

*Scoping Report and TOR for the Proposed Kisumu-Lessos-Olkaria
Transmission Line Upgrading Project, July 2009*

further analysis are studied. The scoping exercise would also define the scope of the ESIA study with regard to spatial boundaries.

2.2 Scoping Methodology

The scoping study was carried out at a desktop level and also through a detailed and structured field study. The desktop study included a review of documents and publications relevant to this project. The scoping team held preliminary meetings with the project proponent and the project design team from 9th June 2009 and mid-July in order to define the scope and structure of the study. Additionally, the field study was conducted between/on 22-24 June, 5 July, 17-19 July, and 21 July 2009.

The field study was intended to help the consultant achieve the following:

- i. Familiarize the team with the project area i.e. the existing transmission lines between Kisumu-Lessos-Olkaria and the proposed alternative alignment of the transmission line in the same area;
- ii. Identify critical environmental and social economic/cultural issues/ecological issues that should be addressed in the ESIA study; and
- iii. Delineate and define study boundaries.

Ground orientation was provided by the KPLC's site engineer and Safety, Health and Environment (SHE) officers of KPLC Central Office. During the site visits, the team also had opportunity to discuss various issues and concerns with the local people. The questionnaire formats filled out by local people are attached in Annex 2 of the Scoping Report.

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3.0 PROJECT AREA DESCRIPTION

Overall environmental and social features of the project area are described in following sections.

3.1 Environmental Setting

(1) Climate

The climatic features in the project area especially the temperatures and rainfall are closely related to altitude changes with variations induced by local topography. Variations in temperature in the project area mainly depend on the altitude of the location. The floor of the Rift Valley experience higher temperatures than the highlands as exemplified by recordings at Naivasha and Nakuru. At Naivasha which is located at 1,829 metres above sea level, the mean monthly temperature has been recorded to range from 15.9 to 17.8 °C, while in Nakuru located at 1,836 metres above sea level; the mean monthly temperature has been recorded 18.2 °C. Moreover, at Nandi which highest altitude is 2,500 metres above sea level, the mean temperature is 20 °C. Finally, in Kisumu, 1,145 metres above sea level has a mean temperature of 23.1 °C while the mean maximum temperature ranges from 27.3 to 30.2 °C.

The rainfall in the project area is mainly determined by the altitude and the prevailing wind. Generally, the floor of the Rift Valley in Nakuru district has lower rainfall than the flanking highlands. Rainfall is low in Naivasha area of about 634mm at altitude 1,900 metres above the sea level and 807mm at Nakuru of 1,850 metres above the sea level. Kericho and Nandi districts receive high rainfall. This is shown by rainfall recordings of 1,880mm in Kericho at altitude 1,981 metres above the sea level while Nandi receives 2,024mm of rainfall at altitude 1,767 metres above the sea level. Rainfall in Kisumu district, especially the Kano plain of the project area is relatively lower as compared to Kericho and Nandi districts. Rainfall in the districts shows considerable variations. Mean rainfall varies from less than 1,000mm along the shores of Winam Gulf to over 1,800mm per annum along the northern boundary.

(2) Hydrology

The project area falls under two drainage systems, the Rift Valley and the Lake Victoria drainage basins. The hydrology associated with the Rift Valley drainage system is characterized by internal drainage and generally scarce surface and underground water resources. The Rift Valley contains several basins of internal drainage including Lake Naivasha, Nakuru and Elmenteita. The largest water body associated with the project area is Lake Victoria. The lake covers an area of 6,889,000 ha of which 413,340 ha is in Kenya. Several rivers in the project area drain into Lake Victoria. They include; the Nyando, Sondu, Kibos and Awach/Nyangori rivers and their tributaries. Due to the flat nature of the lacustrine plains, the above mentioned rivers form extensive

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swamps/wetlands in the lower reaches as they enter the lake.

(3) Topography

The study area generally falls within the Rift Valley and Lake Victoria basin. The general topography of the area is quite varied. There are four major topographical features associated with the study area. They include the Rift Valley floor, the Mau escarpment, the Nandi hills and escarpment, and the Kano plains. The Rift Valley shows a great variety of topographical features caused by earth movements. They include craters, remnants of pre-existing craters, fault scraps, fissures and steam jets. Mau range is one of the most important topographical features in the project site. It is an imposing scrap that rises to over 3,050 metres above the sea level. The Mau range is forms the western wall of the Rift Valley. The southern part of the Mau range is situated between Nakuru and Narok districts while the northern part lies in Kericho and Nandi districts. As for Nandi hills and escarpment, its physiographic is mostly in Nandi district and can be described as undulating upland. The district has a hilly topography and a high altitude, which ranges from 1,525 to 2,135 metres above the sea level. The main topographical features include rolling hills in the west, the Kapsapet plateau and the Nandi escarpment, which descends steeply to the Kano plains in Kisumu district. The Kano plains are situated in a down warped part of large lowland surrounding the Winam Gulf of Lake Victoria. The Kano Plains comprise a flat tract of lad which is at altitudes between 1,300 and 1,135 metres above sea level. The plains have flat to very gently undulating topography with slopes of 0.3%.

(4) Geology

The geology of the project area is complex and usually consists of several geological formations. Around Naivasha area including Olkaria power generation stations, the rocks are volcanic with lake and fluvaitile sediments. In most of the floor of the Rift Valley, the common rocks are basically quaternary deposits mainly the pyroclastic rocks, which consist of tuffs and ashes. The entire area in Molo and surroundings such as Njoro, Mau Summit, Londiani and the Mau escarpment is covered by volcanic rocks ranging in age from tertiary to recent and lacustrine and fluviatile sediments derived from them. Kericho district is covered by phonolites. The higher ground is occupied by more nepheline rich volcanic extrusions and pyroclastics derived from the activity of the Londiani region. Kisumu district mainly consists of rocks and sediments ranging from Nyanzian (Precambrian) to recent times. On the plains, the alluvial deposits and the lacustrine sediments cover the largest part of the district. Geologically, the Kano plains are a lacustrine and alluvial area of Quaternary sediments lying on the floor of the Kavirondo Rift Valley.

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(5) Soils

The soils of the project area are also of great variety in conformity with the geology of the area the soils. They range from the soils developed on the mountains to those developed in the plains especially on the Rift Valley floor as shown below.

Table 5 Soil Types in the Project Site

No.	Geographic Type	Soil Type	Locations
1	Lacustrine Plains	Solonetz, Phaeozems, Cambisols and Vertisols	Lake Naivasha, Lake Nakuru & Lake Victoria
2	Flood Plains	Eutric Fluvisols	Kano Plains
3	Piedmont Plains	Planosols, Gleysols, Solonetz, Vertisols and Fuvisols	Large extent of Kisumu District
4	Volcanic Plains	Ando-calcaric Regosols and vitric Andosols	West of Lake Naivasha & west and northwest of Lake Nakuru
5	Foot Slopes	Ferralsols with ferroluvisols, orthic Luvisols	Border between Kisumu and Nandi Districts
6	Hills and Minor Scarps	Nitisols for volcanic footridges; ando-eutric Cambisols dystric Regosols with Lithosols and humic Cambisols	Olkaria Hills to the south and south west of Lake Naivasha and to the north of Lake Naivasha close to Lake Elementeita; Eburru Mountains; and Nandi District at the border with Kisumu District
7	Uplands and Undifferentiated Levels	Calcaric Regosols	Eburru Mountains located to the west between Lake Naivasha and Lake Nakuru
8	Lower-middle Level Upland	Mollic andosols	Mau Escarpment, Njoro Elburgon and Molo
9	Upper-middle Level Uplands	Humic Nitisols, Cambisols, and Acrisols	Between Londiani and Lessos via Timboroa; and south of Nandi Hill

Source: Kenya Power Transmission Project Feasibility Study – Preliminary Environmental Impact Assessment, ETC East Africa, 2003.

(6) Protected Areas

There are seven (7) protected areas between Olkaria and Lessos and none between Lessos and Kisumu, which was identified by the desk-base study.

Table 6 Protected Site in the Project Site

No.	Route	Protected Areas	Approx. Length in RoW (km)	Remarks
Olkaria-Lessos				
1	Alternative 1	Hell's Gate National Park (Olkaria Geothermal Power Station II)	0.75km (north-western part)	-
2		Northern Tinderet Forest	10 km (northern part)	Closed canopy indigenous forest
3		Nabkoi Forest	10 km (western part)	-
4		Timboroa Forest	7 km (western part)	-
5		Mount Londiani Forest	2.5 km (north-western part) 6 km (southern part)	Sensitive Impact Receptor (mixture of closed canopy indigenous forest, forest association & plantation)
6	Alternative 2	Hell's Gate National Park (Olkaria Geothermal Power Station II)	0.75km (north-western part)	-
7		Eburru Forest	3.5 km (western part)	Sensitive Impact Receptor

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No.	Route	Protected Areas	Approx. Length in RoW (km)	Remarks
				(Predominantly indigenous forest)
8		Eastern Mau Forest	19 km (south-eastern part) 12 km (south-western part)	Sensitive Impact Receptor (Predominantly exotic plantation)
9		Western Mau Forest	2.5 km (western part)	Closed canopy indigenous forest
10		Tinderet Forest	7 km (western part)	Sensitive Impact Receptor (Closed canopy indigenous forest)
Lessos-Kisumu				
11	-	None		-

Note: Forest types were provisionally identified with the topographic maps (scale 1:250,000; Kisumu, 1979; Eldoret, 1973; and Nyeri, 1981) and Major Closed Canopy Indigenous Forest Areas and Associated Vegetation Units, KFS and are subject to change.

(7) Flora

The natural vegetation of the project area has been substantially disturbed by human activities. Natural vegetation is only found in the protected forest reserves and the national parks. Most of the land in the project area is used for human settlement, urban development, small and large arable farming, ranching, floriculture and other land uses. What has remained of the natural vegetation is basically a mosaic of various vegetation types interspersed with human settlement and farmlands. Most prominent remnants of vegetation in the project area are forests, woodlands, bush lands and wetlands.

(8) Fauna

Wildlife in the project area is generally quite low due to human influence. However, in the protected areas and in areas where the land use (ranching) is compatible with wildlife, wildlife is present in significant numbers. Most of the wildlife in the project area is found in the Hell's Gate National Park and Lake Naivasha area, Lake Elmenteita area, Soysambu Wildlife Sanctuary¹ in Elementeita, Lake Nakuru National Park and Mau Forest Reserve.

(9) Land Use

The natural potential of the land uses covered by the project area depend mainly on the altitude above sea level and the amount of rainfall received in various locations among other minor factors. The area falls under five major Agro ecological zones including

¹ Soysambu Conservancy consists of 48,000 acres of former ranchland within the ownership of the Delamere Estate. Soysambu forms a major part of the Elmenteita-Nakuru ecosystem, and is intended to form part of a wildlife corridor between Lakes Nakuru and Naivasha. The vegetation here is mainly *Acacia sp.* and *Tarchonanthus camphoratus* interspersed with *Themeda triandra* grassland. A *Xanthophloea* woodland occurs near the shores of L. Elementeita. Soysambu holds a good population of large mammals such as Eland and the introduced Rothschild's Giraffe *Giraffa camelopardalis rothschildi*.

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Tropical Alpine (TA), Upper Highlands (UH), Lower Highlands (LH), Upper Midland (UM) and Lower Midland (LM). The salient features of the various agro-ecological zones and the associated sub-zones. Based on the above classification, the most prominent land use categories of the project area are forest, tea, wheat/barley, coffee, maize, cotton, sugar cane and ranching zones.

(10) Archaeological, Cultural and Historical Sites

The Lake Nakuru – Naivasha basin has been well surveyed since the late 1970's and more is known about the archaeology of the area than any other part of Kenya. This area and other locations of the Rift Valley Floor have been found to be an important area archaeologically especially the lake basins which provided favoured habitats for the early hominids and associated fauna. The project area has yielded stone tool artifacts. Such artifacts (Eburran Industry) dated between 13,000 and 9,000 years ago have been found at the Gamble's Cave and Nderit Drift area near Lake Nakuru. Other areas of Archaeological importance are located at Kariandusi near Lake Elmenteita and at Hyrax Hill in Nakuru Municipality. The description of the archaeological sites around the project site is summarised in the following table.

Table 7 Archaeological Sites around the Project Site

No.	National Museum of Kenya Accession	Position	SASES No.	Remarks
1	NMK3476	Latitude 5°49'15" Longitude 36°12'0"	GtJi 16, Grid Ref. AK883093	Neolithic Habitation Site with dates of less than 5,000 years.
2	NMK3897	Latitude 0°49'06" Longitude 36°12'03"	GtJi 28, Grid Ref. 883095	Habitation of the Later Stone Age Eburran Hunter gatherers dated from about 12,000 BP.
3	-	-	GtJi 6	Pre-historic site
4	-	-	GtJi 14	Pre-historic site
5	NMK3224	Latitude 0°48'10" Longitude 36°15'22"	GtJi 6, Grid Ref. 944112	Later stone age habitation site
6	-	-	GtJi 15	Records are missing
7	-	-	GtJi 8	Records are missing
8	NMK3121	Latitude 0°42'20" Longitude 36°08'55"	GtJi 48, Grid Ref. 825219	Maasai's Ol Pul (meat and soup feasting site)
9	NMK3117	Latitude 0°41'40" Longitude 36°08'40"	GtJi 44, Grid Ref. 819232	Later stone age habitation site
10	NMK3115	Latitude 0°40'10" Longitude 36°06'59"	GtJi 42, Grid Ref. 790258	Later stone age habitation site
11	NMK3114	Latitude 0°40'08" Longitude 36°07'30"	GtJi 41, Grid Ref. AK799260	Later stone age habitation site
12	NMK3084	-	GtJi 3, Grid Ref. 992472	Iron age pre-historic site
13	-	Latitude 0°25'44" Longitude 36°15'51"	GtJi 6, Grid Ref. 950526	Neolithic site dated to no more than 10,000 BP
14	NMK570	Latitude 0°40'08"	GtJi 02/08, Grid	Later stone age sites

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No.	National Museum of Kenya Accession	Position	SASES No.	Remarks
		Longitude 36°07'30"	Ref. 728456	
15	-	-	GtJi62, Grid Ref. 773456	-
16	NMK 3077	Latitude 0°28'20" Longitude 36°13'30"	GrJi 23, Grid Ref. 910478	Later stone age habitation
17	-	Latitude 0°28'45" Longitude 36°13'44"	GrJi 30, Grid Ref. 914475	Later stone age open site
18	-	Latitude 0°28'26" Longitude 36°13'46"	GrJi 29, Grid Ref. 916476	Cairn burial site

Source: Data and information from the National Museums of Kenya (Division of Archaeology) cited in Kenya Power Transmission Project Feasibility Study – Preliminary Environmental Impact Assessment, ETC East Africa, 2003.

(11) Areas of Conservation Value

Areas of conservation interest in the project area are associated with sites of scenic beauty and the lakes situated on the Rift Valley Floor and the forest reserves associated with the Mau Escarpment. Areas of scenic beauty are mainly protected in the Hell's Gate and Longonot National Parks. The three lakes found in the Rift Valley Floor (Lake Naivasha and adjacent Kongoni Sanctuary, Lake Elmenteita and the adjacent Soysambu Game Sanctuary and Lake Nakuru National Park) are important conservation areas. Lake Naivasha and Lake Nakuru have been designated as Ramsar sites (i.e. wetlands of international importance under Ramsar Convention). Another interesting feature of the Mau forest complex is the presence of forest dwelling Ogiek people. The Ogiek people are hunters and gathers community that has used the forest resources since time immemorial. Although the Ogiek have used the forest resources sustainably in the past, their hunter-gatherer lifestyle is now in direct conflict with forest policy.

3.2 Social Setting

(1) Population

The population in Nakuru District including Naivasha is the biggest, while its density is second lowest amongst districts in the project site. The population density of the project site varies depending on the district as shown in the following table. However, the population density tends to be higher in a developed district such as Kisumu.

Table 8 Population of the Project Site by District

No.	District Name	Population	Population Density	Average Household Size
1	Kisumu District	535,664	549 person per km ²	4
2	Nyando District	322,137	284.6 person per km ²	4.4
3	Nandi District	631,357	218 person per km ²	5.1
4	Kericho District	503,469	238 person per km ²	4.7
5	Uasin Gishu District	682,342	205 person per km ²	4.6
6	Baringo District	286,891	33.1 person per km ²	5
7	Nakuru/Naivasha District*	1,312,555	181 person per km ²	4

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Note: *Naivasha District is covered by the latest DDP of Nakuru District
Source: District Development Plans 2002-2008

(2) Economic Issues

Overall, in most districts of the project site, agriculture seems to be the major income contributing sector except Baringo District and Uasin Gishu District. In these 2 districts, it seems that wage employment is the major income generating sector.

Table 9 Sectoral Contribution to Household Income of the Project Site by District

No.	District Name	Sectoral Breakdown
1	Kisumu District	Agriculture: 75%; Rural self employment: 3% Wage employment: 10%; Urban self employment: 4% Others: 8%
2	Nyando District	Agriculture: 52%; Rural self employment: 10% Wage employment: 25%; Urban self employment: 10% Others: 3%
3	Nandi District	Agriculture: 42%; Rural self employment: 10.9% Wage employment: 44%; Urban self employment: 3% Others: 0.1%
4	Kericho District	Agriculture: 80%; Others: 20%
5	Uasin Gishu District	Agriculture: 35.3%; Wage employment: 55.9% Other non-agricultural income: 8.8%
6	Baringo District	Agriculture: 28%; Rural self employment: 16% Wage employment: 38% Others: 18%
7	Nakuru/Naivasha District*	Agriculture: 48%; Rural self employment: 8% Wage employment: 19%; Urban self employment: 23% Others: 2%

Note: *Naivasha District is covered by the latest DDP of Nakuru District
Source: District Development Plans 2002-2008

(3) Poverty

The absolute poverty rate in most districts of the project site seems to be relatively higher. Additionally, it seems that the poverty rate is higher in the districts which depends the agricultural sector.

Table 10 Absolute Poverty & Unemployment of the Project Site by District

No.	District Name	Absolute Poverty (%)	Unemployment (%)
1	Kisumu District	267,310 (53%)	104,657 (N.A.)
2	Nyando District	206,776 (68.9%)	57,860 (N.A.)
3	Nandi District	405,015 (64.15%)	113,171 (N.A.)
4	Kericho District	305,400 (60%)	71,763 (N.A.)
5	Uasin Gishu District	310,379 (42.2%)	N.A. (30%)
6	Baringo District	164,498 (N.A.)	N.A.
7	Nakuru/Naivasha District*	580,421 (44.2%)	194,195 (15%)

Note: *Naivasha District is covered by the latest DDP of Nakuru District
Source: District Development Plans 2002-2008

(4) Education

The overall enrolment rate for the primary school is much higher in most districts of the