Kenya Power

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR PROPOSED NAROK-BOMET DOUBLE CIRCUIT 132KV TRANSMISSION LINE

TAKE OFF:

Eastings - 825264.4;

Northings-9879148.3

Latitude: 1°5'31.70S

Longitude: 35° 55'15.99E

TERMINAL:

Eastings -753992.71

Northings- 9914036.45

Latitude: 0°46, 45.75"S

Longitude: 35°16'59.96

SEPTEMBER **2018**

Project Client:

Kenya Power and Lighting Company (KPLC)

Project Financial:

French Development Agencies (AFD)

Environmental & Social Management Plan

1.1 Project Information

Kenya Power and Lighting Company (KPLC) through the assistance of French Development Agencies (AFD) plans to construct, commission and operate a 85 Kilometers, 132kV power transmission line in Narok and Bomet Counties. This is in response to an increase in demand for power and the need to expand electricity infrastructure. Power outages are common occurrence especially in south rift region and its surrounding environments. The construction of the proposed transmission line will result in reliable and quality power supply for the area and its environs. Since the proposed transmission line will impact the environment both positively and negatively. This Environmental and Social Management Plan (ESMP) has been prepared to guide this project implementation.

1.2 Project Location and Route

The proposed route starts at Narok 132kV substation at *(Eastings-825264.4, Northings-9879148.3 and Altitude-1959), plot no. Ilmasharian 329* where the T-off point is proposed. It traverses through Ilmasharian and Olopito sub locations towards the North West on a straight line for 8.25 kilometres where the second angle point is proposed at (*Eastings*-819858*, Northings*-9885352 *and Altitude-2022), Plot No. Olopito 1268,* before the line crosses the Narok-Nakuru road just after the telecommunication boosters.

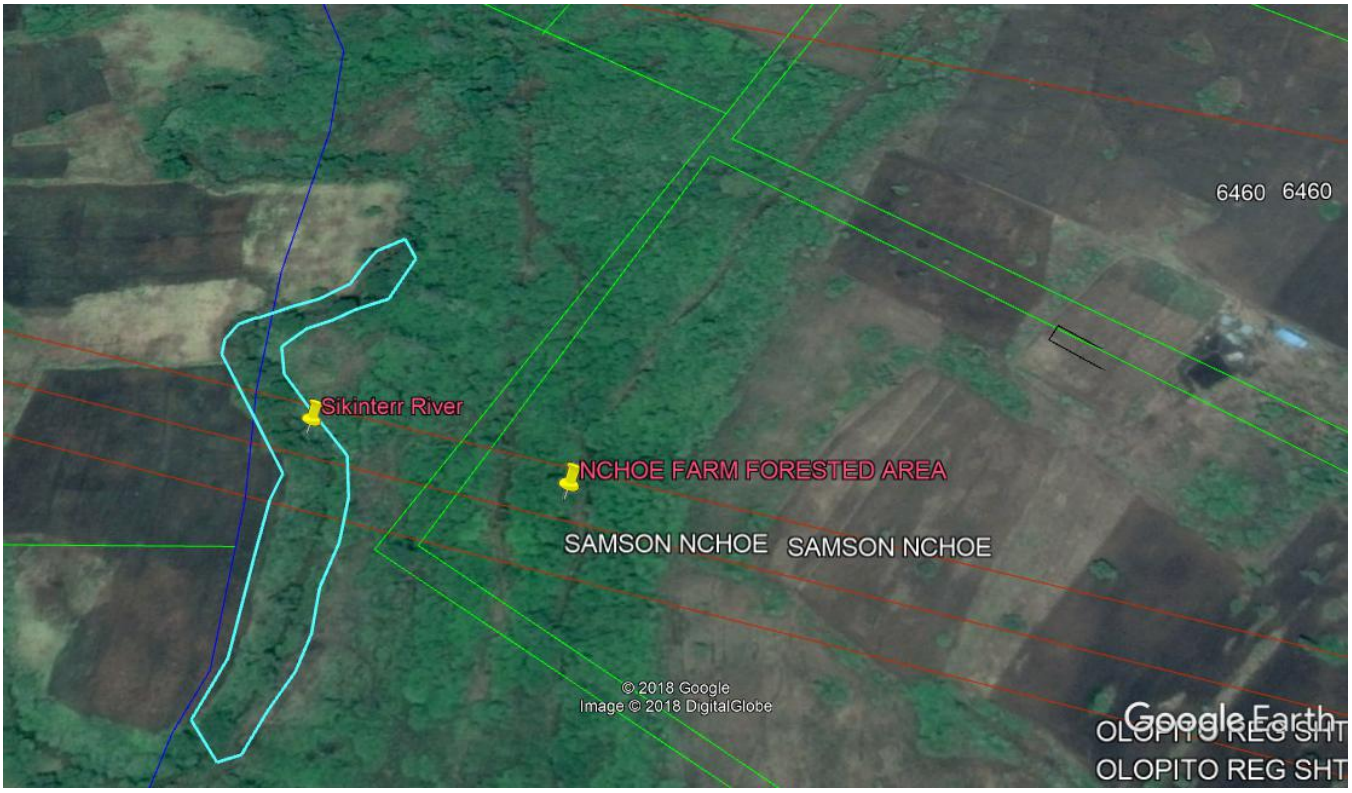
The line takes a slight turn to the left and traverses through Olorroito and Nkareta sub locations on a straight line towards the west for another 13.1 kilometers where another angle point (*Eastings*-807168*, Northings*-9888615 *and Altitude*-2016*)* , *plot no. Nkareta 149,* is proposed. The proposed line is on the south side of Olorroitto primary school.

The proposed line takes a slight turn to the left and traverses Nkoben, kotelian, Olshapani and Ololulung'a sub locations towards the west on a straight line for about 9 kilometers where another angle point at (*Eastings*-798616*, Northings*-9891997 *and Altitude*-2015*)*, *Plot No. Ololulunga 3/3454, is* proposed at Ololulung'a. The line is on the northern side of Kotolian primary school and also traverse between the school and the telecommunication booster at Kotolian centre. The line is on the northern side of Ololulung'a market/ town. The line takes a slight angle to the left and traverse Ololung'a and melelo sub locations towards the west on a straight line for about 13 Kilometers where another angle point at (*Eastings*-783973*, Northings*-9898660 *and Altitude*-1979*) plot no. Ololulunga 155*.

The line crosses to Bomet county at Amalo river which feeds into Mara river. The line descends from hills at Ilmotiook sublocation where it take a turn at angle point B7 (Eastings 775319.82, Northings 9903452.80) near Aganga catholic church to cross the river and traverse farms in Koibeyon sublocation before heading to Kiptulwa sublocation after crossing simwaga river in Kapkimolwa location for 5.2kms where the line has another angle point NB8 (Eastings 770973.67, northings 9905610.51) in Kapkimolwa location near kiptulwa secondary school, the line then scale up the hills and valleys before crossing to lebekwet area in Kongotik sublocation in Kembu where it runs for 14kms passing through Emitiot and Cheboin sublocation in Cheboin location and Koitabsilbwet and Kyogong sublocations in Kyogong location where another angle point NB 9 (Eastings 757600.71, northings 9910825.46) the line then turn westward and runs for 13kms to angle point NB10 (Easting 754810.71, northings 9912767.45) at Itembe sublocation at land LR No. Itembe 813. The line then proceeds for another 2.5kms before another angle point NB11 (Eastings 753863.71, northings 9914008.64) turning towards northern part to Bomet substation running for 0.85kms to join the terminal point ((Eastings 753992.71, northings 9914036.45) at the Bomet 132kV substation at sachagwan area.

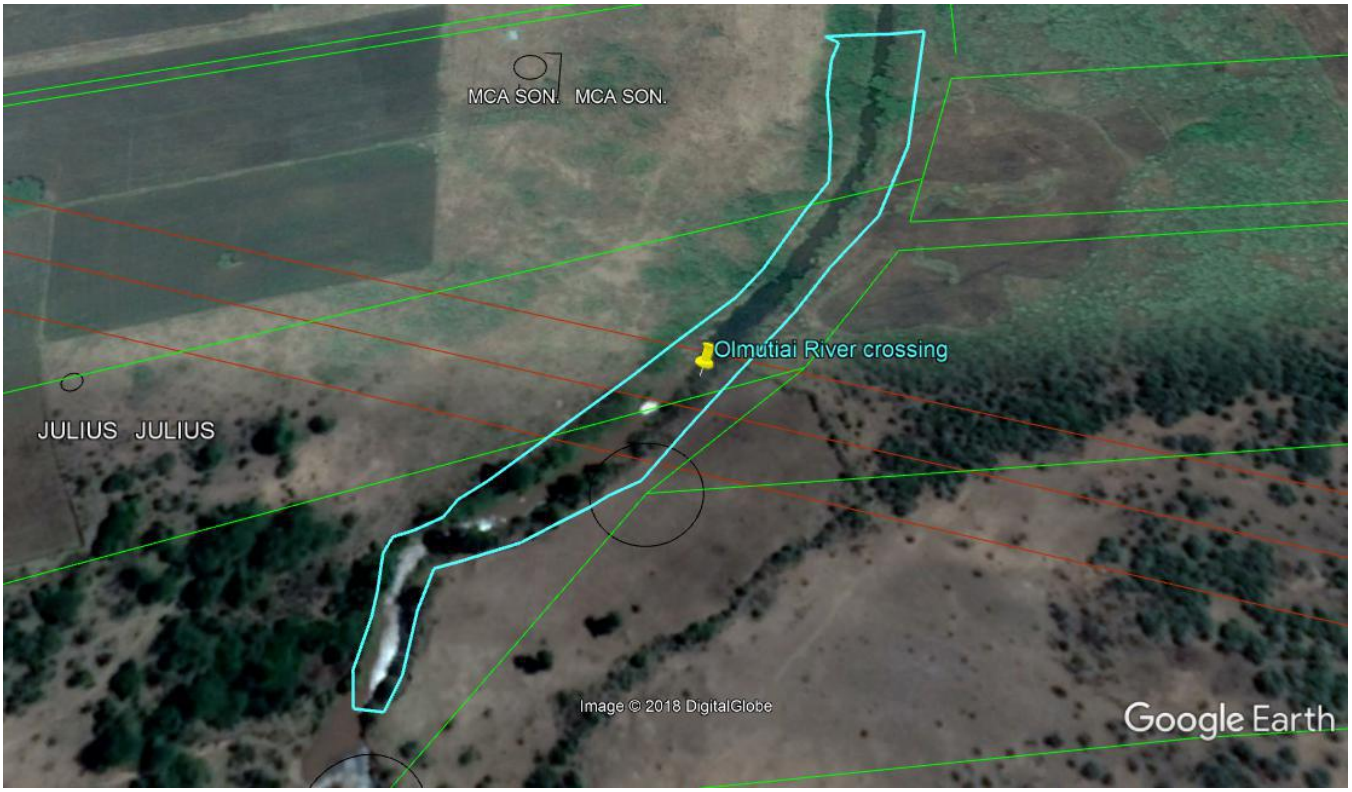
Some of the notable and critical environmental and social issues along the route of traverse of the project are as shown as per the screen shoots as shown below. The project map showing them will come as an attachment.

SIKINTERR RIVER AND NCHOE FARM FORESTED AREA CROSSING

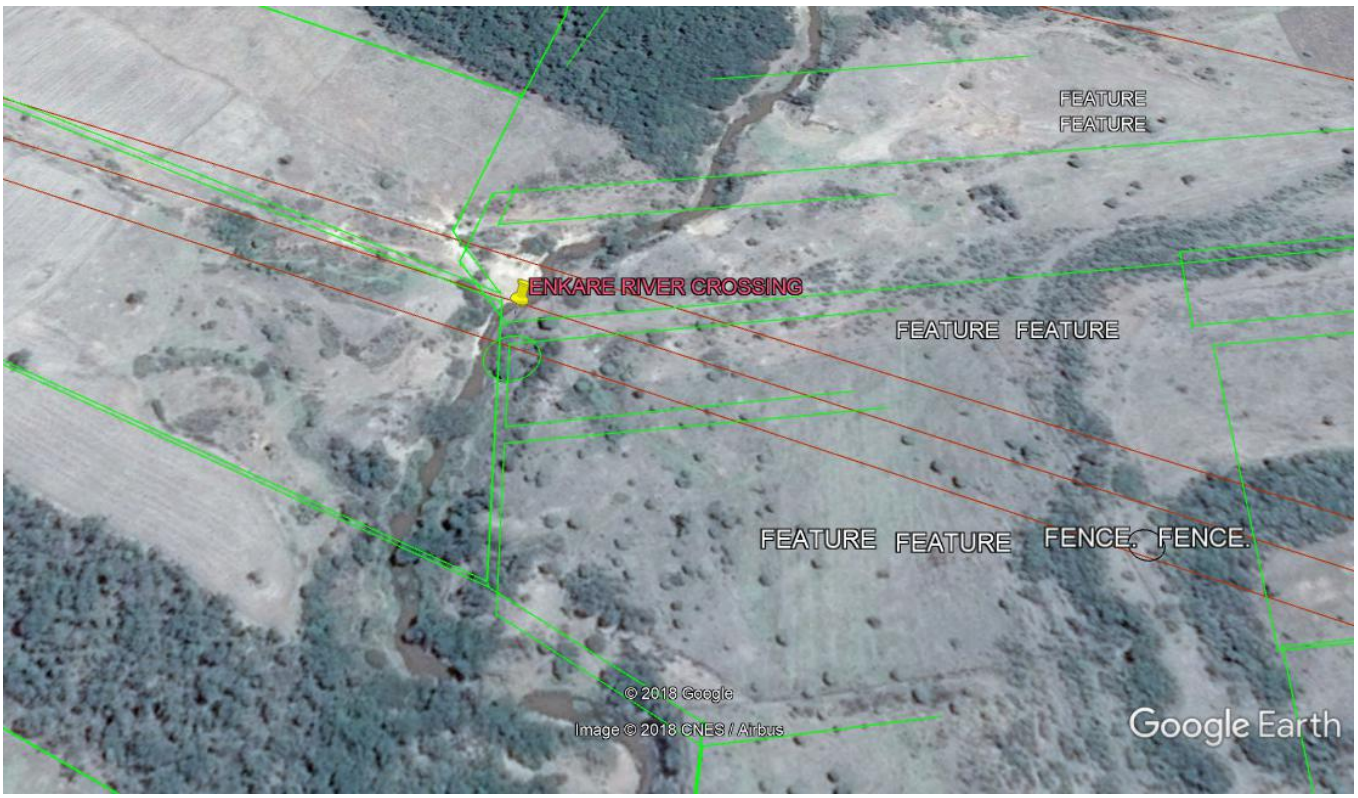


NTUTU FARM FOREST PATCHES

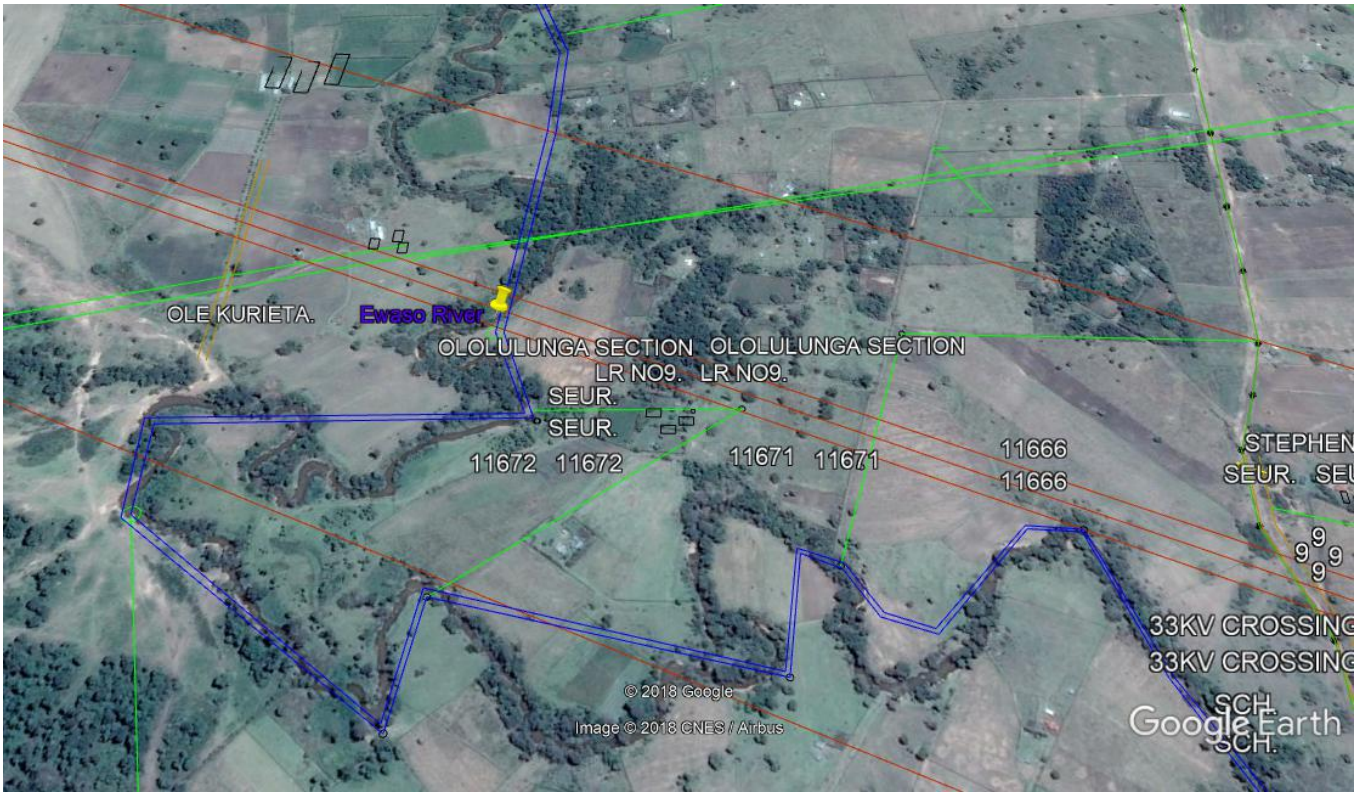
OLMOTIAI RIVER CROSSING



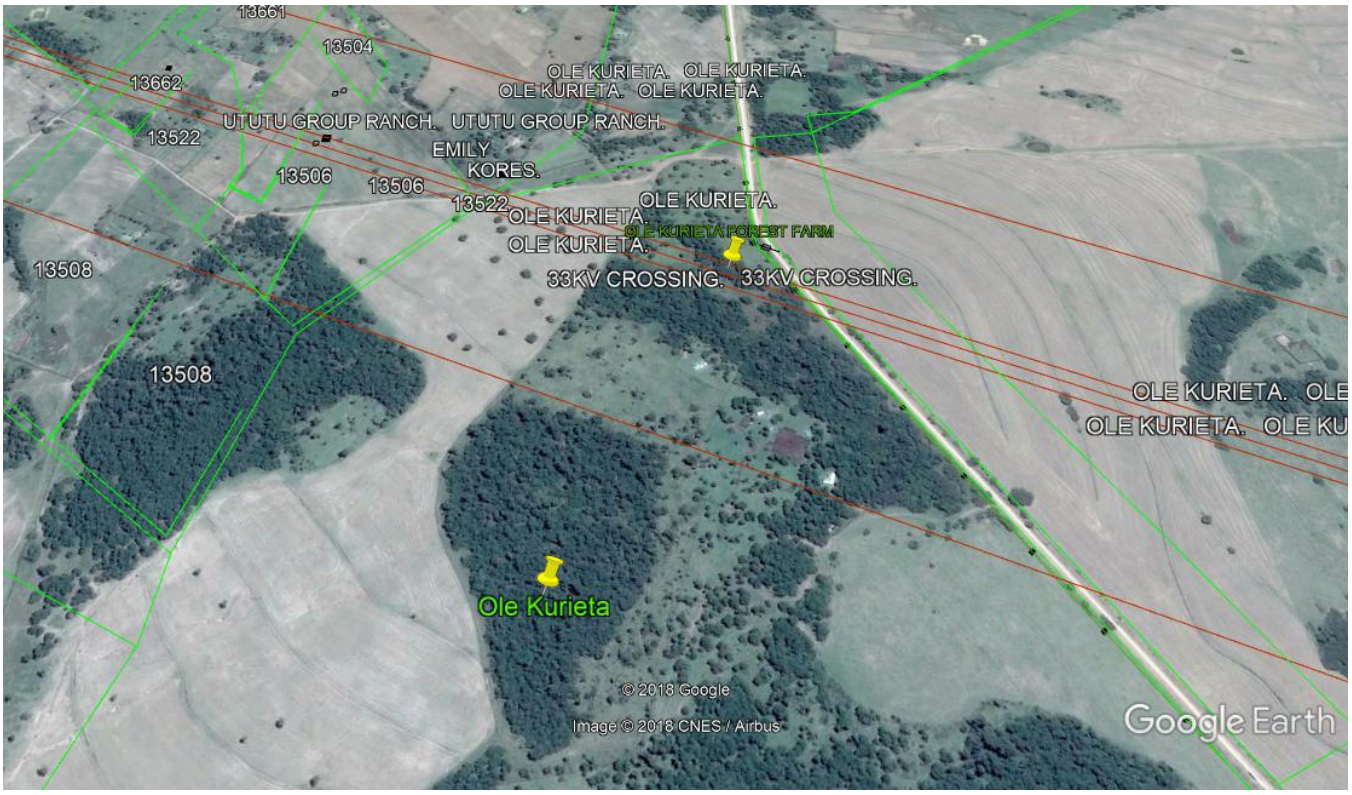
ENKARE RIVER CROSSING



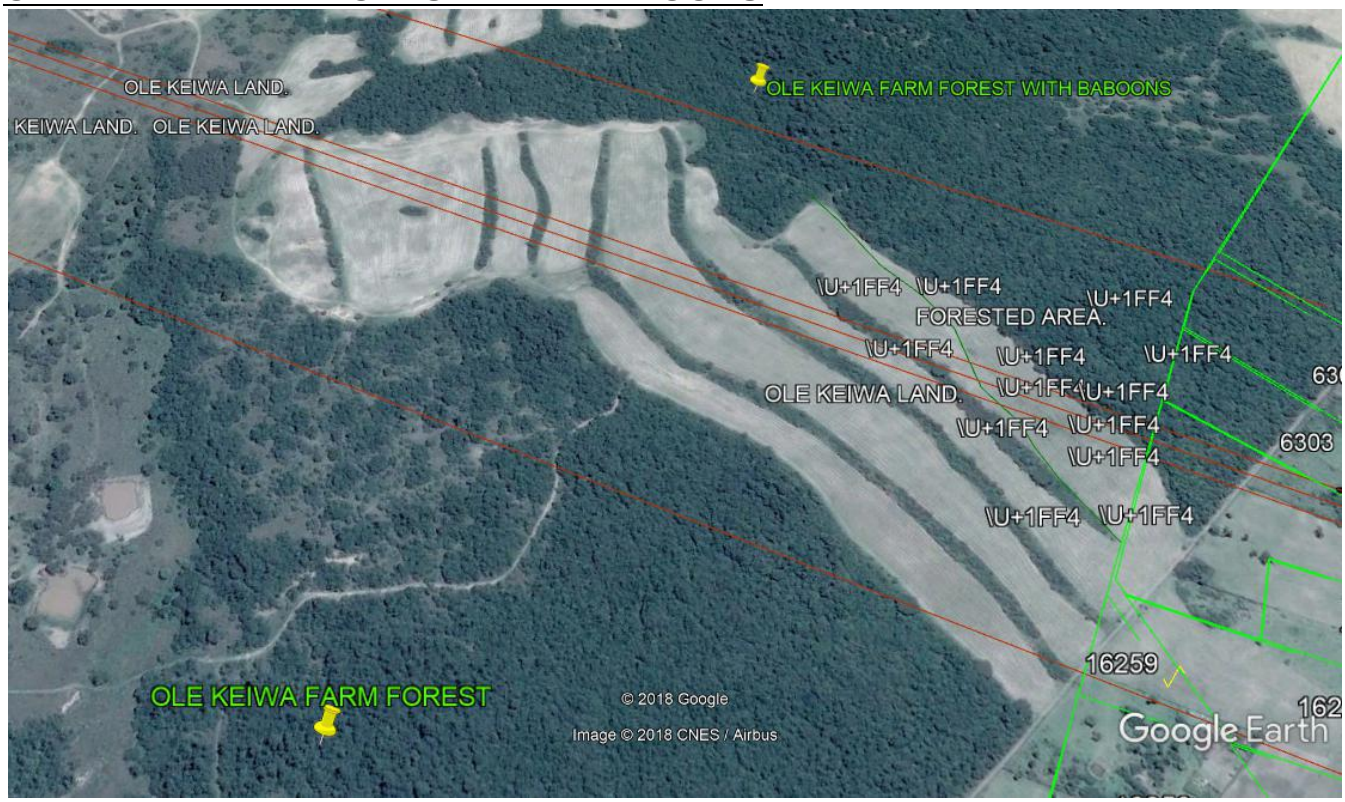
EWASO NYIRO RIVER CROSSING



OLE KURIETA FARM FOREST WITH BABOONS



OLE KEIWA FARM FOREST WITH BABOONS

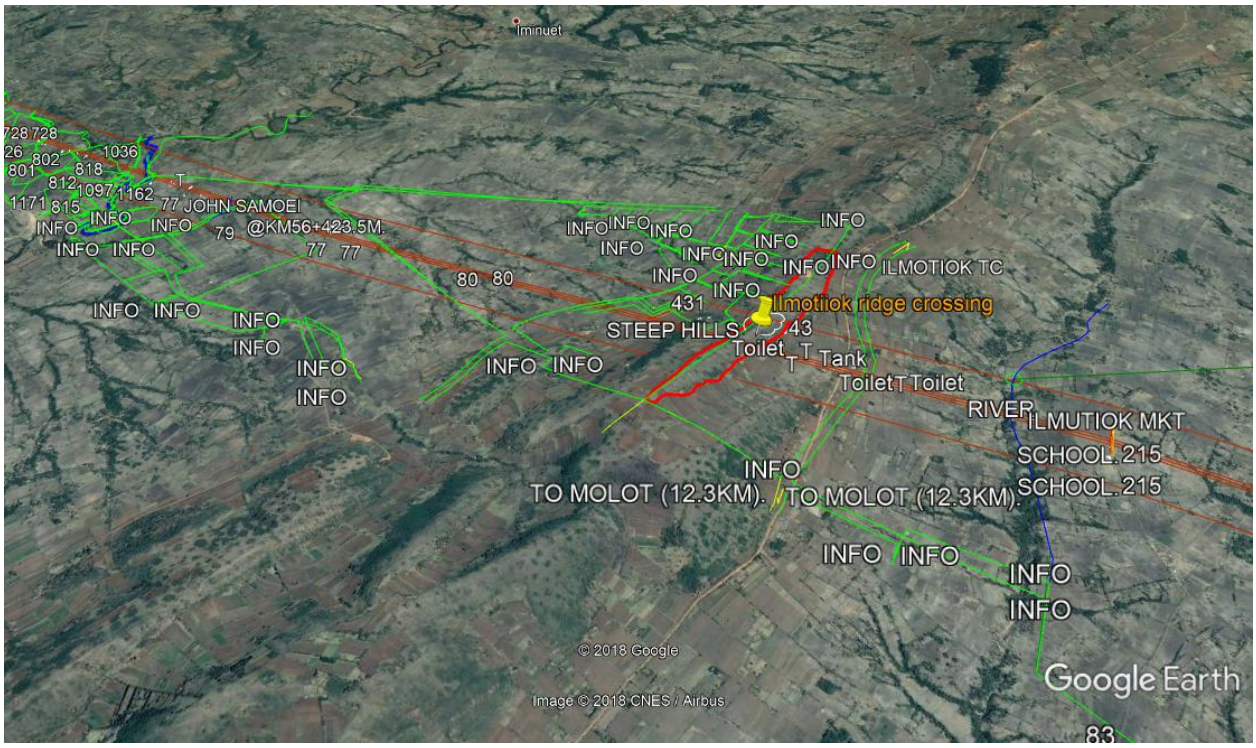


Line crossing mainly wheat farms touching the baboon forest at the periphery

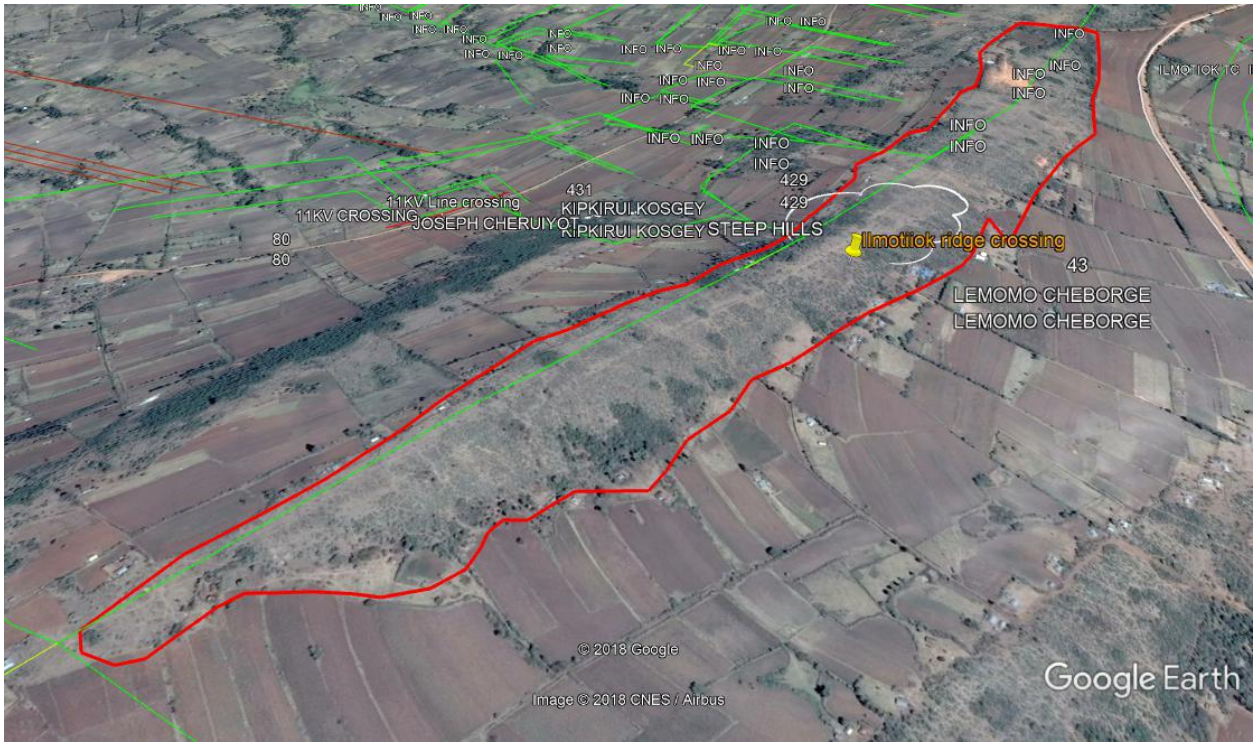
Small Section of Ole Keiwa farm forest crossed by the powerline

ILMOTIOOK RIVER CROSSING

ILMOTIIOK RIDGE CROSSING

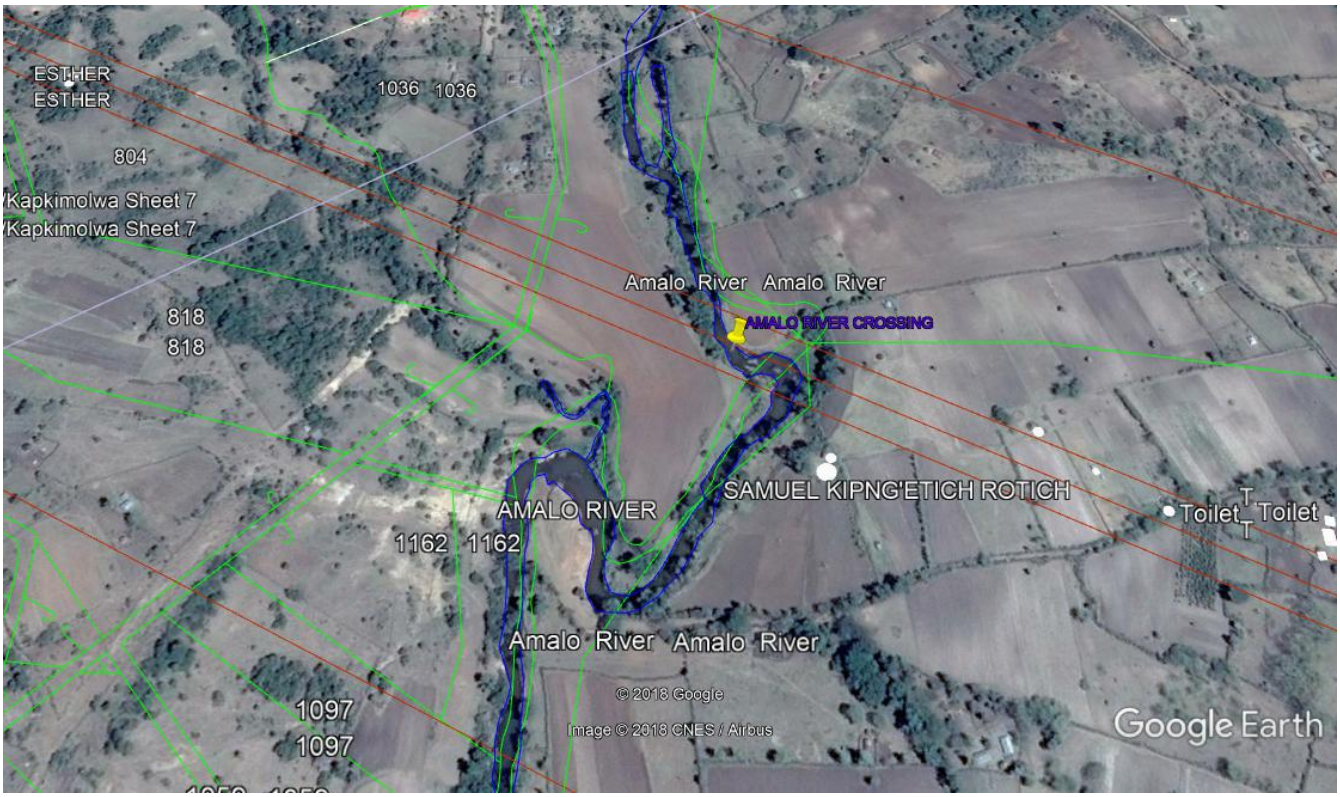


Ilmotiook ridge crossing



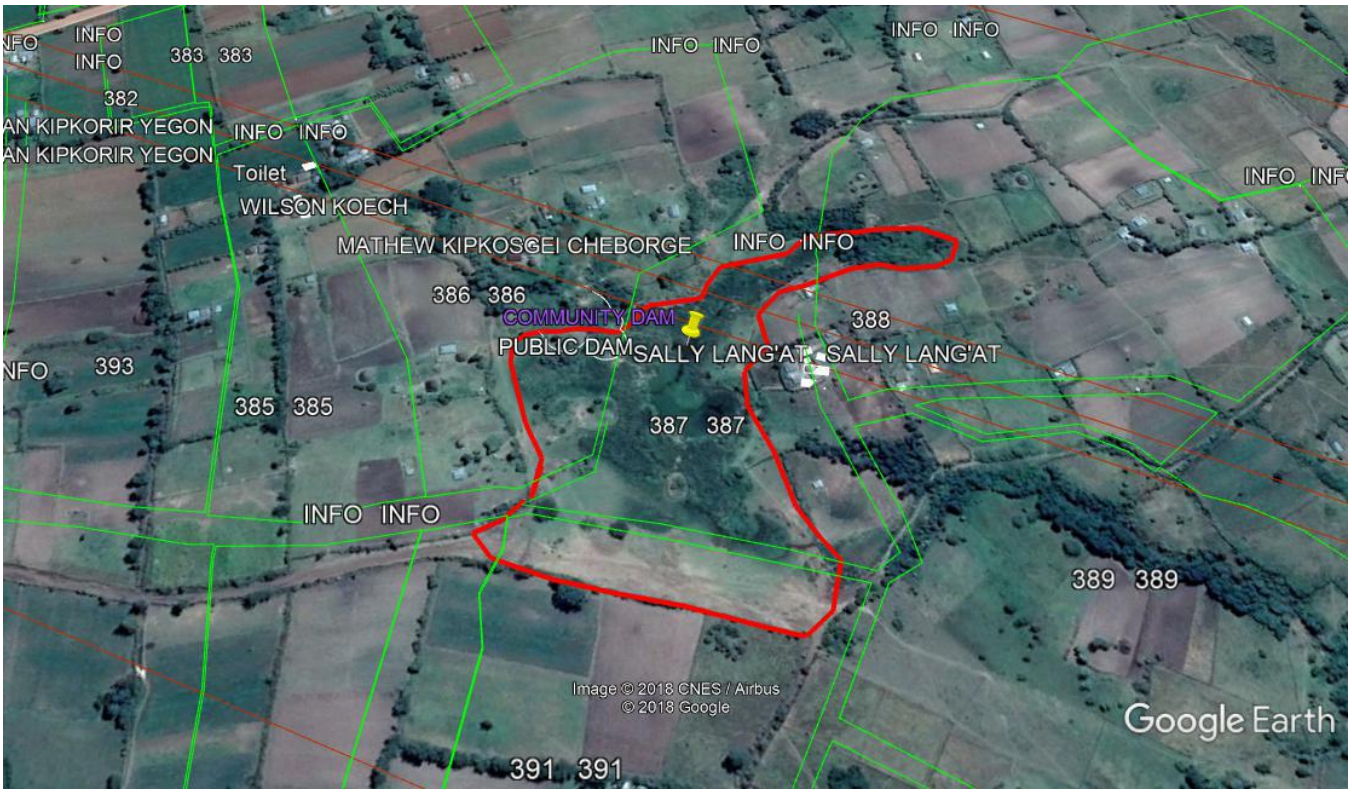
Ilmotiook ridge crossing enlarged

AMALO RIVER CROSSING

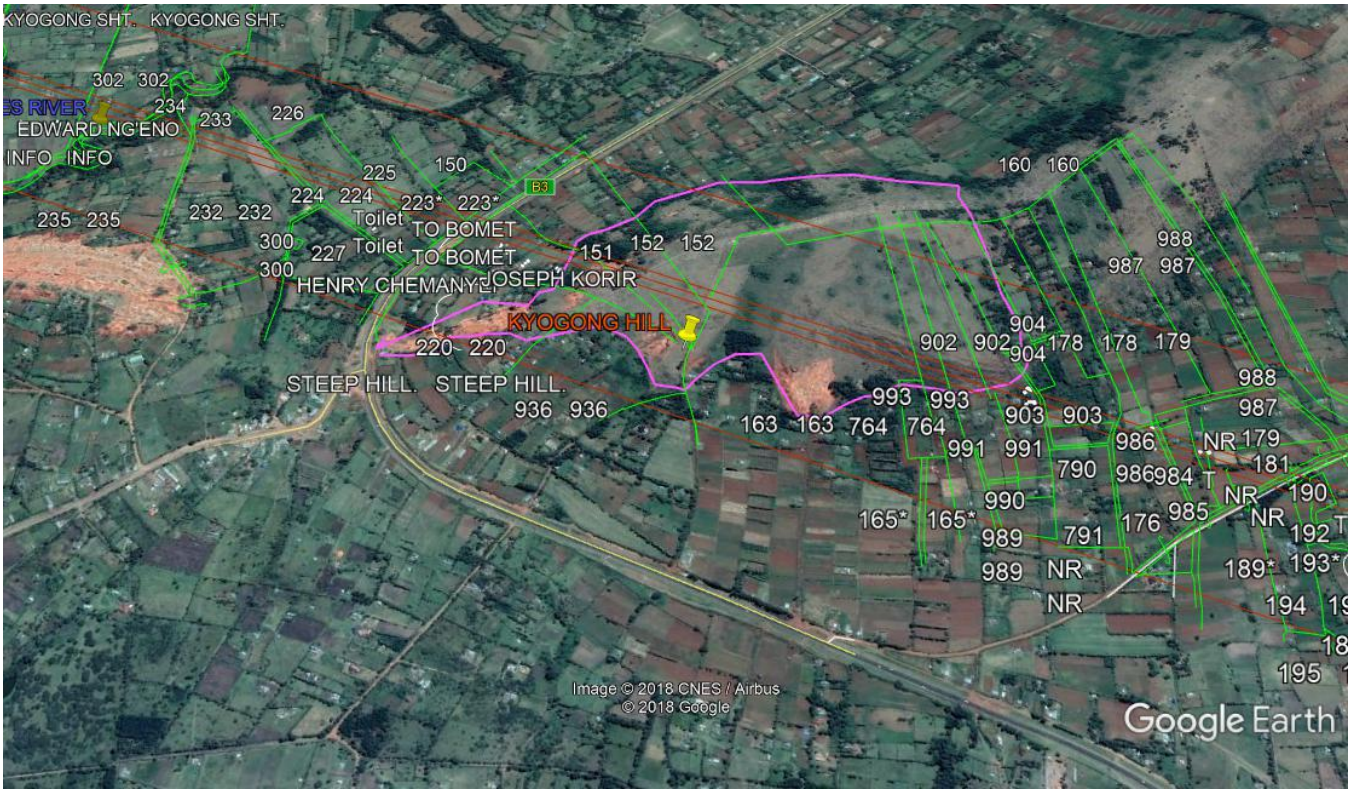


SIMWAGA RIVER CROSSING

COMMUNITY DAM CROSSING



KYOGONG HILL CROSSING



NYOGORES CROSSING

1. Environmental Management Plan

Environmental and Social Management Plan (ESMP) for development projects provides a logical framework within which identified negative environmental and socio–economic impacts can be mitigated and monitored. In addition, the ESMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. ESMP is a vital output of an Integrated Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMP outlined below addresses the identified potential negative impacts and mitigation measures of the proposed Narok-Bomet 132kVTransmission Line during construction, operational and decommissioning phases, based on the Chapter of Environmental Impacts and Mitigation Measures of the expected Negative Impacts.

This section presents the environmental and social management plan (ESMP) for the proposed project. The ESMP specifies the mitigation and management measures which the Proponent will undertake and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP covers information on the management and/or mitigation measures that will be taken into consideration to address impacts in respect of the following project phases: design, construction, operation and decommissioning. **Table 1 and 2** presents the generic and site-specific mitigation measures for the potential impacts of the proposed project

2. Approach to Environmental Impact Management

The proposed ESMP will be the responsibility of the proponent and the contractor as outlined. **The section below** presents the range of approaches that will be used to manage potential impacts of the proposed project. KPLC as the proponent will have to constitute a team including project engineer and Environmental and Social specialist to coordinate implementation of the ESMP. The contractor on his part will have to appoint EHS officer to coordinate ESMP implementation during construction period. During construction KPLC Engineer and SHE officer will ensure continuous supervision and monitoring of activities by the contractor as per recommendations in the ESMP. E&S reporting will be done on regular basis will be captured in the construction site log, periodical E&S reviews with the Engineer, E&S monthly or quarterly. The Engineer will be required to generate various reports including production of minutes of monthly site visits and quarterly supervision reports. While the SHE Officer will be required to provide reports on environmental, social and safety issues compliance on quarterly basis. The contractor will be required to regular report Environmental, social and safety issues on Monthly basis. The aspect to be reported by the contractor will include safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections and audits by contractor, engineer, or others, including authorities.

Management of Impacts during Construction Phase

The ESMP will put in place measures to avoid and mitigate impacts and optimize benefits arising from activities during construction phase of the project. The principal focus of project management for construction phase will include:

- Personnel and contractor management
- Conduct onsite management
- Landowners relations
- Maintenance of complaints register
- Emergency preparedness; and
- Management and mitigation of impacts such as noise, dust, safety and pollution.

Assignment of responsibility and contractor management is important during the construction and operation phase. The contractor will be held to the highest EHS performance requirements to ensure they meet national and international standards

All the works for the project will be under the supervision of KPLC project Engineer.

3. Management Plan during construction phase

The following management plans will be implemented during construction phase of the proposed project:

- Construction management plan
- Labour and human resources plan
- Workplace health and safety plan
- Community safety plan
- Emergency management and response plan
- Rehabilitation and closure management plan

3.1 Construction Management Plan

The construction management plan for the proposed project shall include the following:

a. Management of fuels and other hazardous materials

- The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.

b. Management of the construction site

- The contractor shall prevent littering and the random discard of any solid waste on or around the construction site
- The contractor shall manage hazardous waste

c. Emergency Preparedness

- The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards. The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others.

d. Fire Prevention and management

- The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process.
- The Contractor shall prepare a fire prevention and fire emergency plan as a part of the Environmental Plan to be submitted to KPLC.

e. Management of air quality

- The Contractor shall institute appropriate measures to minimize or avoid air quality impacts. This can be achieved through formulation of air quality management plan.

f. Neighboring land owner and occupier relations

- The Contractor shall respect the property and rights of neighboring landowners and occupiers at all times and shall treat all persons with deliberate courtesy.
- The Contractor shall respect any special agreements between the Proponent and the neighbors e.g. the wayleaves agreements signed between Kenya power and landowners will need to be respected by the contractors.

g. Complaints register

The Contractor shall establish and maintain a register for periodic review by the Proponent that logs all the complaints raised by the neighbors or the general public about construction activities. The register shall be regularly updated, and records maintained including the name of the complainant, his/her domicile and contact details, the nature of the complaint and any action taken to rectify the problem.

h. Health management

- The Contractor shall comply with all relevant legislative requirements governing worker health and safety (e.g. OSHA 2007 and its subsidiary legislations).
- The Contractor shall prepare and implement a programme to minimize diseases likely to be contracted by the construction workers as a result of the proposed project such as HIV &AIDs.
- The contracted company's shall have obligations of managing the safety of its employees by
    - Provision of appropriate PPEs to employee
    - Training employees on competence
    - Employing competence and qualified staff to powerlines
    - Provision of first Aid Kit onsite
    - Should have a trained first aider
    - Safe work procedures and work instruction

- The contractor will manage accidents by having an emergence response plan which will include contacts for all emergency service provider e.g. ambulances, fire brigade and nearest hospitals (Some of the hospitals which can be utilized while working on route include (Narok County referral hospital, Longisa Hospital, Tenwek Hospital, Kapkimolwa Health Centre)

i. Construction Control

The Construction control for the proposed project shall cover the following:

Control of access

The contractor shall ensure that the construction site is accessed by authorized persons only.

j. Control of material supply and burrow areas

- The Contractor shall, as far as possible, source all material needed to construct the proposed project from the licensed mines and /or quarries in Narok and Bomet counties.
- In instances where materials are to be obtained from a new burrow area; the Contractor shall comply with relevant legislations.
- The Contractor shall prepare a method statement including plans, detailing the expected quantity of excavation, temporary and permanent drainage control, the final contouring of the burrow pit and the proposed method of rehabilitation.

Rehabilitation

- After completion of construction activities, the Contractor shall clear the site of construction materials and dispose wastes in appropriate disposal sites.
- The Contractor shall remove all temporary works on the construction site and grow grass on the sloppy areas where retaining wall will not be constructed to control soil erosion

3.2 Labour and Human Resources Plan

In designing the labour and human resources plan Contractor shall:

- Comply with the provisions of Employment Act, 2007
- Wherever possible, give priority to qualified local people when hiring employees.

3.3 Workplace Health and Safety Plan

The workplace health and safety plan to be implemented by the Contractor and KPLC shall include the following key measures:

- All relevant national legislation, including the OSHA 2007 and related regulations, shall be adhered to ensure that health and safety of proximate communities and the public at large are not threatened during construction and operational phases of the Project.
- The Proponent shall ensure workplace health and safety during the operational phase of the project
- Health and safety performance will be continuously monitored, and procedures reviewed with the aim of eliminating risk as far as reasonably practicable.

3.4 Community health and safety plan

The community health and safety plan to be implemented by the Contractor and KPLC shall include:

- Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbors and the public is not threatened.
- The Contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.
- The Proponent to undertake an independent quantitative risk assessment prior to operation of the facility. The findings of this assessment will inform the development of an emergency safety plan the Contractor and KPLC to create awareness among the neighbors on the community safety procedures

4. Management of Impacts during Operation Phase

The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. KPLC will be responsible for all the mitigation measures for negative impacts during the operation phase. This will have done by following the following steps

- Inspections
- Corrective Action
- Reporting

Impacts and mitigation/ management measures

Table 1 presents the ESMP for the proposed project. It covers on the proposed management and mitigation measures for the identified impacts. In addition, the ESMP provides a schedule for the implementation of management/mitigation activities, sub-divided by project phases. The schedule shows at a glance, the timing and responsibility of the many actions required under the ESMP. It is particularly useful where management/mitigation measures extend across phases.

ENVIRONMENT AND SOCIAL MANAGEMENT PLANs

Table 1: Generic Environment and Social Management Plan – For impacts that cut across the entire route

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
Air quality & dust	• The Contractor to protect stockpiles of friable material subject to wind-throw by wetting, or with a barrier, vegetation, or windscreen; • Cover loads of friable material during transportation; • Restrict speed on loose surface roads during dry or dusty conditions; • Suppress dust during dry periods by use of water sprays; • Maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke; • Burning of woody debris & construction waste to be prohibited within the wayleave • The Contractor to ensure that all equipment used, and all facilities erected on site are designed and operated to control the emission of smoke, dust, fumes and any other air impurity into the atmosphere; • Use of personnel protective equipments (PPE) • Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible.	Construction and decommissioning	Contractor
Solid waste generation	• The wrappings and packaging materials should be reused or recycled where applicable • Any service/Repair of vehicles to be done offsite in approved garages or service stations • Construction wastes to be managed in accordance with standards. • Scrap metals/ Conductors and other salvaged materials to be disposed/recycled off-site by licensed vendors.	Construction, and Decommissioning Operation	Contractor KPLC
Noise & vibration	• The Contractor shall comply with the legal requirements for the management of noise impact as specified Environmental Management and Coordination (Noise and Excessive Vibration	Construction and Decommissioning	Contractor

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
	Pollution) (Control) Regulations, 2009. • Provide silencers or enclosures for noise generating machines such concrete mixtures, compressors, etc. • Landowners along the routes to be notified about the construction schedule & activities, including blasting, should it be required; • Construction techniques and machinery selection to minimize noise and vibration. • Noise generating activities that take place near residential or sensitive institutional receptors will be restricted to between 0600 and 2000hrs, which is defined as 'daytime' in the Kenyan noise regulations • Contractor is prohibited causing excessive vibration which annoys, disturb, injure or endanger the comfort, repose, health or safety of others and the environment or excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source. • Provision of protective devices like earmuffs/earplugs to workers, who are continuously exposed to high levels of noise during construction activities.		
Visual & aesthetic impacts	• Extensive public consultation during the planning of power line and power line right-of-way locations; • Maximize straight-line runs to reduce the need for angle towers; • Locate new towers adjacent to already existing high-impact visual features, such as forests where possible • Where possible, locate the new line adjacent to existing power lines • Siting power lines, and designing substations, with due consideration to landscape views and important environmental and community features; • Location of high-voltage transmission lines in less populated areas, where possible	Pre-construction	KPLC

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
Socio Economic	• Route selection to avoid existing settlements and minimize disturbance. • KPLC to follow Land Act 2012 Laws of Kenya and Land Acquisition Act; • Community sensitization on alternative land uses • Compensation of the affected people at current Market rate for land and other loss assets • Prior to wayleave acquisition free and informed consent should be sought • Consultation with PAP should continue throughout project phases • KPLC will identify all potential Project Affected Persons (PAPs) & develop a Resettlement Action Plan (RAP) to address economic losses, physical resettlement & loss of land or land rights. The RAP should be framed in consultation with the PAP	Preconstruction	KPLC
	• Appropriate ongoing consultation with local communities throughout Project construction as well as informing workers on local cultural sensitivities and health matters	Operation	KPLC
	• Time thinning, slashing, and other maintenance activities to avoid forest fire seasons;	Operation	KPLC
Impacts on Archaeological, cultural and historic sites	• Diversion of the Right of Way for the proposed transmission line, to minimize the impacts of these sites if they are present. • Selective tower placement to span archaeological site if any • Avoid siting transmission line towers on cultural property (Graves, shrines etc) consult with local community. • If avoidance is not possible prepare a management plan to ensure least damage to cultural, archaeological sites.	Pre -Construction	KPLC
	• Contractor to follow procedures for chance find and protection of Archaeological sites and contact the National Museums of Kenya (NMK).	Construction	Contractor

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
Construction Material Sourcing	• Ensure accurate budgeting to ensure only Necessary material is ordered • Proper storage to ensure minimal loss • Strip & store topsoil separate from subsoil for major tower site excavations; • Rehabilitation of exposed sites as soon as practicable • Source Raw Materials from NEMA approved sites • Use recycled and recyclable materials where possible	Construction phase	Contractor
Occupational Health & Safety	• Staff Training and regular equipment service and testing • Only trained & certified workers to install, maintain or repair electrical equipment; • Testing structures for integrity prior to undertaking work;	Construction, and Decommissioning	contractor
		Operation	KPLC
	• Workers not directly associated with power transmission activities who are operating around power lines should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities • Use of signs, barriers and education/ public outreach to prevent public contact with potentially dangerous equipment; • Ensure provision and proper use of Personal Protective Equipment (e.g. Safety harness, helmet, dust masks, etc) • Follow safe work procedures • Maintain a fully stocked and accessible first aid kit under trained first aider • Observe OSHA 2007 regulations	Construction	Contractor
	• Community policing to be encouraged to reduce vandalism of towers • Ensure there is no encroachment on the transmission line wayleave	Operation	KPLC

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
EMFs	• Routing or siting Transmission line is so as to avoid or minimize exposure to the public and where it is unavoidable all resettlements within the wayleave will be relocated. • Installation of transmission lines above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided • If EMF levels are expected to be above the recommended exposure limits **(International Commission on Non Ionizing Radiation Protection ICNIRP 2010** guidelines) application of engineering techniques should be considered to reduce the EMF produced by power lines. Examples of these techniques include: o Shielding with specific metal alloys o Burying transmission lines o Increasing height of transmission towers o Modifications to size, spacing, and configuration of conductors **Where each/any of these technics is employed, evidence of adequacy in design proposal should be submitted with the bid document (Electric and Magnetic Field calculations).**	Preconstruction	KPLC Contractor
Hazardous Materials (Fuel, Oil & chemical storage on site)	• The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials. • The Contractor shall manage all hazardous materials and waste in a safe and responsible manner, and shall prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials. • The contractor shall place on-site tools and equipment, such as generators, compressors on compact impermeable sheeting to prevent oil spills/leaks from causing subsurface contamination.	Construction and decommissioning	Contractor

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
	• The contractor shall ensure oil spills/leaks are prevented or minimized. This can be achieved through: instructing employees to avoid spills and regular auditing to verify that no leaking or defective equipment is brought/used onsite; • The Contractor shall ensure that fueling and repairs are carried out by trained personnel familiar with spill containment and clean-up procedures and in Garages and licensed petrol stations • The Contractor shall ensure that all the employees working onsite are trained on good housekeeping practices		
Community Health and Safety	• Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbors and the public is not threatened. • The Contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety. • The contractor should use barricading tape to prevent members of public from accessing excavated tower foundations and work sites during construction • The contractor should put in place adequate hazard communication to the public by use of appropriate signages as prescribed by national law and international best practice • The contractor should conduct public awareness on safety requirements within construction sites • HIV & AIDS education and awareness • Provide adequate security where necessary for the public and staff • Public awareness of the public health issues identified. • Provision of condoms for staff • Distribution of HIV & AIDS awareness materials in collaboration NACC • Condone working sights and ensure controlled access	Construction, and decommissioning	Contractor
Fall from Heights	• Follow safe work procedures	Construction & Decomissioning	Contractor

Mitigation of Impacts			
Possible Impacts	**Recommended Mitigation Measures**	**Duration**	**Responsibility**
	• Procure and enforce proper use of necessary protective equipment	Operation	KPLC

NAROK-BOMET KEY FEATURES SITES/ AREAS ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP)

TABLE 2: SITE SPECIFIC ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
1.	Soils	Soil destabilization, Soil erosion, Soil contamination/Pollution	• Do proper soil investigation and analysis	Pre-construction	Contractor
			• Avoid siting pylons close to rivers and other water ways • The site preparation activities should be scheduled to take place in dry season in areas susceptible to soil erosion		
			• Use existing roads and routes to access sites, contractor to avoid driving and parking on non-designated areas	Construction	
			• All disturbed areas should be rehabilitated		
			• Minimizing the area of ground clearance to 40m wayleave and short shrubs should be left to stabilize soil		
			• Scraped topsoil should be used immediately		

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			for backfilling tower foundations to allow natural regeneration of grass		
			• Areas susceptible to erosion shall be properly sloped & compacted to reduce the effect of runoff		
2.	Hilly areas/ Ridges undulating areas- Kyogong Hills	Soil erosion, Landslides, Collapse of pylons	• Avoid siting pylons on escarpments likely to face massive soil erosion, landslides & unstable grounds. • Giant reinforced tower will be required to span the conductors on hilly areas	Design	• Contractor
			• Excavations will be done using compressors or drilling machines hence need for appropriate PPEs (Ear muffs/ plugs, dust mask, leather gloves etc) • Warning tape/ Barricading to prevent public from accessing the site • Sensitize community members especially sand harvesters during project implementation	Construction	
3.	Rivers (*Sikinteirr, Ewaso, Enkare,* Amalo and Nyongores *rivers*	Soil erosion, Ground destabilization, floods, collapse of pylons	• Study rain patterns and river characteristics and establish maximum and potential river banking • Liaise with WRMA to show you highest flood zone / riparian zone during tower placement near rivers • Avoid siting pylons close to rivers, where	Pre- Construction	Contractor

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			possible modify pylons for greater strength and height to accommodate long spans across water ways.		
			• Span conductors across rivers and ensureTower foundations are at least thirty (30) meters away from each rivers' highest flood zone. • Where necessary construct temporary bridges to facilitate movement of workforce and construction materials • Prevent siltation from foundation spoils/ debris by doing construction such area during dry season • Avoid diversion of the river	Construction	Contractor
		Water Pollution	• Contractor to ensure vehicles and machinery used are in a good state of repair to avoid oil leakage and water pollution. Servicing and repair of vehicles should be done only on designated garages and not in the field.	Construction	Contractor
			• No camps should be constructed near rivers or their catchment areas		
			• Contractor to provide sanitary conveniences along the line routing		
			• Avoid massive disturbance and clearance of vegetation along river banks		

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
		Damage to timber bridge	• Contractor to take caution of Timber Bridge across Ewaso river to ensure weight transported across such a bridge can be accommodated. The contractor should verify transport logistics and take note that any damage to existing infrastructure will be replaced at his own cost.	Construction	Contractor
4.	Streams and springs (Tuiyobei, Olmotiiook, Lebekwet and Kotab-silibwet streams) Chepkutbei & Chepkirib springs	Soil erosion, Water pollution, water obstruction	• In Olmotiook stream clear only blue gum trees which may interfere with line during construction and operation • Indigenous shrubs should be left to protect the stream banks since they don't grow high • Spanning conductors, a cross the streams and springs • Since some areas are sloppy put in place soil erosion control measures • Encourage working during dry season in such areas to prevent erosion • Prevent soil erosion to avoid sedimentation of the community spring • Minimize clearance of vegetation by limiting to the 40m wayleaves • Protection of the stream and springs can be done	Construction	Contractor
5.	Forested areas (Ole Keiwa forest, Ole kurieta farm, woodlots in	Vegetation clearance	• Mark wayleave traces and clear only the necessary vegetation, at the edges do branch trimming as far as practical • Avoid indigenous forest as much as possible	Construction	Contractor
			• Compensate for all cut trees	Construction	KPLC

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
	bomet		• KPLC should identify and implement vegetation restoration by organizing and supporting tree planting in public institutions / areas along route of traverse		
			• Reforestation of the section of the affected farms using native tree species		
		Risk of fire*	• Avoid lighting of fires or burning of anything along route of traverse	Construction	Contractor
			• Charcoal burning should not be allowed along route of traverse to minimize risk of kilns breaking and causing spread of fires		
			• Cleared vegetation should left to the respective owners who shall determine appropriate use		
			• Cigarette buts should be handled with care to ensure they are completely extinguished before disposing off		
			• Construction of the power line should be up to set standards to ensure no arcing, no possibility of disruptions of other existing electrical infrastructure which could lead to short circuits, sparks hence fire hazards		
			Ensure no loose connections and maintenance of wayleave trace.	Operation	KPLC
6.	Farm land (Large tracks of wheat and Maize farm,		• Contractor to exercise precaution to minimize damage to crops	Construction	Contractor
			• Do proper pegging and drive and park only on designated areas		

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
	Commercial grass farms (boma Rhodes)	Risk of fire*	• Cigarette butts should be handled with care to ensure they are completely extinguished before disposing off • Apply all above precautions of mitigating against fire		
		Crop destruction	• All destroyed crops/grass should be valued and compensated at market rates	Construction	KPLC
7.	Roads	Traffic congestions, road accidents, Road tear and wear and construction of access roads,	• Where possible build elevated cross-overs across roads to ensure that cables are pulled and stringed without disrupting roads	Construction	Contractor
			• Install proper signages and warnings for work sites proximal or along roads		
			• Workers should put on reflective clothing and exercise caution and respect for other road users		
			• Apply for necessary permits and advertise on newspapers with highest circulation the days and time when heavy line materials will be transported along the roads, Vehicles to be marked wide load as necessary		
			• Contractor should choose traffic routes to reduce the impact in the neighborhood avoiding, as far as practical any sensitive areas		
			• Employment of a road safety coordinator to oversee implementation of the traffic controls		
8.	Existing Local distribution	Power disruptions/ damage of existing local	• The proposed 132 KV line will be routed above other existing power lines along route	Construction	Contractor

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
	powerlines	power distribution lines (33 and 11KV powerline)	of traverse. Build elevated cross-overs across existing lines to ensure conductors are stringed without disruption of existing infrastructure		
			• Follow KPLC electrical safety rules and procedures		
			• Seek clearance from KPLC when working close to existing powerlines		
			• Where 132kv line is crossing 33 or 11kV provide safety net		
9.	Wild animals/ Fauna Electrocutions	Disturbance, habitat loss, hunting	• Precaution should be exercised to avoid getting into close proximity with zebras in Narok side which can cause harm if terrified	Construction	Contractor
			• Clear only necessary areas to avoid massive destruction of terrestrial animals' habitats.		
			• Pylons erected across forested areas mainly in Ole Keiwa and Ole Kurieta forest farms should be installed with some razor wire or spikes to deter Baboons from climbing up the poles even though Baboons unlike chimpanzees are not arboreal.		
			• Ensure No hunting is carried out by workers		
			• Close monitoring across the forested areas should be carried out in the first 12 months after the line is energized to study any electrocutions.	Operation	KPLC
		Electrocutions	• Ensure no trees along the forested areas are in proximity to conductors to prevent	Operation	KPLC

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			electrocutions – Maintain wayleave trace		
10.	Birds	Electrocutions, collision	• At design stage, Space conductors in such a way to allow for the birds' easy movement between lines so as to prevent cases of collision and electrocution.	Preconstruction	Contractor
			• More attention on birds to paid to areas such as hilly places, forested areas like ole keiwa and Kurieta farms, Community dam in Lekimbo area and riparian areas along the main rivers like Amalo, Ewaso, Nyokores, Enkare and Sikiterr. Contractor to install visibility enhancement objects such as marker balls, bird deterrents, or diverters placed at intervals along conductor for greater visibility.	Construction	Contractor
		Habitat loss	• There are no endangered species in the area along proposed route of traverse; neither are there known migratory paths for birds between Narok and Bomet. Clear only the necessary areas of the wayleave trace.	Construction	Contractor
		Hunting of Guinea fowls	• Guinea fowl are dominant on the Narok site hence need to ensure No hunting is carried out by workers	Construction	Contractor

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
		Electrocutions, collision	• Keen monitoring in the first 12 months after the line is energized should be undertaken to ascertain safety of birds along the powerline. • In case of any deaths due to collisions, the proponent should install flaps to act as reflectors for birds that may occasionally cross the area.	Operation	KPLC
11.	Residential and associated structures (Cattle sheds, chicken houses, latrines, fences	Involuntary resettlement	• The people whose structures will be affected by the proposed line should be notified in advance, sensitized, educated and given the various options available including compensation, actual resettlement by the proponent, and compensation for damages that the construction of the proposed line may cause. Livelihood restoration for relevant project affected persons should also be effected by the proponent.	Pre-construction	KPLC
12.	Graves	Pylon siting on grave/graveyard	• At the design stage; communal graveyards and public cemeteries should be avoided. At the design stage; communal graveyards and public cemeteries should be avoided.	Preconstruction	Contractor
		In case Pylon siting encounters a new grave/grave yard	• In case a pylon siting encounters a new grave, the contractor with approval from Kenya Power shall look for options of moving such a pylon. In case it is inevitable to move the pylon, the affected persons should be compensated in line with the society's	Construction	KPLC

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			cultural norms to migrate the grave at the cost of the proponent.		
13.	Public institutions like schools, churches, and town centers	No public institutions under the trace, they were avoided during survey.	• At survey stage public institutions and town centers have been avoided. • There is no public institution located within the wayleaves	Pre-construction	KPLC
14.	Social ills	Spread of sexually transmitted diseases, unwanted pregnancies, family breakdowns	• The contractor and the proponent should respect the culture and norms of the society. Proper disciplinary measures shall be instilled on culprits. HIV/AIDs awareness should be done by the contractor to staff and the public through notices. Contractor should contact safety talks and include HIV/AIDs and drug and alcohol abuse in the sessions and records maintained as proof. The contractor should provide condoms to the workers.	Construction	Contractor
15.	Sanitary conveniences	Land pollution, spread of food and water contaminable diseases like dysentery, diarrhea, typhoid, tapeworms etc.	• The contractor should provide mobile toilets to the work force throughout the line routing.	Construction	Contractor
16.	Low sagging power lines	Public electrocutions, energizing of low voltage lines, risk of fire.	• The proposed line should be constructed according the KPLC standards and best practice in the energy sector to guarantee structural strength, adequate ground clearance, and safety of other existing power	Construction	Contractor

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			infrastructure.		
			• Any incidences, accidents or near misses should be reported to KPLC and Directorate of Occupational Health and Safety and proper corrective actions implemented as necessary.		
17.	Buried/ underground infrastructure including cables from third parties, water pipes, sewer systems	Damage	• Contractor should conduct extensive ground investigations where pylons will be sited to ensure that no damage is caused on buried/ underground infrastructure. The contractor will be liable for damages and associated costs for any of the infrastructure he may tamper with during implementation and installation of the proposed Narok – Bomet line.	Construction	Contractor
18.	Olmotiiok Ridge (NB6-NB7)	Vegetation clearance (The areas has short shrubs of Tamarindus indica (Lemechwet)	• Avoid cutting of shrubs on top of the ridge since they are short and scattered and will not interfere with line construction or operation of the transmission powerline. Clear on the necessary areas to pave way for construction of the pylons.	Construction	Contractor
		Excavation	• Since the ridge is rocky and stony use of drilling machines and compressors is inevitable inform the community on the drilling activity and timings • No drilling will be done at night since a section of the ridge is inhabited. • Ensure hazard communication is put in place since farmers do graze animals on top of the ridge		
		Noise and dust	• Provide workers with ear muffs due to noise		

NO.	ASPECT/ FEATURE	PONTENTIAL IMPACTS	PROPOSED MTIGATION MEASURES	DURATION	RESPONSIBILITY
			and Dust masks to prevent dust		
19.	Community Dam	Loss of Habitats Soil erosion, siltation and sedimentation	• Spanning conductors, across the dam • Put place flaps or bird warning devices since the dam attracts birds • Avoid destruction of avifauna habitat • No hunting of birds since the dam is characterized by several avifauna types with the cranes foraging in the area • Create awareness amongst the public on safety issues during project implementation	Construction	Contractor

In implementation of the ESMP, the contractors should take note of the mitigation measures for each aspect and should make their financial offers based on their own estimates on cost for each item.

Environmental and Social Monitoring Plan (*ESMP*)

Monitoring

The proposed programmes and plans will be subjected to monitoring. Monitoring will have two elements: routine monitoring against standards or performance criteria; and periodic review or evaluation. Monitoring will often focus on the effectiveness and impact of the programme or plan as a whole.

During construction phase, the Proponent shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the EMP. Compliance will mean that the Contractor is fulfilling their contractual obligation.

During operation phase, the Proponent will monitor facility's operations to ensure compliance with management measures in the EMP and operation procedures. As part of this monitoring, the Proponent will undertake statutory initial environmental audit as required by the EIA/EA Regulations, 2003 and subsequent annul self-environmental audits.

Programme Monitoring

The Proponent shall regularly monitor programme implementation. The process will include the regular monitoring of:

- Erosion of soil resulting in the immediate surroundings of the facility caused by the presence of facility or impacting on structures associated with the facility
- Air quality and ambient emissions, including dust generated by construction activities
- Noise generation during construction, operation and decommissioning phases

Plan Monitoring

All of the management plans make provision for monitoring and evaluation. Special attention should be given to the monitoring arrangements relating to biophysical impacts, occupational health and safety, facility operational and emergency response.

During the construction phase of the project, the Contractor's HSE Officer shall report all environmental impacts as well as accidents and incidents to the Proponent's HSE Officer.

The reported impacts and incidents will be captured on a database to ascertain trends and track progress in the implementation of preventive and corrective actions, and benchmarking against other, similar operations.

Depending on the level of severity, accidents and incidents will be investigated by the Contractor's SHE section, with key input from the line management to ensure accountability.

During operation, the Proponent's SHE department will monitor the health and safety of personnel and contractors, in compliance with legislative requirements. Emergency incidents should be reported to the relevant authorities. The reported impacts and incidents will be captured on a database to identify weakness in the emergency response plan and track progress in the implementation of preventative and corrective and benchmarking against other similar operations.

The Environmental and Social Monitoring Plan (*ESMP*) will provide the basis for monitoring of Potential Environmental Impacts associated with the Transmission Line Project. The implementation of the Monitoring Plan together with the Environmental and Social Management Plan will provide a benchmark for future environmental audits. The ESMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance.

Environmental and Social Monitoring by Contractors

KPLC will require that contractors monitor, keep records and report on the following environmental and social issues for their subproject:

1. *Safety*: hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
2. *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
3. *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
4. *E&S requirements*: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.
5. *E&S inspections and audits*: by contractor, engineer, or others, including authorities—to include date, inspector or auditor name, sites visited, and records reviewed, major findings, and actions taken.
6. *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, and skill level (unskilled, skilled, supervisory, professional, management).
7. *Training on E&S issues*: including dates, number of trainees, and topics.
8. *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
9. *External stakeholder engagement*: highlights, including formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
10. *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
11. *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
12. *External stakeholder grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be gender-disaggregated.
13. *Major changes to contractor's environmental and social practices*.
14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until KPLC determines the issue is resolved satisfactorily.

The environmental and social parameters monitoring procedures and techniques for proposed project are summarized in table 3

Table 3: Environmental and Social Monitoring Plan (ESMP)

Potential Environmental /Social impact	Parameter to be monitored	Timing	Frequency	Responsibility
Noise	Measure the Noise Level within the Project area and at distances of 30 from the transmission line	Construction and Decommissioning phases	Quarterly	Contractor
		Operation	Quarterly	KPLC
Vegetation and Habitat Loss	Quantify the area of cleared forest	During Construction	Monthly	Contractor
Soil erosion	Assess size of rills or Gulleys forming from accelerated run off from compacted areas	Operation phase	Quarterly	KPLC
Increased water Demand	Record amount of Litres used	During Construction and Decommissioning Phases	Monthly	Contractor
Oil Spills	Record any leakages from construction equipment. Record all accidental spills and number of litres	During construction phase	Monthly	Contractor
Encroachment	Record any new settlements within the Transmission Wayleave trace and maintain wayleaves clear	During Operation	Monthly during the first six Months from start of Construction and Quarterly for the first one year of operation then annually	KPLC
Fire hazards	Record any Fire incidences and investigate on possible causes	Construction and decommissioning	Monthly	Contractor
		Operation	Quarterly	KPLC
Occupational Health and Safety Issues	Record any incident, accidents and Possible hazard scenarios	Construction and decommissioning	Through out	Contractor
		Operation	Through out	KPLC
Birds Collisions	Record any dead birds within the project site	Construction	Quarterly	Contractor
		Operation	Quarterly	KPLC
Aircraft accidents	Record any plane crashes due to collision with the transmission line	Operation	Bi annually	KPLC
Fall from Heights	No of accidents	Construction and Decommissioning	Through out	Contractor
		Operation	Through out	KPLC