0		Mar I'llian Cara an Cardian	patterns.
Operations	Commissioning of	Actual use of the	Modification of the	-Construct drains to
Flidse	the trenches	dame movement	local fiyulology	the trenches to the natural
		into the community		
		settlements and		-Integrate spillway drains
		unauthorized entry		into the design.
		into the ranch		-Avoid constructing the
				trenches along waterways
				and wetlands.
			Possible emergence	-Ensure regular
			for disease vectors	and spillway drains to
			such as mosquitoes	prevent water stagnation
				-Sensitize neighbouring
				households on disease
				prevention measures e.g.
				use of mosquito nets
				-Undertake other disease
				vector eradication
				measures such as spraying
			Possible	Ensure the transfer de
			-russible	-Elisule tile trenches do
			game movement to	sensitive areas such as
			and from the ranch.	well-known migratory
				routes/corridors.
				-Engage neighbouring
				ranches and relevant
				agencies in monitoring
				possible changes in game
				movement due to the
			-Possible injuries and	-Establish the trench
			accidents to people.	alignment along the inner

		wildlife and livestock through falling into the trenches	section of the Ranch boundary. -Place soil mounds on the side to reduce wildlife coming into close contact with the trench. -Ensure adequate maintenance of the electric fence to deter people and livestock from getting close to the trench. -Strategic placement of warning signs and disclaimer signs along the fence alignment.
Monitoring and Maintenance of the project	-Maintenance activities including removal of soil, debris and vegetation. -Assessment of the project's effectiveness in game/human control.	-Inadequacy of the trenches in game/human control due to insufficient maintenance activities.	 Put in place a performance monitoring system to continuously inform the management on its effectiveness. Assign personnel to periodically monitor the trenches and recommend adjustments/improvements. Ensure adequate resources are available for monitoring and maintenance Engage the local community and other stakeholders in detecting breaches/deficiencies for timely corrective measures.
		-Possible adverse occupational health and safety impacts on workers during maintenance activities.	 Provide and enforce strict use of PPEs. Hire trained personnel for activities requiring skilled labour. Conduct regular training sessions for first aid and other emergency responses. Provide First Aid kits and ERPs.

Conclusion and recommendations

Development of new projects are now preceded by critical analysis and assessment of the proposed activities and operations as required by EMCA through conducting of Environmental Impact Assessment (EIA) to provide indications of the likely environmental consequences of the proposed activity. This EIA study has identified both negative and positive impacts of the proposed project, how it affects people, their property and the general environment.

On the basis of the results of this EIA, it is apparent that with the adoption and implementation of the Environmental Management and Monitoring Plan, the adverse impacts will be adequately mitigated against. In addition, foreseeable potential impacts will be forestalled before they occur thereby considerably limiting future environmental damage and ensuring the existence of a clean and healthy environment. Accordingly, as per Section 58 of EMCA and Part II, 10(2) of Environmental (Impact Assessment and Audit) Regulations, 2003, we recommend that the proposed project be implemented and we recommend that **OLE NAISHU (2000) LIMITED** be issued with an EIA license for the **Proposed Digging of Game/ Security Trenches at Ole Naishu Ranch, Laikipia County.**

DECLARATION

OLE NAISHU RANCH, LAIKIPIA COUNTY

EIA PROJECT REPORT

Firm of Experts

I, <u>Martin Kamau Gitau</u> of NAREDA Consultants Ltd. P.O. Box 1001- 10400, Nanyuki, confirm that we have prepared this Environmental Impact Assessment Project Report for the Proposed Game/security Moats at Ole Naishu Ranch, Laikipia County. I confirm that NAREDA Consultants is a licensed Firm of Experts by the Authority (No. 0005).

Signature:

19/12/2016

19-12-2016

Date:

Proponent Approval

I, Chris Burt, Manager of Ole Naishu Ranch, P. O. Box 39-10400 Nanyuki, confirm that I have read this Environmental Impact Assessment Project Report for the Proposed Game/security Moats at Ole Naishu Ranch, Laikipia County. I accept the findings and recommendations of the report and will strive to fulfill the obligations of the Environmental Management and Monitoring Plan.

Signature:

Date:

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LIST OF ACRONYMS AND ABBREVIATIONS

ADC	Agricultural Development Corporation
BATUK	British Army Training Unit Kenya
CGL	County Government of Laikipia
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMMP	Environmental Management and Monitoring Plan
Ft	Feet
ILO	International Labour Organization
KWS	Kenya Wildlife Service
LCSC	Laikipia County Security Committee
LWF	Laikipia Wildlife Forum
Masl	Meters above Sea level
NAREDA	Natural Resources Management and Development Agency
NCA	National Construction Authority
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NGOs	Non- Governmental Organizations
OSHA	Occupation Safety and Health Act
PPE	Personal Protection Equipment
WHO	World Health Organization

1.0 INTRODUCTION

1.1 Background to Ole Naishu Ranch

Ole Naishu is a livestock ranch sitting on 30,000 acres of land approximately 30km from Nanyuki town. It borders other notable ranches and conservancies namely Lolldaiga in the west and Borana in the north east. It also borders Makurian Group Ranch to the north and community settlements to the east and southern parts. The project area is located in the larger Laikipia plateau, an area of rolling low hills, and the variety of rangeland resources suitable for ranching, ecotourism and conservation activities. Administratively, the project area is located in Umande Location and Umande Ward within Laikipia East Sub-county and Laikipia East constituency respectively. This is within the former Daiga division of the former Laikipia District.

1.2 Background to the assignment

The EIA was commissioned in December 2016 by the management of Ole Naishu (2000) Ltd to assess the negative and positive environmental impacts of the proposed digging of trenches to act as game/security trenches along the eastern boundary of Ole Naishu ranch. As a planning as well as a decision-making tool, this Environmental Impact Assessment (EIA) project report has in a comprehensive manner identified, predicted and evaluated these potential social and environmental impacts. The EIA did not only concentrate on establishing impacts of the proposed project on the project site, but also considered the surrounding environs, and the long-term effects of these activities on environmental and socio-economic conditions of the project area.

A major output of the EIA process and a component of this EIA Report, the Environmental Management and Monitoring Plan, is the benchmark in the implementation of the mitigation measures and monitoring of the environmental performance of the project. This Project Report has been prepared to provide sufficient and relevant information on the proposed project to enable the National Environment Management Authority (NEMA) establish whether the activities of the project are likely to have significant adverse environmental impacts upon which basis the Authority will make decision on issuance of an environmental Impact Assessment (EIA) License.

1.3 Relevant national legislation

A legislative framework has been put in place primarily to assist in the integration of environmental concerns into economic development to foster sustainable development. Policy and legislative framework of direct relevance to this study includes the following:

1.3.1 The Environmental Management and Co-ordination Act, 1999

The Environmental Management and Co-ordination Act, 1999 (EMCA) aims to ensure successful environmental management in Kenya using four main principles:

- The sustainability of the environment and natural resources;
- The precautionary principle (the principle that where there are threats of to the environment, whether serious or irreversible, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation)

- The integration of environmental considerations into development planning and management;
- The encouragement of public participation in any environmental decision-making.

The National Environment Management Authority (NEMA) is the governing body which oversees the application of these principles. EMCA makes provision for an Environmental Impact Assessment (EIA) to be carried out before permission for any development out of character with its surroundings is granted. Audits must be carried out as per the Environmental (Impact Assessment and Audit) Regulations, 2003, developed to support EMCA. The Act requires an Environmental Impact Assessment (EIA) license for any activity or development out of character with its surroundings. The first step in the application for an EIA license is the submission of a Project Report in the required format, detail, and with the prescribed fee.

Schedule 2 of EMCA describes the types of activities or projects that require EIA license and, with respect to this project, include:

- 1. General:
 - (a) An activity out of character with its surrounding;
 - (b) Major changes in land use.
 - (c) Establishment or expansion of recreational areas;
 - (e) Shopping centres and complexes.
- 4. Dams, rivers and water resources including -
 - (a) Storage dams, barrages and piers;
 - (d) Drilling for the purpose of utilizing ground water resources including geothermal energy.
- 9. Electrical infrastructure including –
- (b) Electrical transmission lines;
- 11. Waste disposal including -sites for solid waste disposal;
- (b) Sewage disposal works;
- 12. Natural conservation areas including –
- (f) Commercial exploitation of natural fauna and flora;

In addition to the Environmental Management and Coordination Act, legislations and policies pertinent to this report on a national level are outlined below.

1.3.2 Environmental Management and Coordination (Waste Management) Regulations 2006

NEMA gazetted these rules under Legal Notice 121 of 2006 to regulate how solid waste is generated, segregated, transported and finally disposed. It deals with all forms of waste including solid, industrial, hazardous, pesticides, biomedical and radioactive wastes. Under these regulations no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. The regulations further require that every person whose activities generates wastes has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose of such waste in a designated waste disposal facility.

Section 2 part II of the regulations requires that any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under the Regulations.

1.3.3 Energy Act 2006

The Energy Act 2006 also provides for the compulsory acquisition of land for any purposes of a license. Under section 54 of the Act, where the Minister in consultation with the Energy Regulatory Commission is satisfied that it is the public interest to do so he may acquire the land in accordance with the laws relating to compulsory acquisition of land. Section 54 (3) provides that KP as the licensee shall bear all the costs relating to the acquisition of land. Section 55 of the Act, makes provision for situations where any tree or hedge obstructs or interferes with the construction of any power supply line. The licensee is required to give a seven days' notice to the owner or occupier of the land on which the tree or hedge is growing to lop or cut the same. The licensee shall be responsible for the expenses incurred by such owner in complying with such notice. Any disputes between such owner and licensee shall be referred to the Energy Regulatory Commission and any appeal from the decision of the Commission lies with the Energy Tribunal.

1.3.4 Water Act 2002

The Water Act makes provision for the conservation, control, apportionment and use of water resources in Kenya, and for incidental and connected purposes. Protection of water supply is clearly a critical issue under the Act. Pollution of water is an offence. Section 75 allows a licensee for water supply to construct and maintain drains, sewers and other works for Intercepting, treating or disposing of any foul water arising or flowing upon land for preventing water from being polluted. Section 76 prohibits discharge of trade effluent into sewers without consent, and section 77 indicates some payment for such discharge. The Act also provides for public consultations where appropriate in the use of the resources notably where such use is likely to impact negatively on the quantity, quality of the water resources in any catchment area.

Section 94 (1) states that No person shall, without authority under this Act -

- Wilfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or
- Throw or convey, or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

1.3.5 Environmental Management and Coordination, (Water Quality) Regulations 2006.

Part 2 of the regulations on Protection of Sources of Water states that every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource

was polluted before the enactment of the Act. It also states that, no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. The regulations also ensure protection of various water sources such as protection of Lakes, Rivers, Streams, springs, Wells and other water sources. It stipulates that no person shall:

(a) Discharge, any effluent from sewage treatment works industry or other point sources into the aquatic environment without a valid effluent discharge license issued in accordance with the provisions of the Act.

(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 Environmental Impact Assessment license issued in accordance with the provisions of the Act; or

(c) Cultivate or undertake any development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the Authority from time to time.

1.3.6 Environmental Management and Coordination (Air Quality) Regulations, 2008

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The general prohibitions state that no person shall cause the emission of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and noncontrolled facilities) and Second7hyui8 Schedule (Ambient air quality tolerance limits).

1.3.7 Occupational Health and Safety Act, 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act has the following functions among others:

- Secures safety and health for people legally in all workplaces by minimization of exposure of workers to hazards (gases, fumes and vapours', energies, dangerous machinery/equipment, temperatures, and biological agents) at their workplaces.
- Prevents employment of children in workplaces where their safety and health is at risk.
- Encourages entrepreneurs to set achievable safety targets for their enterprises.
- Promotes reporting of work-place accidents, dangerous occurrences and ill health with a view to finding out their causes and preventing of similar occurrences in future.
- Promotes creation of a safety culture at workplaces through education and training in occupational safety and health.

Failure to comply with the OSHA, 2007 attracts penalties of up to KES 300,000 or 3 months jail term or both or penalties of KES 1,000,000 or 12 months jail term or both for cases where death occurs and is in consequence of the employer and undertake to

restore the land to the conditions it was before. Any damages or reduction of value shall be compensated to the land owners

1.3.8 Way Leaves Act (Cap. 292)

Way Leaves Act (Cap. 292) Section 3 of the Act states that the Government may carry any works through, over or under any land whatsoever provided it shall not interfere with any existing building or structures of an ongoing activity. Notice, however, will be given one month before carrying out any such works (section 4) with full description of the intended works and targeted place for inspection. Any damages caused by the works would then be compensated to the owner as per section. Finally section 8 states that any person without consent causes any building to be newly erected on a way leave, or cause hindrance along the way leave shall be guilty of an offence and any alternations will be done at his/her costs.

1.3.9 Physical Planning Act (Cap 286)

Section 36 of this act states that the local authority may if it deems it necessary require a submission of environmental impact assessment report together with a development application if they feel the project may have some injurious effect on the environment. Section 33 of the same act gives the director of planning authority to grant the applicant a development permission or decline to grant the applicant such development permission by stating the ground of refusal. Other relevant sections are 41 and 52.

1.3.10 Public Health Act (Cap. 242)

Part IX Section 8 & 9 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waste water flowing or discharged into a water course is deemed as a nuisance. Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances The Act addresses matters of sanitation, hygiene and general environmental health and safety.

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

The regulations essentially state the general prohibitions, provisions relating to noise from certain sources, licensing procedures for certain activities and mapping of noise and excessive vibrations. The regulations stipulate that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. The regulations have vested the responsibility of noise measurement and control to NEMA besides designating bodies that may be involved in mapping of noise and excessive vibrations such as Ministry responsible for physical planning; Kenya Airports Authority; Mines and Geology Department among others.

For any person intending to carry out construction, demolition, mining or quarrying work an Environmental Impact Assessment should be undertaken to;

(a) Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying;

(b) Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and

(c) Incorporate the needed abatement measures in the plans and specifications

1.3.12 The National construction Authority (NCA) Act 2011

Through an Act of Parliament the National Construction Authority was established and the powers and functions enshrined have been spelt out. According to the Act, "Construction works" means the construction, extension, installation, repair, maintenance, renewal, removal, renovation, alteration, dismantling, or demolition of-

(a) Any building, erection, edifice, structure, wall, fence or chimney, whether constructed wholly or partly above or below ground level;

(b) Any road, harbour works, railway, cableway, canal or aerodrome;

(c) Any drainage, irrigation or river control works;

(d) Any electrical, mechanical, water, gas, petrochemical or telecommunication works; or

(e) Any bridge, viaduct, dam, reservoir, earthworks, pipeline, sewer, aqueduct, culvert, drive, shaft, tunnel or reclamation works, and includes any works which form an integral part of, or are preparatory to or temporary for the works described in paragraphs (a) to (e), including site clearance, soil investigation and improvement, earth-moving, excavation, laying of foundation, site restoration and landscaping.

1.3.13 Wildlife Conservation and Management Act, 2013

The Wildlife Conservation and Management Act, 2013 was enacted "to provide for the protection, conservation, sustainable use and management of wildlife management in Kenya and for connected purposes." While its main focus is on addressing threats to wildlife conservation and securing an efficient management of wildlife, the Act also seeks to ensure communities benefit from these natural resources such as from bio-prospecting of natural resources within wildlife conservation areas. The Act came into effect at a time of growing concern over poaching of wildlife and contains stringent laws to safeguard wildlife. The implementation of the Act shall be guided by six principles of which the following have a direct bearing to this project:

- Wildlife conservation and management shall be devolved, wherever possible and appropriate to those owners and managers of land where wildlife occurs;
- Wildlife conservation and management shall be encouraged and recognized as a form of land use on public, community and private land;
- Wildlife conservation and management shall be exercised in accordance with the principles of sustainable utilization to meet the benefits of present and future generations.

In tandem with the devolved governance system that the Country has embraced, the Act has provisions for decentralization as set out in Part IV on the wildlife Regulation

Mechanism. According to Article 18, each of the counties shall have a County Wildlife Conservation and Compensation Committee, whose functions, among other shall be to implement the registration and establishment of wildlife user rights and oversee the preparation and implementation of management plans on community and private land under the provisions of this Act.

In the management of human-wildlife conflict, the Act allows any authorised officer of the Service, with the consent of the owner or occupier in respect of private land, where it is necessary for the purpose, go onto any land to destroy any animal which has been deemed a problem animal. Where the animal is a dangerous animal, which has been previously wounded or otherwise injured so as to make it a potential source of danger to human life, the officer may follow such animal with the intention of killing it on any land notwithstanding that the prior consent of the owner or occupier of the land has not been obtained. The Service shall under such circumstances provide the owner or occupier a subsequent report of what occurred.

Section 34 of the Act requires that among others, any variance of the boundaries of a national park or change of status from national park to wildlife conservancy or sanctuary, such a proposal must be subjected to an EIA in accordance with the provisions of EMCA, 1999. Under the Eighth Schedule of Act, which covers Licensing, applications for licensing must be accompanied by an EIA License issued under EMCA 1999. Such applications must also have regard for the need to protect fragile environmental resources, ecosystems and habitats.

1.3.14 Occupiers Liability Act (Cap 34)

This act requires the occupier of a site to warn visitors of the likelihood of dangers within his site to enable the visitor to be reasonably safe. Under common law, the proponent has a duty to care for workers, visitors and other persons, who enter the site legally or with his consent, in this case at the building site.

1.3.15 Agriculture Act Cap 318

The Agriculture Act Cap 318 aims at promoting and maintaining a stable agriculture, to provide for the conservation of the soil and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry

1.3.16 Penal Code Cap 63

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

1.4 National Policy

1.4.1 Sessional Paper No. 6 of 1999 on Environment and Development

Every person in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment. As envisioned in this Paper, Kenya should strive to move along the path of sustainable development to meet the needs of the current generation without compromising the ability of the resource base to meet those of future generations. The overall goal is therefore to integrate environmental concerns into the national planning and management process and provide guidelines for environmentally sustainable development. The Sessional Paper emphasizes that EIAs must be undertaken by project proponents as an integral part of project design and preparation. It also proposes for periodic environmental auditing to ascertain whether the developer is fully implementing the mitigation measures recommended by the Initial EIA/EA Report.

1.4.2 The National Environment Action Plan (NEAP)

NEAP for Kenya was prepared in 1994. It was a deliberate policy to integrate environmental considerations into environmental considerations in the country's social and economic process. Integration is being achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources is an integral part of the societal decision-making.

The environmental action plan discusses the challenges of change for Kenya and underscores the sustainability of Kenya's economic and social development which depends ultimately on proper and responsible management of the natural resource base and the environment in general. The plan also describes the physical environment and basically follows the thematic areas of nine task forces. These task forces were constituted along the following environmental issues: 1) water resources (inland, coastal and marine); 2) biodiversity (forestry, wildlife biotechnology, indigenous knowledge); 3) sustainable agriculture and food security; 4) desertification and drought; 5) environmental pollution and waste management; 6) human settlements and urbanization; 7) public participation and environmental education: 8) environmental information systems; and 9) policy, institutional, legislative framework and economic incentives. The report is further supplemented by background documents including detailed individual task forces reports. The report makes some concrete recommendations including the need for a new institutional framework, review and harmonization of environmental legislation, implementation of environmental impact assessment for all investment programs and development of environmental programs to mitigate/reduce environmental degradation.

1.4.3 Kenya's Vision 2030

Following the expiry of the Economic Recovery Strategy (2003-2007), Kenya's Development Agenda is now anchored on the Kenya Vision 2030, which aims at creating "a globally competitive and prosperous country with a high quality of life by 2030". It aims to transform Kenya into "a newly –industrialized, middle-income country providing a high quality of life to all its citizens in a clean and secure environment". Simultaneously, the Vision aspires to meet the Millennium Development Goals (MDGs) for Kenyans by 2015.

The Vision is anchored on three key pillars: economic, social and political. The economic pillar aims to achieve an average economic growth rate of 10 per cent per annum by 2012 and sustaining the same till 2030 in order to generate more resources to meet the MDGs and Vision 2030 goals. The social pillar seeks to achieve a just, cohesive and equitable social development in a clean and secure environment, while the political pillar aims for a democratic, issue-based, people-centred, result-oriented and accountable system.

1.5 International Environmental Policies and Agreements

1.5.1 African Convention on the Conservation of Nature and Natural Resources This convention has the following main requirements

- i. Control of soil erosion caused by various forms of land use, which may lead to loss of vegetation.
- ii. Prevention and control of water pollution.
- iii. Protection of flora and ensure best utilization and development and conservation of threatened or special scientific flora for any aesthetic value, plant species or communities.

This project will not go against this treaty.

1.5.2 The World Commission on Environment (the Brundtland commission of 1987)

This international policy recommends development that produces no lasting damage to the biosphere and to particular ecosystems. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. Similarly, social sustainable development is development that maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and wellbeing adequate nutrition and shelter, cultural expression and political involvement.

1.5.3 Other International Policies and Treaties

Moreover, developing and industrialized countries have ratified various multilateral agreements that recognize the need for trans-boundary cooperation on regional and global environmental issues including:

- The Kyoto Protocol on the United Nations Framework Convention on Climate Change,
- The United Nations Convention to Combat Desertification,
- The Convention on Biological Diversity of,
- The Ramsar Convention on Wetlands, among others.

2.0 THE EIA APPROACH AND METHODOLOGY

2.1 The Scope of the Assignment

The scope of the assessment is based on the NEMA *Environmental Impact Assessment and Audit Regulations,* 2003. According to the Regulations, the Project Report should, where possible, contain descriptions of the following:

- a) Description of the proposed project's operations, components and stages (design, construction and operation phases),
- b) Description of the existing environmental conditions,
- c) Analysis of the project alternatives
- d) Identification of potential environmental impacts and risks in the project area
- e) Proposing ways in which potential adverse environmental impacts, if any, will be avoided, minimized, mitigated or compensated.
- f) Preparation of an Environmental Management and Monitoring Plan taking into consideration the reviewed environmental policy framework and guidelines and the capacity of the project proponent to implement the Plan.

2.2 EIA Approach

This EIA was undertaken using three main approaches, which included:

- (i) Desk study
- (ii) Field and site visits
- (iii) Key informants and stakeholders' interviews.

2.2.1 Desk Study and Preparatory Tasks

This involved compilation of available data and literature covering bio-physical and socio-economic environments of the project area. Various relevant documents and previous work were reviewed to identify the imperative baseline data in the project area. The major information elements of the environment captured included: geology, topography, soils, surface water resources, terrestrial communities (including both flora and fauna), aquatic communities (including both flora and fauna), aquatic communities (including both flora and fauna), and environmentally sensitive areas. The socio-economic data included information on land use, demography, livelihoods, and infrastructural services, among others. Review of relevant Kenya environmental legislation and international conventions was also accomplished at this stage.

2.2.2 Field and Site Visits

This mainly involved Environmental Site Visits, Transect Walks and Direct Observation. They were aimed at giving the study team a practical experience on the biophysical conditions of the project area, how operations will be carried out, where the facilities will be situated, and how the various components are expected to operate etc.

2.2.3 Stakeholder consultations

(i) Public Participation: Interviews with community members and leaders around the project areas:

These were meant for the collection of socio-economic data that was aimed at unearthing the community perceptions and concerns on the proposed project and its likely influences on the socio-economic conditions of the project area. Focused group discussions and on-spot interviews were also conducted.

(ii) Key Informant Interviews- key informant interviews were aimed at gathering expert information on the operations and status of the project components. The key informants contacted included the local administrative and opinion leaders.

2.3 The EIA Process

The EIA process involved the following:

Environmental Screening

The project screening was done to generate a description of the problem, the project objectives and activities and the involved parties. This information was important in characterizing what these components are, so as to have insights on the effects of project operations on the physical, biological, socio-economic and human environments.

Environmental Scoping

This involved consultations between the project proponent, project manager and the consultant to identify key issues and key stakeholders to be included during the consultation process.

By determining the scope systematically, the assessment focused on the important environmental issues and risks. Scoping helped to start with actions, and work outwards and enhanced:

- Identification of social significance of the various project impacts
- Establishment of the agenda for the EIA, agreed by all concerned
- Translation of the agenda into a work programme and agreed by all concerned
- Terms of Reference relevant to the study
- Identification of key policy, legal and institutional parameters for the study

Documentary review of basic data

Basic data collected included that related to biodiversity of the study area; its environmental settings and socio-economic conditions. Collection of this data involved the review of relevant literature and documents; site visits inside the project area, direct observations, transect and resource persons/ key informants interviews.

Identification of impacts

The key tool for the identification of existing impacts was the Leopold's Matrix (see Appendix 1). This matrix contained a candidate list of key impacts with the 'sources' and 'receptors' of impacts. Brainstorming among the study team members after careful review of the proposed project activities also aided in the identification of impacts

Prediction of impacts

Prediction of impacts involved characterizing the impact causes and effects and their consequences on the physical, biological and the human environment. This was achieved through expert judgments, referencing of necessary literature and brainstorming among the members of the study team.

Evaluation of impacts

Evaluation of adverse impacts was deemed necessary to determine whether they are significant enough to warrant mitigation. To achieve this, the study team reviewed relevant literature (comparison with laws, regulations and standards, consistency of project objectives with government policy); brainstorming sessions among the study team guided by the collected data. Public consultations and disclosures with key stakeholders were also held.

The main concern here was the influence of the identified impacts on the above parameters. A point scoring system and analysis were used to determine comprehensively the influences and dimensions of the impacts.

Identification of Mitigation options and Preparation of an Environmental Management and Monitoring Plan

In identifying the mitigation options, the study team explored strategies to prevent, reduce, or compensate the adverse impacts already identified and analysed. The tools applied here included review of literature and similar case studies done elsewhere, value judgments, and brainstorming sessions with both technical and non-technical experts.

2.4 Objectives of the EIA

The objectives of this Environmental Impact Assessment (EIA) were:

- To fulfil the legal requirements as outlined in Section 58 to 69 of the Environmental Management and Coordination Act (EMCA),1999 and Part I and II of the EIA/Audit(2003) Regulations
- To obtain background biophysical and human information of the site and legal and regulatory issues associated with the project
- To assess and predict the potential impacts during planning and designing, construction and operational phases of the project
- To make suggestions of possible alternatives to the proposed project based on the assessment findings
- To propose mitigation measures for the potential significant adverse environmental impacts, occupational safety and health
- To facilitate for public participation.
- To prepare an Environmental Management and Mitigation Plan (EMMP).

2.5 Expected Outputs

The output of this EIA is an Environmental Impact Assessment Project Report containing:

- Executive summary of findings
- Baseline information of the project area (Description of the project area)
- Description of project activities.
- Evaluation of activity-impact identification and formulation of recommended mitigation measures
- Environmental Management and Monitoring Plan
- Conclusion

2.6 Study Team

This EIA was carried out by a multi- disciplinary team of EIA experts, which comprised of:

- 1. Socio-economist Tackled the socio-economic component of the proposed project and provided overall backstopping.
- 2. Environmentalist- Provided expert guidance on issues pertaining to effects of the project on the environment and mitigation measures for the anticipated negative impacts
- 3. Wildlife management expert- Provided technical guidance in relation to impacts associated with wildlife and the general ecology of the project area.

Two technically experienced research assistants were involved in the collection of socio-economic and biophysical data.

3.0 BASELINE INFORMATION OF THE PROJECT AREA

3.1 Physical environment

3.1.1 Position, Size and Topography

Laikipia County covers an area of approximately 9,723 km² which translates to 1.6% of the total landmass in Kenya. The County is situated between longitudes 36 degrees 00 minutes and 37 degrees 45 minutes east and between latitude 0[°] 30' South and 1[°] 00' North. It borders Samburu County to the North, Meru and Isiolo Counties to the East, Nyeri and Nyandarua counties to the South and Baringo and Nakuru counties to the West.



Figure 1: Location of the project area in the context of Laikipia East Constituency

The altitude of Laikipia County varies between 1600 to 2300 meters above sea level with the project area at a mean altitude of 1900. The topography is dominated by gently undulating plateau buildup of extensive lava flow at an elevation of 1600-1800 m. Lolldaiga hills are located northwest of Mt. Kenya lying between 1,700 and 2,300 meters above sea level. The ranch hosts the Lolldaiga Range, which is an ancient landform comprising of a series of magnificent high rolling hills.

Administratively, the project area

is located in Umande Location and Umande Ward within Laikipia East Sub-county and Laikipia East

constituency respectively. This is within the former Daiga division of Laikipia District.

3.1.2 Climate

Laikipia County is sandwiched between Mt. Kenya and Aberdare Ranges, which influence the spatial distribution and temporal variability of rainfall. The main rainy seasons in the project area correspond to the influence of the Inter Tropical Convergence Zone (ITCZ) which comes twice a year, that is, March-May for the long rains and October-November for the short rains. In August, humid air streams from the west produce a third rainy period, the "continental rains". These rains are sometimes considered very valuable as they are seen to be an extension of the long rains. However, there is no clearly established pattern on whether they arrive or not in a particular year.

The amount of mean annual rainfall drops along a steep gradient, from 800-900 mm at the foot of both massifs, where the project site is located, to less than 500 mm in the northern part of the County. The variability and distribution of annual rainfall is great. Moreover, there is an increase in both variability and distribution along the same gradient

Agro climatic zones vary from semi-humid (Zones III and IV) to semi-arid (Zones V and VI) according to precipitation gradients. Great variability in precipitation means, however, that there is great spatial and temporal fluctuation in the critical boundary for rain fed agriculture between Zones IV and V on the high plateau. The project area is located within agro-ecological zone 4.

Temperatures are highest in the months of January to mid-March before the rainy season and lowest in the months of July to August. The project area falls within Kalalu and Mukogodo weather stations.

Station	Mean Daily	Daily Temperature	Annual	Annual
	Temperature (°c)	Range (°c)	Temperature Range	evaporation(mm)
			(°C)	
Rumuruti	18	13	3	2030
Sirima	18	12	3	1890
Kalalu	16	15	2	1580
Mukogodo	19	14	2	2110

Table 1: Temperature trends for selected stations in Laikipia County

Data source: CETRAD (NRM³)

3.1.3 Geology and Soils

The larger Laikipia is underlain by metamorphic rocks of Pre-Cambrian age which form part of the extensive African Basement Complex. These rocks are exposed in some parts of the county forming the Mukogodo and Lolldaiga hills. Volcanic sediments in the project area were washed down from Mt Kenya. Most of the soils formed from these rocks are cracking clays but in some places silty loams are found. They generally cover the central parts around Mutara, Segera and Lolldaiga-Ole Naishu(the project area).

The project area is underlain by *soils on the structural plateau* according to a classification based on the physiographic characteristics, parent material and the dominant colour of the sub soil. These soils occur on nearly flat to gently undulating (1-8%slopes) volcanic plateaus. The soils are moderately well drained to imperfectly drained, very deep, dark grayish brown to very dark grey, firm, cracking clay. On the gently undulating to undulating areas, the soils are well drained, very deep, reddish brown to dark brown, firm clay with high humus content topsoil. They cover the largest part of the county approximately 602,700 ha or 62%.

3.1.4 Hydrogeology

The level plateau and Laikipia County's drainage in general is dominated by the Ewaso Nyiro North. Together with the flanks of Mt. Kenya and the Nyandarua Range, Laikipia forms the upper catchment area of the Ewaso N'giro River which is of crucial importance to the semi-arid and arid lowlands to the north-east. The tributaries of the

Ewaso N'giro that flow through Laikipia County are perennial streams fed exclusively from Mt. Kenya and the Nyandarua Range during the dry seasons. The forest belts of both mountain systems are of crucial importance in this process. Surface waters that form on the high plateau conduct water only seasonally or episodically. The volcanic portion of the Laikipia Plateau also has a large aquifer, but its rate of renewal appears to be rather low, based on evidence from ground water data.

Hydro-geological studies conducted in Laikipia County indicate that the County has high groundwater potential. Chances of striking ground water in boreholes are high but the anticipated yields vary widely. Average boreholes yields in Laikipia County are low at 3.89m³/hr with lows of 0.2m³/hr to highs of over 30m³/hr. This depends on aquifer type, penetration through the aquifers, depth, and drilling and construction precision. Generally, the higher borehole yields are associated with volcanic aquifers whereas the low yields are related to the Basement System rocks. Dry boreholes have been drilled in the basement and also the volcanic aquifers which again reflect the precision of the borehole siting techniques utilized. As the principal aquifers are Basement System rocks and buried alluvial deposits along watercourses, the aquifers must include narrow winding zones of relatively high permeability, which can be delineated using suitable geophysical and remote sensing methods.

3.2 Biological environment

3.2.1 Flora

Vegetation distribution in Laikipia in general is strongly influenced by altitudinal diversity, with dry forest occurring on the highest elevation and a gradient of *Acacia-Themeda* bush on the plains. Exceptions to the overall regional ecological gradient are edaphic communities of *Acacia drepanolobium* in the central plains, escarpment vegetation and secondary communities induced by historical management factors. Some of the dominant species include *Juniperus procera, Olea africana, Acacia drepanolobium and Acacia nilotica* bushland. The dominant grass types are *Triandra* communities including *Themeda triandra, Pennisetum mezianum, Pennisetum schimperi* and *Setari sphacelata.* The project area is dominated by cedar forests and acacia savannah, open grassland and wooded valleys.

3.2.2 Fauna

The history of wildlife in Laikipia dates to the pre-colonial period. The pastoralist Laikipia Maasai communities were then few in number, sparse in settlement and non-sedentary. These dynamics meant that there was insignificant competition for resources between wildlife and the community as opposed to the current situation. Prior to 1970s, game population, especially elephants, was low. Only seasonal movements south from Samburu along the major drainage systems of Ewaso Ngiro, Ewaso Narok and Mutara rivers would occur seasonally.

After the mid-1970s, wildlife population, especially elephants and ungulates increased and showed a tendency to remain in the County for most of the year. This situation was due largely to the heavy poaching in the then Samburu and Isiolo districts (now Counties) that marked the "shifta" era forcing wildlife to move to the relatively tranquil Laikipia which then and still borders the two Counties. However, wildlife populations have declined substantially in the past 20 years largely attributed to increase of immigrant farming communities considerably reducing wildlife habitat and inevitably resource competition.

Nonetheless, Laikipia has some of Kenya's richest ecosystems in terms of number of endangered wildlife species and supports high densities of large mammals. However, the area contains no formally protected wildlife areas but still has the second highest concentration of wildlife in the country (second only to the Masai Mara), and more endangered wildlife species than anywhere else in Kenya (Laikipia Wildlife Forum, 2007). Half the numbers of endangered black rhinos in Kenya are found in Laikipia. Wildlife in Laikipia exists within a mosaic of different forms of land-use, which include ranching and pastoralism.

Most of the wildlife population is concentrated in the private ranches because of better pasture and forage resources within these ranches. Wildlife dispersal from the private ranches into community ranches is more common in the wet season when grazing and foraging is not a constraint. The common wildlife species in Laikipia include plain and grevy zebra, elephants, jerenuk, warthogs, dik-diks, impalas, gazelles, hippos, buffaloes, hyenas and lions.

3.3 Socio-economic Environment

3.3.1 Population

Laikipia County's population is diverse or heterogeneous in its composition comprising pastoralists in the north east and agro-pastoralists in the rest of the County. Population figures in various parts of the County are related or linked to specific issues such as agro-ecological zones, security of subsistence, off-farm activities, migration trends and wildlife problems. These factors are area specific and interlinked with each other. According to the 2009 KNBS Housing and Population Census, the total population for the county stood at 399,227 people of which 198,625 were males and 200,602 were females. The population is projected to rise to 457,514 and 479,072 in 2015 and 2017 respectively. The population around the project area has experienced an upward trend in the recent years.

Administrative Units	Male	Female	Total	Households	Area in Sq. Km	Density
Laikipia County	198625	200602	399227	103114	9461.92	118.09
Laikipia East (Sub- County)	71648	70386	142034	40676	2970.38	47.82
Daiga Division	16,646	16,648	33,304	8,732	828.8	40
Umande Location	8,168	8,033	16,201	4,456	289.1	56
Kalalu	2,671	2,657	5,328	1,540	21.8	244

Table 2: Population of the project area

Umande	2,521	2,366	4,847	1,308	241.0	20
Nyariginu	2,976	3,010	5,986	1,608	26.3	227

Source: Kenya National Bureau of Statistics

3.3.2 Land Use and Tenure systems

Land use in Laikipia County can broadly be divided into large-scale ranches and conservancies, commercial horticultural farms, pastoralist, small-scale farms, unsettled land, forest reserves and urban centers. Land use at the project site falls within large-scale ranches and conservancies category. A substantial amount of the formerly large scale farms have been sub-divided triggering a massive influx of people mainly from the neighbouring counties of Nyeri Isiolo and Meru. The ranch now borders community settlements/lands in the eastern and northern parts which have in the recent years experienced

The communities to the South and South eastern boundaries practice mixed farming principally involving crops and livestock production. The main crops grown include potatoes, wheat, maize and beans primarily for subsistence while the surplus is sold to cater for non-farm household needs. The northern section is mainly inhabited by pastoralists who are essentially nomadic.

3.3.3 Human-Wildlife conflicts situation

As pointed out during the Laikipia County Human- Wildlife Conflict Stakeholders Forum (2013), the County population has been growing steadily through natural factors such as immigration of human population moving from the high agricultural potential areas into ASAL. The ecological pressure has in turn resulted into the collapse of some ecologically balanced traditional production systems as population load overstretches the ecological capacities threatening the sustainability of the resources. The changes have resulted in a number of challenges being experienced in the natural resource development in the county. Some notable ones include:

- i. Severe human-wildlife conflict: wildlife causing loss of human life, injuries and property destruction; encroachment of wildlife corridors
- ii. Wildlife poaching (especially of rhinos and elephants) inside and outside protected areas
- iii. Forest destruction: fire outbreaks, unsustainable charcoal production, illegal logging and farming, overgrazing
- iv. Weak natural resource management institutions
- v. Lack of alternative or renewable sources of energy leading to over-use of wood for fuel
- vi. Limited means of livelihood options: inadequate live coping capacities within communities
- vii. Degradation of water resources: drying of rivers due to water abstraction, up- and downstream catchment destruction; encroachment into riparian areas, leading to destruction on riparian land and wetlands; soil erosion; planting of eucalyptus on water sources and courses
- viii. Uncontrolled sand harvesting

- ix.
- Х.
- Poor animal husbandry and grazing practices Uncoordinated conservation practices Increasing human population leading to land sub-division to unproductive xi. levels

4.0 DESCRIPTION OF PROJECT ACTIVITIES AND PUBLIC CONSULTATION

4.1 Project description

4.1.1 Brief on Ole Naishu Ranch

Ole Naishu is a livestock ranch sitting on 30,000 acres of land in Umande Location of Laikipia East sub-county. It borders other notable ranches and conservancies namely Lolldaiga in the west and Borana in the north east. It also borders Makurian Group Ranch to the north and community settlements to the east and southern parts. The project area is located in the larger Laikipia plateau, an area of rolling low hills, and the variety of rangeland resources suitable for ranching, ecotourism and conservation activities. It is dominated by gently undulating plateau build-up of extensive lava flow at an elevation of 1600-1800 m. The highest point is along the Lolldaiga hills which at an altitude of about 2,200m. The hills are about 20km off the west slope of Mt Kenya and 16km north of the equator.

Livestock production remains the core activity at Ole Naishu. The ranch currently has about 2,600 heads of cattle and 150 sheep. Ole Naishu ranch management has effectively adopted holistic rangeland management to ensure coexistence of livestock production and wildlife conservation. The management acknowledges that competition between wildlife conservation and livestock production for rangeland resources could easily create ecological pressure which in turn will result into collapse of ecologically balanced production systems. Livestock grazing thus follows a rotational program that prevents overgrazing and allows time for vegetation regeneration as well as keeping wildlife population within the carrying capacity. The ranch is also used as a training ground for BATUK under the Defense Cooperation Agreement between the United Kingdom and Kenya

4.1.2 Project concept and design

The proposed project will essentially entail digging of a trench along the eastern boundary of the ranch. The trench, which will measure about 4ft x 8ft, will cover about 15 Kilometres along the alignment of the existing electric fence line. There will be minimal vegetation clearance as the ditch will be established along the space created to act as fire break, and access road for security patrol. Cut off drains will be developed at strategic intervals to drain excess surface runoff during rains.

The electric fence was constructed to mitigate human wildlife conflicts but has since been rendered ineffective by frequent vandalism by people and wildlife. The trench is thus expected to reinforce the fence by providing an effective barrier that is relatively less prone to sabotage. Its location along the inner section of the boundary is expected to effectively deter wildlife from coming into contact with the electric fence and also livestock from the neighbouring pastoral community from accessing the ranch after breaching the security fence. The use of game/security trenches in other ranches and private farms within Laikipia has been found to be effective, especially in control of large mammals. Such facility has been applied in the protection of the Rumuruti Forest; Mt. Kenya Forest Reserve; and in private properties like Laikipia Ranching in Laikipia West and in the Former Ereri Farm in Laikipia East. The main challenge associated with trenches fencing is maintenance especially through soil erosion and undergrowth.

Most importantly, the construction of the trench was necessitated by the dire need to address the following concerns which have brought forth adverse socio-economic and environmental costs;

4.1.2.1 Extensive trespassing for illegal grazing and logging

Incidences of extensive trespassing by pastoralists and illegal loggers have been on the rise in the recent years. These cases are mainly confined along the boundary with Chumvi which is predominantly inhabited by pastoral communities. Herders lead thousands of livestock into the ranch annually which leads to significant degradation of the encroached sections of the rangelands. This has been attributed to environmental degradation experienced in the community lands and group ranches in the project area which has led loss of pasture areas. They are lured into the ranch by the availability of ample pasture which is a result of proper implementation of range management practices by the Ole Naishu management.

In most cases, the herders are armed rendering efforts to deter intrusion by Ranch's security futile. There have been numerous cases of assault and damage to property reported and forwarded to the security agencies (Kenya Police and local administration) for action **(See Appendix 3).** However, the continued engagement of the agencies has worsened the relationship between the ranch and the community, resulting in more attacks. In addition, there has been increased logging of Cedar for timber. The formerly



Plate 1: Livestock grazing near Ole Naishu's fence line

denselyvegetatedareasalongtheboundaryhavesignificantlybeendiminished.

If the situation is left unabated, the main income generating activity for the ranch is severely threatened. This is due to the fact that, ranching is
anchored on sound rangeland management practices such as operating within the carrying capacity. The trench will also ease off pressure from the security agencies and national government administrators who have unsuccessfully been dealing with cases of trespass and illegal grazing in Laikipia County.

4.1.2.2 Human wildlife conflicts

Human –wildlife conflicts in the project area have metamorphosed over the years to become a major political issue as well as a key factor in aggravating effects of drought and insecurity. The area hosted a large population of wildlife whose unrestricted movement was disrupted by the increased human settlements and expansion of cultivation. The increase emanated from a mass influx of people from neighbouring counties such as Nyeri and Meru counties (former districts) due to availability of land.

Practically, it has been recognized that one of the most effective ways of controlling human-wildlife conflict is physical separation of wildlife areas from human settlements using barriers. It will be a long way in reducing crop raids in the neighbouring by wildlife, especially buffaloes and elephants. The proposed project readily conforms to the fencing strategy formulated by LWF to mitigate human wildlife conflicts in Laikipia.



Figure 2: LWF fencing strategy for Laikipia developed in 2002

4.1.2.3 Theft of livestock

Cattle rustlers have often used OI Naishu as a refuge and route to move livestock stolen from communities in Muramati and Umande to the northern parts of the county. The aggrieved communities have often blamed the ranch for not securing its boundaries to avert the incidences. Furthermore, there have also been cases of the Ranch's livestock being stolen with the most recent involving five heads cattle.

4.1.2.4 Theft of ranch property and British Army equipment

There have been several incidences of malicious damage and theft of ranch property. This thrives at the backdrop of some sections of the electric fence having been damaged. Theft of British Army equipment such as iron sheets, fuel and optics among others is a major justification for the proposed project. The issue became of grave concern during the recent negotiations between the governments of Kenya and Britain on the Defense Cooperation Agreement. Cases of dangerous military gear and equipment being in the hands of the civilians increased with the rise in number of theft cases. The use of the ranch for BATUK training is an important economic activity not only for the ranch but also the country and local economy. Successful abatement of the issue is only crucial in maintaining cordial relations between the two countries.

4.1.3 **Project activities, inputs and considerations**

The main project activities will encompass digging of the trench and commissioning for use as a barrier for wildlife and security control purposes. Most of the activities during construction phase will be mechanized due to the nature of the project and the need to develop a highly effective barrier. It will be carried out using heavy machines such as loaders and excavators. The machines should be in good condition to avoid excessive emissions and oil leakages thereby degrading the environment.

Skilled labour will be utilized in running of machines and equipment while non-skilled labour will be employed where appropriate. Albeit at a smaller scale, use of manual labour for various tasks during the construction phase will not only provide for more employment opportunities but also ensure lesser impact in terms of noise, air pollution and incidences of oil leaks if machinery were to be used.

The proponent will effectively provide for the occupational health and safety of the workers and users. Due considerations on occupational health and safety will be put in place and revolve around the following:

- The health and safety of workers being compromised by the activities at the proposed site. Hazards may be due to dust emissions above allowable limits or noise exposure over 90dB for 8 hours within a week.
- Falling of persons, equipment or tools which may lead to injury.
- Hazards due to lifting heavy weights manually or mechanically.
- Collapse of walls and embankments.

4.1.4 **Project implementation and management**

The proponent will be involved in management of the project which encompasses planning, organizing, controlling resources, and operationalization. The implementation of the proposed project will follow the due procedures as stipulated by the relevant government authorities such as by KWS and applicable standards of Kenya.

The Project is estimated to cost Kshs. 16,924,880.00 which will cover the digging of trenches and costs associated with running the machines. The submission fee amounts to Kshs16, 925, calculated as 0.1% of the total project cost

ltem	Description	Amount (Kshs)
1	Excavation and actual digging of trenches.	3,110,000.00
2	Breaking rocks	7,168,880.00
3	Bucket scooping rocks	6,646,000.00
Total		16,924,880.00

Table 3: Summary of the Project Costs

4.2 Public participation

4.2.1 Objectives of Public participation

Section 17-1 of The Environmental-Impact Assessment and Audit Regulations, 2003 requires that an EIA should *"seek the views of any person who may be affected by the project"*. Stakeholders' consultation and disclosure are therefore overriding principles and practice of EIA and EA. It involves collating views and concerns of the community neighbouring a development activity/project so that they get to know what the project entails and how the operations will affect their biophysical and human environments.

Public consultations were specifically conducted to establish:

- The possible socio-economic and cultural profile effects that would be affected by the operations of the fence, and
- Collate community concerns and their views on how negative impacts could be mitigated

Due to the unique settings of the project areas and their socio-economic and ecological settings, consultations and disclosure activities were carried out through two main ways:

- Resource person/ key informants interviews (this involved interviews with the property owners and local administration leaders)
- Administration of simple checklists to the neighbouring community members and residents. (*See Appendix 2.*)

4.2.2 Potential Impacts of the Project as expressed by the Community Members

The following potential positive impacts of the proposed developments were highlighted by the stakeholders during public consultation process;

- The trench will significantly alleviate human-wildlife conflicts in the area that have often led to human deaths and destruction property.
- Improved agricultural productivity and subsequent improvement of livelihoods for local communities.
- The trench will help reduce hostilities between agricultural communities and pastoralists and between pastoralists and ranch owners.
- The trench will improve security in private ranches and enhance biodiversity conservation in addition to allowing property owners to invest in higher value enterprises.
- The project will improve the security situation in the project areas and reduce livestock thefts which have reached alarming levels as reported by the community members/stakeholders consulted.

However, stakeholders highlighted the following negative impacts that may arise from the proposed project;

- It may interfere with wildlife movement along existing corridors. The ranch takes cognizance of the prevailing wildlife movement to and from the ranch as part of the larger Laikipia Samburu ecosystem. Therefore the trench will be dug with due regard of the need to facilitate free movement of wildlife within the neighbouring wildlife sanctuaries and conservancies. The game/security trenches will not block any natural wildlife dispersal conduit.
- It may restrict pastoral communities' access to pasture within the ranch which may lead to conflicts. To address this, the ranch envisions a better relationship with pastoral communities through well-structured arrangements to allow for controlled access to pasture as it has been in the past. This will however be anchored on laws governing rights to private property.
- Possible emergence of invasive vegetation species such as *Datura stramonium* in the disturbed areas. The proponent will periodically monitor the growth of such species and undertake corrective measures such as uprooting.
- Clearance of vegetation and cutting down of trees along the fence alignment. However, this will be minimal as only about 3metres will be cleared along both sides of the existing fence alignment where the dominant vegetation is grass. The design has ensured that no trees will be uprooted during the excavation.
- Alteration of the local landscape, soil erosion and degrading the aesthetic value. To address this, the proponent will ensure that the soil spoils are uniformly lined along the ditch. A healthy vegetation cover will also be maintained to enhance soil conservation measures in addition to regular maintenance.

4.2.3 Communities' opinion on Project Considerations/Mitigation Measures

To address the issues discussed above, the stakeholders made the following suggestions;

- Ensure the alignment does not interfere with the existing wildlife migratory routes by leaving them open/unfenced.
- Create awareness amongst community members around the project areas and actively engage them in various project activities. This will enhance the social acceptability of the project and address challenges experienced in the past. Community members consulted indicated that they would actively be involved in the operations of the project when the need arises.
- Selective clearing of vegetation and ensure trees are not uprooted.
- To address tensions with pastoral communities, some stakeholders suggested that relevant stakeholders and government agencies should initiate projects aimed at promoting alternative livelihoods, energy sources and sound range management practices.
- A set of legal and security provisions should be formulated and developed to address the unique issues relating to vandalism of the private fences and barriers by people in Laikipia. This should encompass the prevailing socio-political dynamics and active involvement of the community policing apparatus and agencies such as Laikipia County Security Committee (LCSC).

Therefore, there is a dire need for the project components to address these concerns so as to avoid potential conflicts and ensure with the neighbouring residents. All of these concerns have been adequately addressed in the technical evaluation and prediction of impacts and in the preparation of the EMMP.

5.0 **PROJECT ALTERNATIVES**

5.1 Introduction

Since the introduction of the EIA process and subsequent development of EIA methodologies and legislative provisions, the analysis of alternatives has been one of the main tenets of EIA policy and procedures. Indeed, a thorough, unbiased and transparent assessment of investment alternatives from an environmental and social perspective (as well as a technical and economic standpoint) is one of the most important contributions.

Alternatives analysis in EIA is designed to bring environmental and social considerations into the "up-stream" stages of development planning-project identification and earlier-as well as the later stages of site selection, design and implementation. In the assessment of the project alternatives, this study considered four main scenarios. A scenario in this study and context was considered to mean the "description of a possible future situation and the development from the current situation to this future stage" (Huber and Opondo, 1994:10).

- Status quo or no action scenario;
- Live barrier fence.
- Use of stone walls
- Rehabilitation of the electric fence

5.2 Analysis of Alternatives (scenarios)

5.2.1 Status quo or no action scenario

This scenario would require that the current situation be maintained. Ole Naishu Ranch will continue relying on the existing electric fence for game control and deterring intrusion by people. This alternative would have the advantage of saving the Ranch management the burden of mobilizing resources for implementation of the proposed project. In addition, potential negative environmental impacts associated with excavation of the trenches would be avoided.

However, human-wildlife conflicts have been a major impediment to productive agriculture and a harmonious existence in the project area. Incidences of wildlife straying into the neighbouring farms have been on a constant increase over the years. This has led to a strained relationship between the ranch and the agriculturalist community, as the latter is blamed for inadequacy in preventing wildlife from wandering off into the farms. On the other hand, incidences of extensive trespassing and illegal grazing and logging have been rampant along the north eastern boundary where the ranch shares a boundary with pastoral communities. This goes against the tenets of rights to private property and laws prohibiting trespass.

Moreover, cases of cattle rustling in the project area have risen as bandits/rustlers flee through the open sections of the fence into the ranch where security personnel have limited access. The consequence of this has been social strife that has been exacerbated by food insecurity and poverty cycles.

In light of this, it's apparent that the "No Action" alternative is not desirable to the project proponent, local community, investors or the interests of the government, in particular pertaining to mitigation of human-wildlife conflicts. Due to the foregoing, the status quo scenario is not tenable and should not be maintained.

5.2.2 Live barrier fence.

These are fences that consist of plants that are hedge forming. The most commonly used plants are *Cupressus lusitanica* (cypress), *Aberia caffra* (kei apple), *Euphobia tirucalli* (finger euphorbia), *Ceasalpinia decapetala* (Mauritius thorn), Cactus such as *Opuntia vulgaris*, *O. stricta* and *O. exalta*, and *Agave sisaliana* (sisal). Although, the use of such fences is common at small scale levels, Ole Naishu has incorporated live fences in some sections. The environmental impacts associated with such fences are minimal and the edaphic and climatic conditions in the project areas are favourable for the growth and use of live fences.

However, these fences could act as a host to some crop pests and diseases thus impacting negatively on agricultural production in the area. Some of the flora used for fences in semi-arid areas, such as the cactus family, tends to become invasive species that eventually require more resources to control and eradicate. This has been of much concern in the northern parts of the county including the project area. The invasiveness of the cactus species has mainly been attributed to the local sandy soils, rapid dispersal and regeneration capability, and their high tolerance to drought and low rainfall. It is further enhanced by disturbances such as overgrazing which has become widespread in the neighbouring pastoral lands and continued use of the species in fencing.

Besides being ineffective in the current circumstances, the use of cactus (e.g. prickly

pear) can be associated with more negative impacts due to its invasive nature. Some of the impacts include: infection and deaths of livestock as a result of feeding on the encroachment fruits. of rangelands leading to loss of pasture areas, low aesthetic value. and suppression of native plants species resulting to loss of vegetation cover and soil erosion. Other plant species such as trees



Plate 2: Some of the cactus vegetation along the eastern boundary

would require a lot of time and attention in the early stages of growth and constant maintenance through regular pruning and trimming. Therefore, this alternative should not be considered in the need to control game and unauthorized entry into the ranch.

5.2.3 Use of stone walls

This scenario would involve building of game barriers using stones. Stone walls have been widely used in Laikipia County recording varied levels of success. The associated environmental impacts are relatively low as materials which mainly comprise of stones are locally available and usually on the surface. Collection of these stones also increases pasture coverage as grass replaces the area where rocks and stones have been removed.

Nevertheless, availability of substantial amount of stones in some sections of the of the project areas is not guaranteed. The alternative would also be resource consuming/intensive in terms of the time and labour required for completion. The use of the stone walls is essentially dependent on the game pressures and may result in considerable exceeded carrying capacity inside the habitat necessitating cautious monitoring to keep the animal populations within the carrying capacity. This alternative is thus limiting and would not lead to realization of the intended purposes of the proposed project.

5.2.4 Upgrading and Rehabilitation of the electric fence

Electric fences are one of the widely used wildlife barriers and security measures by ranches in the County. Their use is widely associated with a host of direct and indirect benefits which include; relatively low maintenance costs and higher durability as compared to others, it is more effective and durable as compared to other alternatives, acts as a psychological barrier to deter intrusion attempts and provides higher levels of detection capability to detect an intrusion attempts

The existing fence was constructed in 2010 as part of the ranch's strategy of alleviating human wildlife conflicts in the project area. Although, the effectiveness of the fence in confining wildlife within the ranch and preventing intrusion by people has decreased over the years, the fence has played a critical role in mitigating human wildlife conflicts. This alternative would involve rehabilitation of the fence to enhance its effectiveness under the prevailing circumstances. It would comprise of installing a short electric fence design which would address shortcomings noted in the previous design such as easy intrusion and vandalism by elephants.

The design would consist of a 4-foot, 7 strand design (1 buried earth, live – semi live design) with strategically placed outriggers Fence posts would be drilled in order to allow the wire to pass through pipe insulators. This helps to prevent petty vandalism and damage to insulators by people and elephants. Energizer houses would be situated at appropriate intervals in order to maintain a voltage above 7Kv (the level at which elephants are known to avoid attempting fence breaks). Based on the existent situation and assessments conducted elsewhere, this alternative would be more viable if used as reinforcement to the proposed project. This is due to the fact that people and wildlife, in particular elephants, would in due course learn how to breach the system.

6.0 IDENTIFICATION, ANALYSIS AND ASSESSMENT OF IMPACTS

6.1 Impact Identification

The identification of impacts in the assessment generally used the following methods:

- Compilation of a comprehensive list of key environmental impacts such as changes in air and water quality, noise levels, wildlife habitats, biodiversity, landscape, social and economic systems, cultural heritage, settlement patterns, and employment levels.
- Identification of all the sources of impacts such as dust, spoils, vehicles emissions, water pollution, construction camps, et al. using checklists or questionnaires. This was followed by listing possible receptors in the environment (i.e., community, and labourers) through surveying the existing environmental and socio-economic conditions and consultation with concerned parties.
- Identifying and quantifying various environmental and socio-economic impacts through the use of a standard checklist. The checklists were complemented by a Leopold's interaction matrix, which is appended in Appendix 1.

6.2 Impact Prediction

Prediction of impacts technically characterized the causes and effects of impacts, and their secondary and synergistic consequences for the environment and the local community. It involved examination of each impact within a single environmental parameter into its subsequent effects in many disciplines (e.g., deterioration of water quality, destruction or disruption of economic activities and resulting socio-cultural changes). The process is anchored on physical, biological, socioeconomic, and anthropological data and techniques. In quantifying impacts, socio cultural models, economic models, and expert judgments were employed. It is worth noting that all prediction techniques of environmental impacts, by their nature, involve some degree of uncertainty. Infrastructure impacts are identified at the following four phase's i.e.

- Planning and design phase
- Construction phase
- Operation phase
- De commissioning phase

6.3 Types of Impacts

The project activities are likely to result in social and environmental impacts. The impacts will be defined as:-

- Positive Impact: A change which improves the quality of the environment (for example by increasing species diversity; or improving the reproductive capacity of an ecosystem;
- Neutral Impact: A change which does not affect the quality of the environment.

• Negative Impact: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).

The potential impacts of the project fall under two broad categories of bio-physical (natural) and socio-economic environments. A matrix table was used to analyse these impacts.

6.4 Significance of impacts

The identified impacts were then subjected to a criterion that was used to determine their characteristics and significance. The parameters used in this particular study include:

- Direction: will the impact generate a beneficial or adverse change?
- Extent: will the impact affect a small, medium or large area?
- Duration: the period over which an impact will be felt. Is it short-term or long-term?
- Reversibility: the permanence of the impact. Is the impact reversible particularly for negative ones?
- Imminence: the possibility of the impact occurring as predicted.

Impact analysis and evaluation results for rehabilitation and improvement of both the construction and operational phases of the proposed Project are presented in the table below. The legend for the table is also shown here below:

PROJECT PHASE	PROJECT COMPONENT	IMPACT	DIRECTION	DIRECT/INDIREC T	REVERSIBILITY	EXTENT	DURATION	IMMINENCE	SIGNIFICANCE
Planning and Design	Environmental Impact	-Enhanced success and sustainability of the project	+	D	L	S	LT	Н	Н
phase	Assessment	-Prevention of conflicts with neighbouring farms	+	D	L	S	LT	Н	Н
		-Integration of environmental considerations in project implementation and management	+	D	L	S	LT	Н	H
		-Incorporation of stakeholders views in project formulation and implementation	+	D	L	S	LT	Н	Η
		-Enhanced consultations with stakeholders	+	D	L	S	LT	Н	Н

Table 4: Impact significance

		-Lack of cooperation and misunderstanding amongst various key stakeholders	-	D	Н	S	ST	Н	L
Construction phase	Construction the fence	-De-vegetation, soil erosion and alteration of landscape quality.	-	D	Н	S	ST	Н	L
		-Possible accidents and injuries to workers on the site	-	D	L	S	ST	L	Н
		-Increased generation of soil and debris	-	D	Н	S	ST	Н	L
Operations	Power supply to the fence and	-Enhanced settlement in the area	+	IND	Н	S	L	Н	Н
phase	operationalization	-Improved food security as a result of better crop yields.	+	D	Н	S	L	Н	Н
		-Enhanced biodiversity conservation through eradication of illegal grazers and charcoal producers	+	IND	H	S	L	H	Н
		-Improved security in the area	+	IND	Н	S	L	Н	Н
		-Conflicts mitigation and reduced hostilities between different land users	+	IND	Н	S	L	Н	Η
		Reduced human –wildlife conflicts	+	IND	Н	S	L	Н	Н
		Lack of proper project maintenance	-	D	Н	S	L	Н	Н
		Sabotage of the trench by people	-	IND	Н	S	L	L	Н
		Possible interference with game natural way of life	-	IND	Н	S	L	L	L

6.5 Results of the Impacts Analysis

6.5.1 Positive Impacts

The positive impacts of the proposed project activities are presented in the table below.

Table 5: Anticipated positive impacts

Project Phase Project Components	Project Activities	Positive impact
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Planning and Design Phase	Environmental Impact Assessment	-Consultations with community members and key stakeholders. -Determination of high priority areas.	-Determination of alternative designs and trench alignment. -Integration of environmental considerations in project implementation and management -Incorporation of community and stakeholders views for enhanced planning, re- designing and implementation -Incorporation of legal considerations and requirements in the project
Construction Phase	Development of trenches for game control and security purposes.	-Excavation of trenches	-Reinforcement to the existing electric fence -Cost effectiveness -Employment creation to the local population
Operations Phase	Commissioning of the trenches	Actual use of the trenches to prevent game movement into the community and unauthorized entry into the ranch	 -Alleviation of human-wildlife conflicts as a result reduced incidences of crop raids by wildlife. -Enhanced security in the area through hindering use of the ranch as a refuge for cattle rustlers. -Reduced tensions between the Ranch and the neighbouring communities. -Improved physical security in the ranches/conservancies -Conflict mitigation and reduced hostilities the ranch and pastoralists -Enhanced biodiversity conservation due to restricted access to unauthorized persons e.g. illegal charcoal producers and poachers. -Improved fence operations due to timely detection of deficiencies

6.5.2 Possible Negative Impacts

The negative impacts of the proposed project activities and mitigation measures are presented in the table below.

Project Phase	Project	Project Activities	Negative Impacts	Proposed Mitigation
	Components			Measures
Planning and Design Phase	Environmental Impact Assessment	-Consultations with community members and key stakeholders. -Determination of high priority areas.	-Misunderstandings between stakeholders and possible conflicts with neighbouring communities due to reduced access to the Ranch. -Lack of cooperation and misunderstanding amongst various stakeholders	-Enhanced consultations and stakeholders' scope of coverage during EIA study. -Provide requisite technical and socio-economic facts about the proposed project -Sustain the consultation process through establishing reliable communication mechanisms.
Construction Phase	Development of trenches for game control and security purposes.	-Clearing of the excavation sites. -Excavation of trenches using mechanized means. -Placement of soil from the excavation along the trench alignment.	-De-vegetation -Soil erosion -Alteration of landscape quality.	-Develop the trenches along already cleared areas (i.e. existing firebreak and security patrol access road) -Clear only the necessary areas. -Avoid densely vegetated areas. -Maintain dense vegetation around the area to prevent soil erosion. -Carryout the excavation of trenches during the dry season to prevent soil erosion as a result of stormwater/surface runoff.
			-Substandard excavation works	-Ensure use of appropriate machinery and equipment. -Institute a stringent monitoring system is put in place to inform the excavation activities conform to the desired specification and design. -Engage qualified personnel in the project activities.
			debris from the excavation activities	debris as strategic reinforcement to the trenches. -Ensure the soil is well lined along the trench configuration to prevent unsightly heaps of soil.

			Possible accidents	Koop a general accident
				-Reep a general accident
			and injuries to	inventory at the site
			workers during	-Provide and enforce use
			excavation activities.	of protective clothing and
				equipment such as gloves,
				boots, aprons, ear
				protection, etc.
				-Ensure occupational
				health and safety
				awareness creation before
				and continuously on the job
				-Provide a First Aid Box
				and have trained first
				aiders on site
				-Provide secure camps
				where necessary to house
				workers during the night to
				avert wildlife attacks
			-Noise and air	
			nollution	serviced machinery and
			polition	aquinment
				Noisy machines shall be
				-NOISY Machines shall be
				switched on when they
				stop onsite.
				-Limit construction to day
				time only.
				-Observe the Noise
				Regulations strictly
				-All workers should wear
				dust masks
			-Disruption of natural	-Plan construction time in
			serenity and game	response to movement of
			movement	wildlife within the areas to
				avoid or minimize
				disturbance and conflict
				-Employ humane
				approaches in
				translocation/movement of
				game in accordance to
				relevant wildlife legislation
				where necessary
				-Ensure the trenches do
				not interfere with thenatural
				wildlife dispersal patterns
Operations	Commissioning of	Actual use of the	Modification of the	-Construct drains to
Phase	the trenches	trenches to prevent	local hydrology	channel water away from
		game movement		the trenches to the natural
		into the community		course ways.
		settlements and		-Integrate spillway drains

	unauthorized entry into the ranch		into the design. -Avoid constructing the trenches along waterways and wetlands
		Possible emergence of breeding ground for disease vectors such as mosquitoes	-Ensure regular maintenance of the trench and spillway drains to prevent water stagnation. -Sensitize neighbouring households on disease prevention measures e.g. use of mosquito nets -Undertake other disease vector eradication measures such as spraying
		-Possible interference with game movement to and from the ranch.	during the rainy season. -Ensure the trenches do not cross ecologically sensitive areas such as well-known migratory routes/corridors. -Engage neighbouring ranches and relevant agencies in monitoring possible changes in game movement due to the presence of the trenches
		-Possible injuries and accidents to people, wildlife and livestock through falling into the trenches	-Establish the trench alignment along the inner section of the Ranch boundary. -Place soil mounds on the side to reduce wildlife coming into close contact with the trench. -Ensure adequate maintenance of the electric fence to deter people and livestock from getting close to the trench. -Strategic placement of warning signs and disclaimer signs along the fence alignment.
Monitoring and Maintenance of the project	-Maintenance activities including removal of soil, debris and vegetation. -Assessment of the project's effectiveness in game/human control.	-Inadequacy of the trenches in game/human control due to insufficient maintenance activities.	-Put in place a performance monitoring system to continuously inform the management on its effectiveness. -Assign personnel to periodically monitor the trenches and recommend adjustments/improvements. -Ensure adequate

-Possible a occupational and safety i on workers maintenance activities.

7.0 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 Introduction

The Environmental Management and Monitoring Plan will provide the basis for the implementation of the mitigation measures and provide a benchmark for the monitoring of the environmental performance of the proposed project through internal and external audits. The Environmental Management and Monitoring Plan has the important advantages of improving operational efficiency, promoting overall conservation and protection of the catchment area through improving risk management and reducing liabilities.

The EMMP involves measurement of relevant parameters and setting benchmarks, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality. The EMMP outlined in **Table 6** addresses the identified issues of concern (potential negative impacts) and mitigation measures as well as roles, costs and indicators that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the subject project.

To comprehensively implement the EMMP, the management should strive to:

- Do an evaluation that would assess whether or not project activities as designed have been successful i.e. whether or not the environmental status of pre and post-EIA has remained the same, changed for the better or worse.
- Implement project activities, co-ordinate and do follow-up management and monitoring of the mitigation measures for the project.

The EMMP is presented below.

Table 7: Environmental Management and Monitoring Plan for the adverse impacts

Project	Project	Negative Impacts	Proposed Mitigation	Verifiable	Estimated	Responsibility	Timeframe
Components	Activities		Measures	Monitoring	Costs		
Planning and De	sian Phase			Indicators			
		ſ		During the start	050.000		During planning
Impact	with	- Misunderstandings	and stakeholders' scope of	and alignment	250,000	-Ole Naishu Ranch	and design
Assessment	community	between	coverage during EIA study.	-Consultation		-EIA Consultant	phase
	members and	stakeholders and	-Provide requisite technical	approaches			
	key	possible conflicts	and socio-economic facts	used			
	stakeholders.	with neighbouring	about the proposed project	-Consultative			
	-Determination	communities due	-Sustain the consultation				
	areas	to the Ranch	establishing reliable	-EIA Sludy			
		-Lack of	communication	approuon			
		cooperation and	mechanisms.				
		misunderstanding					
		amongst various					
Construction Bh		stakenoiders					
Construction Fi	lase						
Development of	-Clearing of	-De-vegetation	-Develop the trenches	-Vegetation	200,000	-Ole Naishu	During
trenches for	the excavation	-Soil erosion	along already cleared	density		Ranch	construction
game control	Sites.	-Alteration of	areas (i.e. existing	-Soil erosion			phase
	-Excavation of	landscape quality.	netrol access road)	control measures in			
purposes.	mechanized		-Clear only the necessary	place			
	means.		areas.	Pierce			
	-Placement of		-Avoid densely vegetated				
	soil from the		areas.				
	excavation		-Maintain dense vegetation				
	along the		around the area to prevent				
	alignment		-Carryout the excavation of				
	Significant		trenches during the dry				
			season to prevent soil				
			erosion as a result of storm				
			water/surface runoff.				

-Substandard excavation works	-Ensure use of appropriate machinery and equipment. -Institute a stringent monitoring system is put in place to inform the excavation activities conform to the desired specification and design. -Engage qualified personnel in the project activities.	-Monitoring system in place. -Final design of the trench	150,000	-Ole Ranch	Naishu	During construction phase
Increased soil and debris from the excavation activities	-Use mounds of soil and debris as strategic reinforcement to the trenches. -Ensure the soil is well lined along the trench configuration to prevent unsightly heaps of soil.	-Soil conservation measures in place -Soil reuse and integration into the design.	100,000	-Ole Ranch	Naishu	During construction phase
-Possible accidents and injuries to workers during excavation activities.	 -Keep a general accident inventory at the site -Provide and enforce use of protective clothing and equipment such as gloves, boots, aprons, ear protection, etc. -Ensure occupational health and safety awareness creation before and continuously on the job -Provide a First Aid Box and have trained first aiders on site. -Provide secure camps where necessary to house workers during the night to avert wildlife attacks. 	-Accident Inventory -Number of accidents reported -First aid box and ERP notices -Induction sessions held -PPEs	120,000	-Ole Ranch	Naishu	During construction phase
-Noise and air pollution	-Ensure use of well serviced machinery and equipment	-Frequency of servicing -Noise levels	50,000	-Ole Ranch	Naishu	During construction phase

			-Noisy machines shall be	_PPFs				
			switched off when they	-Activities				
			stop opsite	schedule				
			limit construction to day	Schedule				
			time only					
			Observe the Neise					
			-Observe the Noise					
			-All workers should wear					
		Diamatica of	Dian agratuation time in	A	70.000		Malahu	During
		-Disruption of	-Plan construction time in	-Activity	70,000	-Ole	Naishu	During
		natural serenity	response to movement of	schedule		Ranch		phase
		and game	wildlife within the areas to	-Game				phase
		movement	avoid or minimize	translocation				
			disturbance and conflict	approaches				
			-Employ humane	employed(whe				
			approaches in	re necessary)				
			translocation/movement of	-Animal				
			game in accordance to	behaviour				
			relevant wildlife legislation					
			where necessary.					
			-Ensure the trenches do					
			not interfere with the					
			natural wildlife dispersal					
			patterns.					
Operations Phas	se							
Commissioning	Actual use of	Modification of the	-Construct drains to	-Storm	250,000	-Ole	Naishu	Throughout
of the trenches	the trenches to	local hydrology	channel water away from	water/surface		Ranch		operations
	prevent game		the trenches to the natural	water				phase
	movement into		course ways.	management				
	the community		-Integrate spillway drains	mechanisms.				
	settlements		into the design.	-Trench				
	and		-Avoid constructing the	alignment				
	unauthorized		trenches along waterways					
	entry into the		and wetlands.					
	ranch	Possible	-Ensure regular	-Sensitization	60,000	-Ole	Naishu	Throughout
		emergence of	maintenance of the trench	approaches		Ranch		operations
		breeding ground	and spillway drains to	employed				pnase
		for disease vectors	prevent water stagnation.	-Disease				
		such as	-Sensitize neighbouring	vector				

		mosquitoes	households on disease prevention measures e.g. use of mosquito nets -Undertake other disease vector eradication measures such as spraying during the rainy season.	eradication measures -Storm water management measures				
		-Possible interference with game movement to and from the ranch.	-Ensure the trenches do not cross ecologically sensitive areas such as well-known migratory routes/corridors. -Engage neighbouring ranches and relevant agencies in monitoring possible changes in game movement due to the presence of the trenches.	-Animal behavior -Monitoring reports	170,000	-Ole Ranch	Naishu	Throughout operations phase
		-Possible injuries and accidents to people, wildlife and livestock through falling into the trenches	-Establish the trench alignment along the inner section of the Ranch boundary. -Place soil mounds on the side to reduce wildlife coming into close contact with the trench. -Ensure adequate maintenance of the electric fence to deter people and livestock from getting close to the trench. -Strategic placement of warning signs and disclaimer signs along the fence alignment.	-Number of accidents reported. Final design of the trenches -Warning signs and notices.	50,000	-Ole Ranch	Naishu	Throughout operations phase
Monitoring and Maintenance of the project	-Maintenance activities including removal of soil, debris and	-Inadequacy of the trenches in game/human control due to insufficient	-Put in place a performance monitoring system to continuously inform the management on its effectiveness.	-Monitoring system in place -Personnel assigned.	150,000	-Ole Ranch	Naishu	Throughout operations phase

vegetation	maintenance	-Assian personnel to	-Stakeholders				
-Assessment	activities.	periodically monitor the	engaged				
of the project's	-Possible filling of	trenches and recommend	ongagoa				
effectiveness	the trench by	adjustments/improvements.					
in	people	-Ensure adequate					
game/human	hook.o	resources are available for					
control.		monitoring and					
		maintenance.					
		-Engage the local					
		community and other					
		stakeholders in detecting					
		breaches/deficiencies for					
		timely corrective measures.					
	-Possible adverse	-Provide and enforce strict	-PPEs	50,000	-Ole	Naishu	Throughout
	occupational health	use of PPEs.	provided		Ranch		operations
	and safety impacts	-Hire trained personnel for	-Presence of				phase
	on workers during	activities requiring skilled	First Aid kits				
	maintenance	labour.	-Trainings held				
	activities.	-Conduct regular training					
		sessions for first aid and					
		other emergency					
		responses.					
		-Provide First Aid kits and					
		ERPs.					

8.0 DECOMMISSIONING PHASE

8.1 Overview

The project will be undertaken in conformity with relevant county and national governments' legislation and regulatory requirements. The proponent has no short-term, medium-term or long-term plans for decommissioning of the Project. If need for decommissioning the project arises, the trenches will basically be backfilled with soil. The main objective in decommission will be to make the project site equivalent or better than its original condition.

However, before the project decommissioning is considered, regular review of the project during its operations phase will be carried out. In between this period, mini reviews will be done on annual basis, whose results will contribute to the final resolutions on the fate of the project. Environmental Audits shall also be relied upon to inform the process.

8.2 *Rationale for decommissioning*

Decommissioning of the project operations can occur due to the following reasons:

- (i) The trench fills up with sediment and it is no longer effective. This will be avoided by making the trenches secure from sedimentation and proliferation by weeds through regular monitoring and maintenance (desilting) and conservation of an adequately vegetated catchment area.
- (ii) Ole Naishu Ranch decides to decommission the trenches due to varied reasons such as cost implications, inadequate capacity for continued running of the project, allocation of the project sites for other uses that would not readily conform to the existence of trenches or any other substantial reason. The trenches will be backfilled with the soil placed along the trenches
- (iii) Recommendations from relevant government authorities. Ole Naishu Ranch will ensure that the project is undertaken as per the existing legal and institutional framework. This will include sourcing of requisite permits, licenses and constant consultation with relevant institutions/agencies in matters pertaining to the operation of the project.

Further, another aspect of decommissioning of the project that could be considered may arise due to change in ranch management. In the event of this, the new owner will assume all responsibilities associated with the project operations. Copies of all environmental reports, audits and NEMA correspondence will be made available to the transferee/recipient. The transferee/recipient will be expected to adhere to the environmental management plans and any other issues appended in the documentation

8.3 Anticipated activities and impacts in decommissioning phase

In summary, de-commissioning phase will involve the following:

- Notification of intent to cease operations to the relevant regulatory agencies;
- Liaise with stakeholders and project consultants including engineers, and environmentalists to ascertain guidelines, anticipated de-commissioning impacts and mitigation measures.
- Inform NEMA on any planned demolition activities
- Return the EIA license to NEMA

The anticipated adverse impacts from de-commissioning activities include but not limited to the following:

- Re-emergence of tensions between the ranch and neighbouring pastoral communities.
- Deterioration of security in relation to cattle rustling and theft of ranch property.
- Inadequate game control and possible re-emergence of human-wildlife conflicts.
- Reduced agricultural productivity as a result of crop destruction by wildlife.

9.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Development of new projects are now preceded by critical analysis and assessment of the proposed activities and operations as required by EMCA through conducting of Environmental Impact Assessment (EIA) to provide indications of the likely environmental consequences of the proposed activity. This EIA study has identified both negative and positive impacts of the proposed project, how it affects people, their property and the general environment.

The analysis of the EIA project report has evidenced that the implementation and operation phases of the proposed project will likely have positive impacts to the affected community. The impacts will include:

- Increased physical security in the area.
- Reduced human-wildlife conflicts.
- Increased agricultural production.

Environmental concerns that are associated with this project implementation with potentially negative impacts were established and included: -

- Injuries to workers during the project activities
- Soil erosion as a result of the vegetation clearance.
- Modification of local hydrology and ecology.

8.2 Recommendation

In alleviating the negative impacts that may emanate from the implementation of the project, the proposed mitigation measures should be incorporated during entire phases of the project. This will ensure that environmental management strategies are incorporated at every stage thus ensuring that the negative impacts are proactive identified and forestalled before they occur. The principle objective should be geared towards minimizing the occurrence of impacts that (may) have the potential to degrade the general environment. This will be effectively achieved through close monitoring and adoption of the recommended Environmental Management and Monitoring Plan (EMMP).

On the basis of the results of this EIA, it is apparent that with the adoption and implementation of the Environmental Management and Monitoring Plan, the adverse impacts will be adequately mitigated against. In addition, foreseeable potential impacts will be forestalled before they occur thereby considerably limiting future environmental damage and ensuring the existence of a clean and healthy environment. Accordingly, as per Section 58 of EMCA and Part II, 10(2) of Environmental (Impact Assessment and Audit) Regulations, 2003, we recommend that the proposed project be implemented and we recommend that**OLE NAISHU (2000) LIMITED** be issued with EIA license for the **Proposed Digging of Game/ Security Trenches at Ole Naishu Ranch, Laikipia County.**

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APPENDICES

Appendix 1: Leopold's Matrix of Impacts Analysis

IMPACT ON		Soc env	cial vironm	ent		econc	omic	Bio	Hu n E	ma Inv	Physical Environment																
PROJECT PHASE	PROJECT ACTIVITY	Conflicts	Employment	Public Health	Social responsibility	Benefit to community	Cost to community	Ecological Function	Wetlands ecosystems	Migratory Species	Aquatic ecosystems	Vegetation	Alien Species	Species Diversity	Pests and Disease Vectors	Diseases	Health and safety	Water quality	Soil Erosion	Groundwater	Siltation	Surface Run-off	Solid waste management	Aesthetic/scenic quality	Dust levels	Surface Water	Air pollution
Planning and Design	Surveying and determination of the trench/game trenches alignment	0	+1	0	+2	+2	0	0	0	0	0	0	0	0	0	0	+2	0	0	0	0	0	0	0	0	0	0
	Environmental Impact Assessment	+ 2	+2	+ 2	+2	+2	+ 2	+2	+ 2	+2	+2	+2	+ 2	+2	+2	+ 2	+2	+ 2	+ 2	+ 2	+ 2	+ 2	+2	+ 2	+ 2	+ 2	+ 2
Construction Phase	Site preparations e.g. clearance of debris	0	+2	0	0	+2	0	-1	-1	0	0	-2	0	-1	0	0	-1	-1	-1	0	-1	-1	-1	-2	-1	-1	-1
	Excavation works	0	+2	0	0	+2	0	-2	0	0	0	-1	0	0	0	0	0	0	-1	0	0	-1	0	-1	0	0	-1
Operation Phase	Operation of the game/security trenches	+ 1	+2	0	+1	+2	0	-1	-1	0	-1	+1	0	0	0	0	-1	0	+ 1	0	0	0	-2	+ 1	0	0	0

Appendix 2: Signed Comments from stakeholders

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	STAKEHOLDERS' INTERVIEW IMPRESSION Ole Naishu Ranch intends to dig game/security moats along the eastern boundary of the ranch. Before such an activity starts, EMCA 1999 requires that an Environmental Impact Assessment is undertaken. One of the key requirements of an EIA is stakeholders' consultations. To achieve this and for this particular project, we request you to assist us fill this check list.
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~49	2. What are the likely positive impacts of the project activities? Thuman mildle conflicts will be eignificantly be activessed 2. Tension between the Raugh and Pestorel commutes Made have left to what mill be reduced active sed active sed
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	4. How can the potential negative impacts be reduced or avoided?
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STAKEHOLDERS' INTERVIEW IMPRESSION Ole Naishu Ranch intends to dig game/security moats along the eastern boundary of the ranch. Before such an activity starts, EMCA 1999 requires that an Environmental Impact Assessment is undertaken. One of the key requirements of an EIA is stakeholders' consultations. To achieve this and for this particular project, we request you to assist us fill this check list.

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Name Etanasio. Mbariut	sign
ID number 10899063Mobile phone.0	276635Date 19-12-2016 -

STAKEHOLDERS' INTERVIEW IMPRESSION

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4. How can the potential negative impacts be reduced or avoided?

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3. Improved aquie	altural Production for the local
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Negative impacts and mitigation measures

3. What are the likely negative impacts of the project activities?

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access into the rand for grass pasture	

4. How can the potential negative impacts be reduced or avoided?

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The ranch mill engage other stateholders in	
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Name ANTHORY MWANGI MURUIY sign Allumet ID number 328163) Mobile phone 323983664 Date 19 12 2016

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STAKEHOLDERS' INTERVIEW IMPRESSION Ole Naishu Ranch intends to dig game/security moats along the eastern boundary of the ranch. Before such an activity starts, EMCA 1999 requires that an Environmental Impact Assessment is undertaken. One of the key requirements of an EIA isstakeholders' consultations. To achieve this and for this particular project, we request you to assist us fill this check list. 1. Are you aware of this project development and if so what are the intended activities (describe in your own words all what the project is all about) les and I support the project completely 1 -4 1 1 **Positive Impacts** 2. What are the likely positive impacts of the project activities? a increased security. 11..... • Negative impacts and mitigation measures 3. What are the likely negative impacts of the project activities? 4. How can the potential negative impacts be reduced or avoided? Name Josphal Mundny sign J Eo

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STAKEHOLDERS' INTERVIEW IMPRESSION Ole Naishu Ranch intends to dig game/security moats along the eastern boundary of the ranch. Before such an activity starts, EMCA 1999 requires that an Environmental Impact Assessment is undertaken. One of the key requirements of an EIA ris stakeholders' consultations. To achieve this and for this particular project, we request you to assist us fill this check list. 1. Are you aware of this project development and if so what are the intended activities (describe in your own words all what the project is all about) The Ole Naisho eastern boundary, and is intended to reduce cropraight by Elephants trespass and illegal grazing and thegt of livestallt 2. What are the likely positive impacts of the project activities? - Reduction in thest of British Army equipment - Reduction in thest of British Army equipment - Reduction in thest of Investock - Improved security - Better relationships with crop garming neighbours Negative impacts and mitigation measures 3. What are the likely negative impacts of the project activities? -Visible star on the Landscape - Possible crosion - Growth of Stramonium on disturbed land 4. How can the potential negative impacts be reduced or avoided? - Maniforing - Seeding by grass - Correction Sy crosion when identified - Uproot stramonium plant when observed 1

Name MICHAER ROBERTS sign Michael Rolor ID number 22072355. Mobile phone 0720662646 Date 19/12/2016

Appendix 3: Copies of illegal grazing, assault, malicious damage and arson incidences reported



OLE NAISHU (2000) LIMITED

P.O. BOX 39, NANYUKI 10400, Tel 0720927837

Email:- olnaishu@gmail.com

15th December 2016

Assault, malicious damage and arson

- 30th June 2016 Ole Naishu security, John Mangondu attacked and injured after finding 144 sheep & goats grazing illegally. OB 6/30/6/2016
- 7th September A stone store was broken into and an energizer, battery and charge controller stolen. OB 11/8/9/2016
- 12th September 2016 Fire started at 1am by unknown
- 21st September 2016 Security staff found 70 head of cattle grazing illegally Security man, John Muthengi was attacked by Morans and seriously wounded. OB 4/22/9/2016
- 22nd September 2016 Umande police caught and arrested two people lighting fires. OB No. 8/22/2016. Case still in court
- 28th September 2016 Fire started by unknown OB/5/27/9/2016

28th October 2016 – Two Morans arrested - caught cutting and destroying the Ole Naishu fenceline on Eastern Boundary. OB No. 15/28/10/2016

 30th November 2016 – Windows removed and items stolen from Kudu Camp OB No 6/30/11/16

Theft of Livestock

• 8th December 2016 - 5 head of cattle stolen. OB No. 16/8/12/2016

THE KENYA POLICE P3 MEDICAL EXAMINATION REPORT PART I-(To be completed by Police Officer requesting examination) OCS UMANDE POLICE STA Ref. 06. 4 BOX 23 NKI Date 22/9/2016 To the M. O.H NANYUK, TEXCHAG Hospital/Dispensary. I have to request the favour of your examination of :---56-IRS OFFN MUTEUI MOJINE Name (if known) Address Co OLENKISHU Date and time of alleged offence 21/9/16 J 2330HRI Sent to you/hospital on the 27TH SEPT. SELF 2016 under escort of and of your furnishing me with a report of the nature and extent of bodily injury sustained by him/her. 22/9/2016 AT 0630HR Date and time reported to police..... Ceportee allers to ARVE Brief details of alleged offence. Magai NORALIS been Caulted WellKaswa 0011 les tain ature of Police Offic PART II-MEDICAL DETAILS-(To be completed by Medical Officer or Practitioner carrying out examination) (Please type four copies from the original manuscript) SECTION "A"-THIS SECTION MUST BE COMPLETED IN ALL EXAMINATIONS Medical Officer's Ref. No 1. State of clothing including presence of tears, stains (wet or dry) blood, etc. 12 No With 1110 000 2. General medical history (including details relevant to offence)... ATICNT (1)25 Les 0 Ch 9 . W1 2530u Juknown 3. General physical examination (including general appearance, use of drugs or alcohol and demeanour) won general i 4002 Condi 5-011-A 01-

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THON "B" TO BE COMPLETED IN ALL CASES OF ASSAULT, INCLUDING SEXUAL ASSAULTS, AFTER THE COMPLETION OF SECTION "A" 1. Details of site, situation, shape and depth of injuries sustained. (a) Head and neck Bleeding deprended # on the forche ad , measuring & by 5 cm and 21.8 cm in slept (b) Thorax and abdomen No Enjusies (c) Upper limbs. NO imprises (d) Lower limb. NO 1-JUST 21 2. Approximate age of injuries (hours, days, weeks) FALTH INSURY Bleding OPPON. 2-3 hrs 3 Probable type of weapon(s) causing injury BWnt Object 4. Treatment, if any, received prior to examination ABWDAic, Afgenic SUNGHAY = NOURDENGENT. of Mothers Hospil 5. What were the immediate clinical results of the injuny sustained and the assessed degree, i.e. "harm", "main", of "grevious harm".") "Harm" means any bodily hurt, disease or disorder whether permanent or temporary. "Maim" means the destruction or permanent disabling of any external or internal organ, member or sense. "Greating the destruction of permanent disabiling of any external or internal organ, member or sense. "Greating Hurm" means any harm which amounts to main or endangers life, or sensusly or permanently injures health or which is likely so to mure health, or which extends to permanent disfigurement, or to any permanent or serious injury to any st real or internal organ. Practitioner P.O. Bes 20, NANY