Kenya National Highways Authority
Quality Highways, Better Connections

African Development Bank

Republic of Kenya

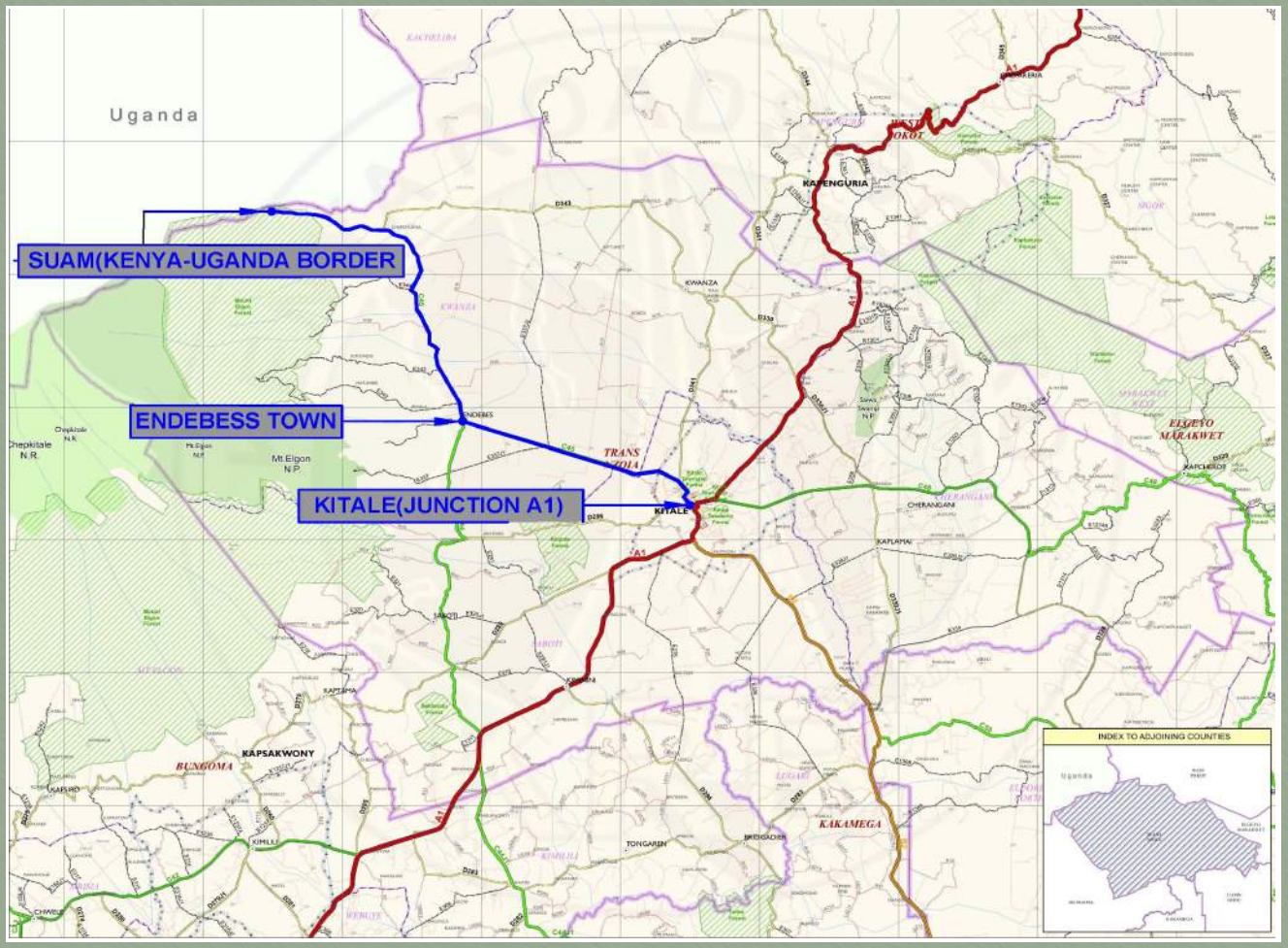
Final



Feasibility Study, Environmental and Social Economic Impact Study,Preliminary and Detailed Engineering Design for

KITALE - ENDEBESS - SUAM (C45) ROAD
Contract No.KeNHA/RD/CS/D&C/1376/2014

Part 6 - Environmental and Social Impact Assessment Study Report (Volume 1)



egis International

In association with

egis Kenya

September 2015

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT

KITALE – ENDEBESS – SUAM (C45) ROAD IMPROVEMENT PROJECT

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CERTIFICATION

I, **Tom Omenda**, hereby submit this Environmental Impact Assessment (EIA) Project Report, for the Proposed Upgrading of the Kitale – Endebess - Suam (C45) Road in Trans Nzoia County. The EIA Report has been carried out in accordance with the Environmental Management and Coordination Act, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Signature:.....

On this 16th Day ofJuly 2015

Mr. Tom Omenda
LEAD EXPERT – EIA/EA
Nema Reg. 0011

The Proponent's Declaration:

As the proponent of the proposed project, we confirm that the information given in this ESIA Project Report is true to the best of our knowledge.

Name……..

Designation……Signature……..

Date……..

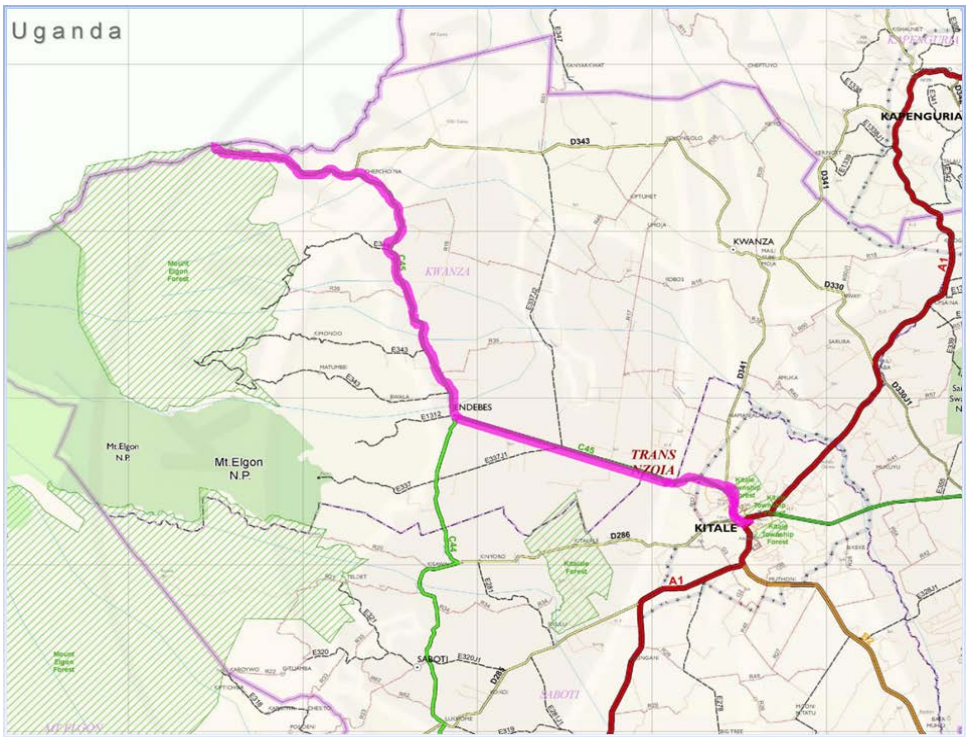
EXECUTIVE SUMMARY

1. Introduction

This Environmental and Social Impact Assessment Project Report is for the Proposed Upgrading of the 45 Km road from Kitale to Endebess to Suam. The road is currently a single lane road supporting heavy traffic within Kitale Town, but less so towards Suam. The Government of the Republic of Kenya received financing from the African Development Fund (ADF), the lending arm of the African Development Bank (AfDB) towards the cost of the Mombasa - Nairobi -Addis Ababa Road Corridor Development Project Phase III — Upgrading of Turbi - Moyale Road (A2) Section and intended to apply part of the proceeds of this loan to payments for Feasibility Study, Environmental and Social Impact Assessment and Detailed Engineering Design of Kitale - Endebess - Suam (C45) Road.

1. Location

The project road is situated in the North Rift region of Kenya in Trans Nzoia County. It starts at the junction with A1 Road in Kitale Town and traverses through the town of Endebess, thereafter runs northwards before finally terminating in Suam River Bridge at the Kenya-Uganda border.



Project location within Trans Nzoia County

2. Project Cost

The proponent averts that total estimated project cost is **KSh. 5,762,298,970.00 (Kenya Shillings Five billion, Seven Hundred and Sixty Two Million Two Hundred and Ninety Eighty thousand Nine Hundred and Seventy)** (See Annex for summary of costs).

3. Project Description and justification

The project road is situated in the North Rift region of Kenya in Trans Nzoia County. The project road is a primary road designated as class C and links the rural centers on the west of Trans Nzoia County to the Urban center of Kitale which is the head quarter of this county. The major function of Class C roads is to provide both mobility and access.

The project road starts at the junction with A1 road on the southern part of Kitale town at approximately 1875m above the sea level traversing Kitale town on the northerly direction for 3.1Km up to the junction with Kwanza - Kapenguria road. From this Junction, the road takes a westerly direction to Endebess town at km 19+700 and about 1964m above sea level. From Endebess town, the road takes north-Westerly direction up to Suam town at Km 45+500 terminating at Suam River Bridge approximately 2052m above sea level. Suam River provides the border line between Kenya and Uganda. The first section of this road (from Kitale to Endebess) exhibits gentle geometry with very long straight elements. Terrain along this section can be described to be relatively flat with few water crossings. The second section from Endebess town (beginning of non-bitumen pavement) which is about 26Km long is characterized by rolling terrain exhibiting relatively high gradients. This section is characterized by relatively small water crossings spread evenly along the alignment with numerous curves with small radii that have been proposed for improvement. Proposed project activities include:-

- Site clearances
- Earthworks
- Concrete works
- Road realignment of some sections
- Road paving and other accompanying works

Project Justification

The project road takes off the Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor Project (LAPPSET), which in recent years has gained importance as the much awaited solution to Kenya's overdependence on her port of Mombasa for trade. The transport corridor is expected to open up Kenya's underdeveloped northern frontier for economic growth. The project road is therefore desirable in facilitating exchange between Kenya, Uganda, Southern Sudan and Ethiopia. The route from Kitale to Suam, consequently hold economic advantages for Kenya – given that Ugandan is a landlocked country. It has been envisaged that the development of any section of this route could help in solving Uganda's import problems and at the same time bring business opportunities, employment, and increased economic prosperity to Kenya and Uganda. Thus, this benefit would be realised by the upgrading of the section between Kitale and Suam.

The North Rift region of Kenya is known for the production of large volumes of cereals and has been rated as the grain basket of the country. The project road in its current state has been used by farmers as the major link road from the farm to Eldoret where crops are repackaged for transportation all over the country. The current state of the road (damaged sections) has continued to pose a great challenge to farmers resulting in high production cost in terms of high vehicle operation cost and longer travel times. Upgrading of the road therefore would bring about improved economic benefit to farmers in this region and so to the whole country.

4. Description of the road sections

The road between Kitale, Endebess and Suam is divided into the following two sections for purpose of Design and Contract Packaging:

Contract	Section	Length
1	Kitale – Endebess	19 km
2	Endebess – Suam	26 km

Kitale - Endebess; This section is currently to bitumen standards. The current road is completely worn out and will require complete rehabilitation. This section exhibits a relatively substantial number of traffic connecting Kitale town and Endebess through the rich agricultural area harboring Agricultural Development Corporation (ADC) farms.

Endebess - Suam; This section is approximately 26 Km long and is currently to gravel standards. Traffic in this section is generally low compared to the previous section. This section will require upgrading to bitumen standards.

5. Study Methodology

The study involved field studies, interviews, literature survey and public consultations to obtain data on the baseline conditions of the general study area. Threats to the environment were identified and this was followed by impact analysis and finally the compilation of a comprehensive report on the current status of the environment, possible positive and negative impacts that the project is likely to cause and proposals on mitigation measures and finally the development of an Environmental and Social Management Plan (ESMP) which is presented in a separate volume.

6. Policy Legal and Institutional Framework

This Environmental and Social Impact Assessment report was guided by a number of environmental legislations, the primary one being the Environmental Management and Coordination Act (EMCA, 1999). This Act makes Environmental and Social Impact Assessments a legal requirement. The ESIA was also guided by a number of subsidiary legislations under EMCA. Other Acts include the Lands Act, Water Act, Occupational Health and Safety Act, Public Health Act Cap 232, Sexual Offences Act No. 3 of 2006, Work Injury compensation Benefit Act 2007 among other pertinent legal and institutional framework guiding road development projects. In addition, there are several social instruments that are relevant to this project including the National Policy on Gender and Development, sexual offences Act and the National Aids Strategic Plan (KNASP). The Children's Act prohibits child labor and exploitation of children in any form. The ESIA was also guided by the AfDB Safeguard policies.

7. Scope and Objectives of the study

The Environmental and Social Impact Assessment study is normally carried out before the initiation of a project. The study aims to define baseline conditions of the study area, the potential environmental impacts that the proposed project is likely to pose; both positive and negative, as well as the possible mitigation measures to the probable impacts. The assessment also comes up with an Environmental Management Plan which the proponent is supposed to adhere to in order to avoid adverse impacts of the project on the environment.

The scope of this ESIA thus included a study of the following:

- Proposed reclamation of the 40 m road reserve
- Proposed improvement of the drainage system in the proposed roads through installation of new drainage structures including upgrading of four bridges
- Evaluation of the potential impacts of the proposed project on soil, flora and fauna of the area
- Development of conservation and mending up measures to be implemented during and after completion of works
- Degradation of physical environment through excavations, clearing of vegetation cover and material sourcing
- Air and noise pollution
- Potential impacts on the socio-economic aspects within the project area

However, the identified potential negative impacts can be mitigated by implementing the proposed Environmental and Social Management Plan (ESMP) which aims at mitigating the identified environmental impacts.

The ESIA activities were running alongside the preliminary design work such as to involve a series of consultations with the design engineering team, stakeholders through workshops, key informant interviewees and public consultations with a view to sharing information and data on environmental resources and social aspects. Effective evaluation of the baseline status comprised of interviews

(consultative meetings and discussions) and physical inspections and data gathering along the project road. Detailed baseline environmental conditions provide a basis for impacts predictions and benchmarks for the mitigation measures.

8. Project alternatives

Only two alternatives were considered for this project; the 'No Alternative' and the upgrading of the road section. Going for the no alternative option it would mean all the economic benefits associated with the upgrading will be foregone and the status quall will remain. However with the upgrading the region and the country will stand benefiting in so many ways such;

- The new upgraded road will improve travel times and if travel times decrease passengers would be expected to increase their trip frequency (i.e. demand for travel would go up) in all directions and for all trips that include wholly or partially the project road in their itinerary (provided the decrease represented a significant portion of current travel time).

- Road User Costs (RUCs) and Road Agency Costs (RACs). Savings (reductions) in RUCs and RACs are considered as 'benefits'. When a road improvement is undertaken road users whether as vehicle owners or passengers benefits from reduced vehicle operating costs or reduced travel time costs. These effects are known as Road User Costs and they are composed of Vehicle Operating Costs (VOCs) plus Value of Travel Time costs. In the project area in particular, where road condition is relatively poor, the bulk of benefits is made up of Vehicle Operating Costs savings.

Accident reduction benefits are a useful measurable addition to overall benefits of the project. In the project area however there are no reliable statistics on which to base any sort of conclusion. Qualitatively there will be a reduction in the accident rate. Numbers of accidents are measured as a rate per million veh-kms.

9. Baseline Conditions

Physical Environment

Climate

Temperature varies with altitude and the climate on the higher volcanic places to the west is generally cooler than that of the lower lying Basement System country of Kitale. Rainfall over much of the area is fairly high. It is mainly controlled by altitude being lowest at Kitale and increasing northwards and westwards towards the lowest slopes of the Mount Elgon.

The road section from Kitale to Suam is within the cool to warm temperate zone and the annual mean temperature varies from 16 to 18 degrees Celsius, with the mean maximum temperature ranging between 22 and 26 degrees Celsius. The mean annual rainfall varies between 800 and 2800mm.

Topography

The project region is very diverse with physiography that includes high elevation in the Mt. Elgon landscape to lowland plains in parts of Kitale. Typically the project area can be divided into two topographic divisions in each of which the relief, are more or less uniform: (1) The Kitale Plain and (2) Mount Elgon. The Kitale plain, which forms part of the pre-Miocene peneplain has a slight southerly tilt, with the principal drainage system flowing towards Lake Victoria. The project rises gradually from the Kitale plains to 2069 m a.s.l at Suam within the Mt. Elgon highlands.

Geology and Soils

The first 2.5 kilometres from Junction with A1 road into Kitale Town, along the project route lies on the Buff or light brown sandy soils which are produced by the breakdown of Kavirondian grits and bright red clayey soils of mud stones. The region from chainage 2+500 to 7+500 is covered with variable sandy and gravel soils. Chainage 7+500 to 13+500 is covered with Archean Basement System pediments overlain with undifferentiated semi-peltic gneissis, bitiotite and migmotite soils. Chainage 13+500 to 45+000 is covered with upper series phonolitic soils, melanephelinite, melilitite, lower and middle pyroclastic series, agglomerate, berccia and tuff of Mt. Elgon volcanic series.

The main types of erosion occurring in the area are splash erosion, rills, gullies and sediment deposition. A steep slope, low vegetation cover, erosive soil, high intensity rainfall and improper soil, crop and water management are factors leading to, or increasing, erosion.

Surface Water Resources and Hydrology

The alignment crosses 4 major rivers namely; Sabueni River, Kaibei River, Mubere River and Suam River at the border of Kenya and Uganda which is also the project end. All these rivers originate from the highlands of Mount Elgon and flow from east to west direction crossing the project road from left hand side to the right hand side.

Air quality

Air quality is defined by ambient air concentrations of specific pollutants determined to be of concern with respect to the health and welfare of the general public. The project roads is largely rural and currently of gravel standards hence fugitive dust generated by road traffic constitute the main air pollutant.

Noise

Noise and ground vibrations can be defined as unwanted sound. However, sound and vibration are measurable, whereas noise is subjective and is only of concern in relation to receptors. There are over 60 noise-sensitive institutions that are within 300m of the road that include schools, health facilities, colleges and places of worship.

Biological Environment

Vegetation resources

At Suam, the road crosses part of Suam Forest Reserve which is dominated by indigenous trees. Currently the forest has limited access to people from outside the area due to the poor condition of the road. The project crosses an area where natural vegetation has been largely degraded and replaced by exotic tree species, thus biodiversity is already compromised. Furthermore the project will mostly be restricted to the current road reserve which has good vegetation cover but poor species diversity. The few sections that will be realigned are mainly covered with agricultural crops and exotic trees. In some cases the local farmers have planted crops within the road reserve.

Fauna

Wildlife are found in the Mt Elgon protected areas, Suam forests rivers and farmland. There are 37 'globally threatened' species in the Mt Elgon ecosystem (22 mammals, 2 insects and 13 bird species such as cave elephants, giant forest hog, oribi, rothschild girrafe, turacos and red-fronted parrots. Other mammals present in the region are leopards, waterbuck, bushbuck, duiker, black and white colobus monkey, blue monkey, spotted red tailed monkey and de brazza's monkey.

Socio-economic Environment

Administrative Setting

The Project Road is located within Trans Nzoia County. The County covers an area of 2495.5km2. Kitale – Endebess – Suam road traverses the two sub-counties of Trans Nzoia West and Kwanza. It crosses Kibomet Municipality and Matisi locations in Trans – Nzoia West Sub-County and Endebess, Kaibei and Chepchoina, locations in Kwanza Sub-County. The sub-locations traversed by the project road include: Bidii, Twiga, Endebess, Matumbei, Mubere, Matisi, Tuwani and Milimani.

Land-use and land-tenure

The County has two types of land ownership; public and private. The government owns the land where government facilities are erected, and also river and road reserves. The privately owned land was previously owned by the government but it has now been allocated or sold to individuals and institutions. Large chunks of land in Trans-Nzoia are currently under the management of the Agricultural Development Corporation (ADC). Some of the original ADC farms have been sub-divided for small-scale agriculture. Currently, there are eight ADC farms in Tran-Nzoia which cover about 40,000 acres in total, mainly in the Endebess region. Small scale farmers on average have 0.607 Hectares of land while the large scale farmers hold an average of 12.15 Hectares.

Agriculture and Livestock production

Trans-Nzoia has large areas under large-scale farming. Large-scale farming is found especially in the Endebess-Kitale plain (1800-2000m), (total of 66,000 ha). Most of the large-scale farms belong to the Agricultural Development Corporation (ADC). In Trans-Nzoia, the main crops include tea, coffee, pyrethrum, maize, beans and sunflower. Particular cash crops are sunflower, tea and coffee. Maize and

beans serve the dual purpose of food and cash. Other food crops include, finger millet, sorghum, potatoes (sweet and Irish). Fruits include citrus, bananas, apples and avocados. Cotton has been introduced recently. In large farms maize and dairy are important. Food processing includes oil processing, flour milling, and tea and coffee production. Fish farming also plays a significant role due to the number of fish farmers and ponds in Trans-Nzoia County.

Tourism

The main tourist attraction sites in the project counties are the Mt Elgon National Park, Saiwa Swam National Reserve, Chepkitale National Park, Kitale Museum and Kitale Nature Conservancy. There are also wildlife including elephants in the Kitale and Mt Elgon Forest forest as well as Columbus monkeys and a variety of birds, buffaloes, hippos, bushbucks, crocodiles and snakes.

Trade, Commerce and industry

In the County, only Kitale town is classified as an urban centre according to the Urban Areas and Cities Act 2011, however, the other upcoming major urban centre is Kiminini. The main market centres include Kachibora, Endebess, Gitwamba, Maili Saba, Sikhendu, Mucharage, Sibanga, and Kesogon. The development of markets and urban centres lead to an influx of people and increase in economic activities thereby leading to higher demand for facilities, services therefore exerting pressure on available facilities and space. This implies that there is an increased demand for employment creation, innovation and markets for goods and services. These issues are therefore critical in planning for the County. If not provided for, here will be possibilities for crime, pestilence and other undesirable social habits.

Education

A total of 21% of Trans Nzoia County residents have secondary level of education or above. Kiminini constituency has the highest share of residents with secondary or above at 24%. This is twice Endebess constituency, which has the lowest share of residents with a secondary level of education or above. Kiminini constituency is 3 percentage points above the county average. Hospital ward has the highest share of residents with a secondary level of education or above at 41%. This is 31 percentage points above Chepchoina ward, which has the lowest share of residents with a secondary level of education or above. Hospital ward is 20 percentage points above the county average.A total of 59% of Trans Nzoia County residents have a primary level of education only.

Poverty

Gender inequality is a common phenomenon in the county and is deeply rooted in the cultural and traditional values. Women are disadvantaged in terms of access and ownership to resources and decision-making. The poverty situation in the Trans Nzoia region is manifested in various forms such as inaccessibility to health services, food security, inadequate potable water, inadequate shelter, poor sanitation, inaccessibility to education and landlessness. Most of Endebess division in Trans-Nzoia, and parts of Cheptais and Kapsokwony have highest percentages of poor households.

Health

The most prevalent diseases are Malaria, HIV/AID and Tuberculosis. The number of people suffering from tuberculosis per 100,000 people is 155, while those suffering from malaria are 18,053 per 100,000 people. 42.3% of children in the County had undergone full immunization as at the year 2012. 15 % of the children are underweight for their age while 29% have stunted height for their age, an indicator that nutrition is not adequate. 21.5 % of all deliveries in the County happened at health facilities. Contraceptive use improved from 26.4% in 2011 to 27.4 % in 2012.

HIV /AIDS

HIV/AIDS poses a big threat to development of the area because of increasing dependency ratio with an increasing number of orphans and street children. These could reverse progressive gains made in poverty reduction. The youth (15-49 years) are the hardest hit and this is a threat to the labour force of the region. This group is also important because of the labour force they are likely to provide during the construction phase of the project. In 2012, mother-to-child transmission of HIV/AIDS was reported to be at 6.5%. The number of people living with HIV/AIDS and n antiretroviral therapy is 6,248.

Social and Cultural Aspects

The dominant ethnic group in the project area is the Luhya who consists of several sub-tribes, the Teso (in the lowlands) and the Sabaots on the higher slopes. However, there are other ethnic groups mainly concentrated in urban areas including Asians. Thus the project area generally has monolithic cultural based on Luhya customs and traditions. However, modern influence has eroded the traditional way of life for this community. The project corridor is dotted with many religious institutions including churches and mosques. Both Christianity and Islamic religions exists in addition to traditional practices.

The Mt. Elgon area has been designated a Man and Biosphere site by UNESCO, implying that developments in and around the biosphere reserve should be sustainable.

Gender and Social Relations

Trans Nzoia County, like the rest of the country, experience different forms of gender bias against women. While the county government has made considerable progress in addressing this inequality through the political appointments, women still hold lower political, social and economic status irrespective of their enormous contribution towards the economic development of the county. They have little access to land ownership, limited participation and representation in decision making forums, among other forms of inequality. The community remains highly patriarchal with family decisions vested in the male head.

Summary of Potential Environmental Impacts and mitigation measures

Environmental parameter	Potential impact	Proposed mitigation measures

Drainage and Soil erosion	Four new bridges are expected across several rivers (Sabweni, Kaibei, Mubere and Suam). The bridge crossing river Kaibei may be improved to include a pedestrian walk. Construction works at the new bridges could lead to localized erosion. Furthermore, excavations could lead to sediment transportation during April-October especially between Endebess and Suam which has rugged terrain and higher rainfall. Culvert outfalls and mitre drain discharges directed to farmlands can cause new erosion and even affect farm productivity with a direct consequence on family livelihoods *Soil may erode along the road alignment, particularly during the wet season (April through October) in the initial years after decommissioning.*	• Partner with KFS to rehabilitate the excavated sites especially on the upstream and downstream of the new bridges • Optimized new drainage structure positions and improved capacities of the structures used in combination with specific erosion protection works • Scour checks should be constructed alongside drains on steep slopes • Consult owners of receiving farms whenever water discharge from mitre drains and culverts are to be directed into their farms. It is however strongly suggested that these outfalls be directed at vegetated areas • Designing outfalls from culverts and side drains onto farms in such a way that the discharge does not cause soil erosion or adversely affect farm conditions. In some instances when the discharge is on a sloppy terrain then consider lining the outfall up to a point where flow velocity is substantially reduced • Vegetate all excavated sites immediately works are completed within those sites using local species or those approved by the RE
Air quality	The project site has well defined wet and dry seasons. The dry seasons tend to be relatively hot and windy conditions that exacerbate generation and blowing away of dust beyond the project site. Dust pollution could be significant within the Towns, the over 30 institutions close to the road and adjoining settlements.	• Use dust suppressants as far as possible, especially within the towns. Increase frequency to at least every 3 hours during the dry season • All workers should wear dust masks at all times when at the sites of high dust generation • Provide a system of informing neighbourhoods close to the road of possible generation of dust beyond normal levels
Soil pollution	Could occur in the event of accidental oil spills, or release of petroleum products and bitumen (amongst other liquid waste) particularly in and around machinery and plant yards, base camps and areas of concentrated activities. These may infiltrate into soils and cause soil pollution.	• Mitigation actions will mainly involve maintenance of machinery, bunding the garage/ fuel stations, using drip trays, and directing spills to an oil sump which should be emptied into a designated final disposal site
Construction water sources	There are adequate water resources in the project area, so conflicts with the local water users are not foreseen. However, consultations are needed prior to commencement of water abstraction.	• Acquire WARMA permit for water abstractions. • Consult Water Users Association to gain their support prior to abstraction
Global warming / Climate Change	Climate change projections indicate slight enhancement of rainfall but minimal increase in temperature of 0.7 – 2.10C.	• Changes in temperature may not have a direct bearing on the bitumen road, however associated extreme weather events such as higher than normal rainfall days could

		impact on the road through enhanced erosion and need to design for maximum floods. The design has used a 100 year flood return period which potentially captures extreme weather events between 1960 and todate. This is the period when global warming / climate change related extreme weather events have been noted.
Flora	Other than the dual carriage between Kitale Town and Matisi, and short re-alignment sections where there are sharp bends, the rest of the road will be restricted to the current road reserve. In all cases land cover will be transformed to permanent paved surface, leading to permanent and irreversible loss of vegetation cover. An indirect impact during operation is the possible opening up of Suam forest to tree poachers and this could lead to enhanced degradation of the forest. The converse can also happen, where cheaper trees from Uganda can easily be accessed and transported thus protecting the Suam forest.	• Design to avoid the old trees that are sporadically found in sections of the road between Kitale and Endebess • Value the vegetation resources to be affected that are within land to be acquired for appropriate compensation • Kenya Forest Service should be encouraged to enhance protection of Suam forest and closely monitor movements of forest resources in the area. • Partner with KFS to rehabilitate part of the Suam Plantation Forest area by providing funds to establish or enhance tree nurseries and to assist with out-planting
Noise and ground vibration	This impact can be of concern only at construction sites within the urban environments of Kitale, Veterinary, Tuwan, Matisi, Mowlem, Endebess, Chepchoina, and Suam. There are over 30 noise-sensitive institutions that are within 300m of the road that include learning institutions, health facilities, homesteads and places of worship. Where explosives will be used, especially at quarries, there will be serious noise and vibrations in the vicinity of the site.	• At commencement of construction works, map all noise sensitive receptors and prepare a construction plan that avoids excessive noise within proximity of the receptors as appropriate • Restrict activities that emit loud noise to day time • Warn residents within 300m of quarries of intention to blast and the exact blasting time
Visual intrusion	On the whole, there are few scenic sites, but opened up quarries and borrow pits could be of visual intrusion Cut slopes and excavated sites that scar the landscape are also sources of visual intrusion	• The contractor to prepare quarry and borrow pit management and rehabilitation plans • Progressively rehabilitate quarries and borrow pits as work progresses and as per site specific material site rehabilitation plan. The contractor should only demobilize once rehabilitation is complete
Waste Management	Construction waste could be a health hazard and also of visual intrusion	• Develop a waste management plan for use during the entire construction period • Identify waste disposal sites and ensure the sites are registered with NEMA and the relevant County Government • Stockpile spoil materials for use in backfilling excavated areas or rehabilitating borrow pits and quarries
Urbanization	The road could trigger rapid	• Proactive physical planning for the area by

	development of urban centres, increase of property values and could promote ribbon settlement pattern beyond Endebess.	Trans Nzoia County
Socio-cultural impacts	Enhanced social interaction and networking that will further erode indigenous communities' traditional ways of life as many adapt to hybrid cultures. In addition, there will be cultural diffusion and to some extent, erosion of some values and practices. These could mainly affect the Sabaot community who still value their culture. Restricted access to public facilities and amenities and even homes	• This may be a positive impact and could also be a negative impact depending on standpoint of an individual • The County authorities may need to be informed of this potential impact • Provide accesses to all public institutions and homes adjacent to the road at all times
Gender	The road will have very positive impacts in reversing gender disparity in regards to access to opportunities that include markets, social facilities and overall improve thereby improving basic income levels of women and vulnerable groups	• This impact can only be enhanced especially by the contractor adopting the 30% gender rule during construction. • The county government should be informed of the potential positive gender impacts to formulate ways of enhancing the positives
Resettlement and compensation	There will be some land and property acquisition to allow for re-alignments. The most affected sections will be Kitale Town due to the dual carriageway. Others are at Mowlem, Tuwan,Kimase and Chepchoina. Overall over 200 individuals will be affected by the project.	• A resettlement action plan has been separately undertaken and reported in a separate volume. • The RAP proposes compensation at the current market rates while livelihood activities especially in Kitale Town will be mitigated by providing alternative trading sites • Lorry park will be provided at Matisi and provision of grain drying yard will be explored at the same site
Public Health	The indirect impacts of the project on health and safety are associated primarily with human behaviour, and this includes the potential for transmission of HIV-AIDS and other STIs	• Integrate HIV AIDS and STIs preventive and awareness programme in the cotract • Include issuance of free condoms to workers in the BoQ • Establish a clinic within the Contractors' camp to attend to workers
Road safety	The road is designed for high speed motoring.	• Install elaborate road safety signs along the entire road and enforce compliant • Provide bus parks at all trading centres that can accommodate at least 4 fourteen seater mini-buses • Construct foot bridges and under-passes at strategic points along the road. • Zebra crossings should be accompanied by speed calming humps. • KeNHA should permanently acquire the road reserve to avoid structures close to the road carriage

Conclusions and recommendations

Overall the socio-economic impacts will be positive as it is for the larger societal good. The road will enhance agricultural productivity in the agriculture rich catchment, through faster and cheaper transportation of farm produce and farm inputs. Ultimately the cost of agricultural production will be reduced potentially resulting in lower cost of food and other commercial crops from the area. More importantly the road will open up more trade with Uganda, thus creating export opportunity for agricultural products into Uganda and import opportunities for products from Uganda. In addition the road will foster East African integration with enhanced movement of people and goods across the border. The other tangible benefit is the projected appreciation of land values especially between Endebess and Suam due to better access.

Impacts on the bio-physical environment are medium to low and most of them can be avoided or mitigated. Material sites especially quarries and borrow pits could alter the general landscape and also lead to land degradation. This is a major impact considering that very large quantities of materials will be needed for construction. Improved road to all weather standards will improve access to Suam forest with a possibility of encouraging poaching of trees and the temptation to annex parts of the forest for agricultural production. This temptation could be further motivated by the ease of access to markets for agricultural products that shall have been afforded by the new road. The Kenya Forest Service should consider enhancing surveillance across the forest once unusual activities begin to be noted.

Cumulative impacts have been included in all the assessments of the environmental parameters. The findings are that cumulative impacts are related to potential secondary effects on Suam forest and the impacts associated with material sourcing. However, this does not exclude future cumulative impacts that may include those accruing from construction of the Ugandan side of the road and additional use of material sources. During operation, impacts will be significant within farmlands and urban fringe between Kitale and Chepchoina resulting in a gradual change of character. Landscape changes may contribute to a potential future urbanising impact changing the character of the area from rural to urban edge. Due to expected future residential and commercial developments along the Kitale and Kapchorua section, cumulative impacts relating to land use change and increased number of noise and vibration receptors are expected.

The assessment has concluded that significant impacts can also occur on landscape and visual amenity occasioned by opening up of quarries and borrow pits and earthworks. It is predicted that although some adverse visual impacts can arise during construction and assuming adequate mitigation is provided, these impacts will not be significant. Proactive planning on the part of the county government could significantly mitigate these impacts. In general and taking into consideration all factors, it is concluded that the road project would have substantial positive impacts on livelihoods and the economy while long term potential adverse impacts mainly relate to the opening up of Suam forest to degradation. Construction related impacts are all transient and can be easily mitigated.

LIST OF ACRONYMS

ADT	Average Daily Traffic
AfDB	African Development Bank
AIDS	Acquired Immuno-Deficiency Syndrome
BOQ	Bill of Quantities
CBO	Community Based organization
CO	Carbon monoxide
CPP	Consultative Public Participation
CRC	County Resettlement Committee
DC	District Commissioner
DOHS	Directorate of Occupational Health and Safety
DSC	Design and Supervision Consultant
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental/Social Management Plan
ESO	Environmental & Social Officer
FGD	Focus Group Discussions
FIDIC	International Federation of Consulting Engineers
GoK	Government of Kenya
HH	Household Head
HIV	Human Immuno-deficiency Virus
ISS	Integrated Safeguard System
KeNHA	Kenya National Highways Authority
KFS	Kenya Forest Services
KIHBS	Kenya Integrated Household Budget Survey
Km	Kilometre
KNASP	Kenya National Aids Strategic Plan
KNBS	Kenya National Bureau of Statistic
KRB	Kenya Roads Board
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
m	Metre
MAB	Man and Biosphere
masl	meters above sea level
MCA	Member of the County Assembly
MDG	Millennium Development Goals
NEMA	National Environmental Management Authority
NGOs	Non-governmental Organisations
NMT	Non-Motorized Transport
NOx	Oxides of Nitrogen
OD	Origin and Destination
OSHA	Occupational Health and Safety Act
PAP	Project Affected Persons
PAPC	Project Affected Persons Committee
PI	Public Involvement
PIU	Project Implementation Unit
PM	Particulate Matter
PPE	Personal Protective Equipment
PSV	Public Service Vehicles
RAP	Resettlement Action Plan
RE	Resident Engineer
RHS	Right Hand Side
RMI	Roads Maintenance Initiative
RUC	Road User Costs
SO_2	Sulphur dioxide
STI	Sexually Transmitted Infections
ToR	Terms of Reference

VOCs	Vehicle Operating Cost
WUA	Water Users Association

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1 INTRODUCTION

The Kitale-Endebess-Suam Road is currently a single lane supporting heavy traffic within Kitale Town, Tuwan and Matisi areas. The existing road is an impediment to the flow of heavy traffic experienced while exiting Kitale Town. The 45Km road starts at the junction with A1 road on the southern part of Kitale town. It traverses the town in the northerly direction up to the junction with Kwanza - Kapenguria road. From this junction, the road takes a westerly direction to Endebess Town from where it turns to the north-west to terminate at Suam River Bridge, which provides the border line between Kenya and Uganda. This route holds economic advantages for Kenya in her trade with Uganda which is a landlocked country. It is envisaged that the development of this route could ease Uganda's import and export problems while bringing business opportunities, employment and economic growth to the East Africa region as a whole.

In the design, several minor alignment improvements have been adopted to improve its geometry with some few sections provided with complete realignment. The road section from Kitale to Endebess is to bitumen standards while the section from Endebess to Suam is still to gravel standards. On constructing the entire road to bitumen standards, it is expected that the road will be busier than it currently is.

1.1 DESCRIPTION OF THE PROJECT

1.1.1 Description of the road sections

The project road is a primary road designated as class C and links the rural centers on the west of Trans Nzoia county to the Urban center of Kitale which is the head quarter of this county. The major function of Class C roads is to provide both mobility and access.

The project road starts at the junction with A1 road on the southern part of Kitale town at approximately 1875m above the sea level traversing Kitale town on the northerly direction for 3.1Km up to the junction with Kwanza - Kapenguria road. From this Junction, the road takes a westerly direction to Endebess town at km 19+700 and about 1964m above sea level. From Endebess town, the road takes north-Westerly direction up to Suam town at Km 45+500. Terminating at Suam River bridge approximately 2052m above sea level. Suam River provides the border line between Kenya and Uganda.

The first section of this road (from Kitale to Endebess) exhibits gentle geometry with very long straight elements. Terrain along this section can be described to be relatively flat with few water crossings.

The second section from Endebess town (beginning of non-bitumen pavement) which is about 26Km long is characterized by rolling terrain exhibiting relatively high gradients. This section is characterized by relatively small water crossings spread evenly along the alignment with numerous curves with small radii that have been proposed for improvement.

1.1.2 Location

The project road is situated in the North Rift region of Kenya. It traverses the County of Trans Nzoia starting at the Junction with A1 road while entering Kitale Town. It goes through the trading centers of Veterinary, Matisi, Endebess, Mowlem, Tuwan, Kimase and Chepchoina, before finally terminating in Suam town at the Kenya-Uganda Border.

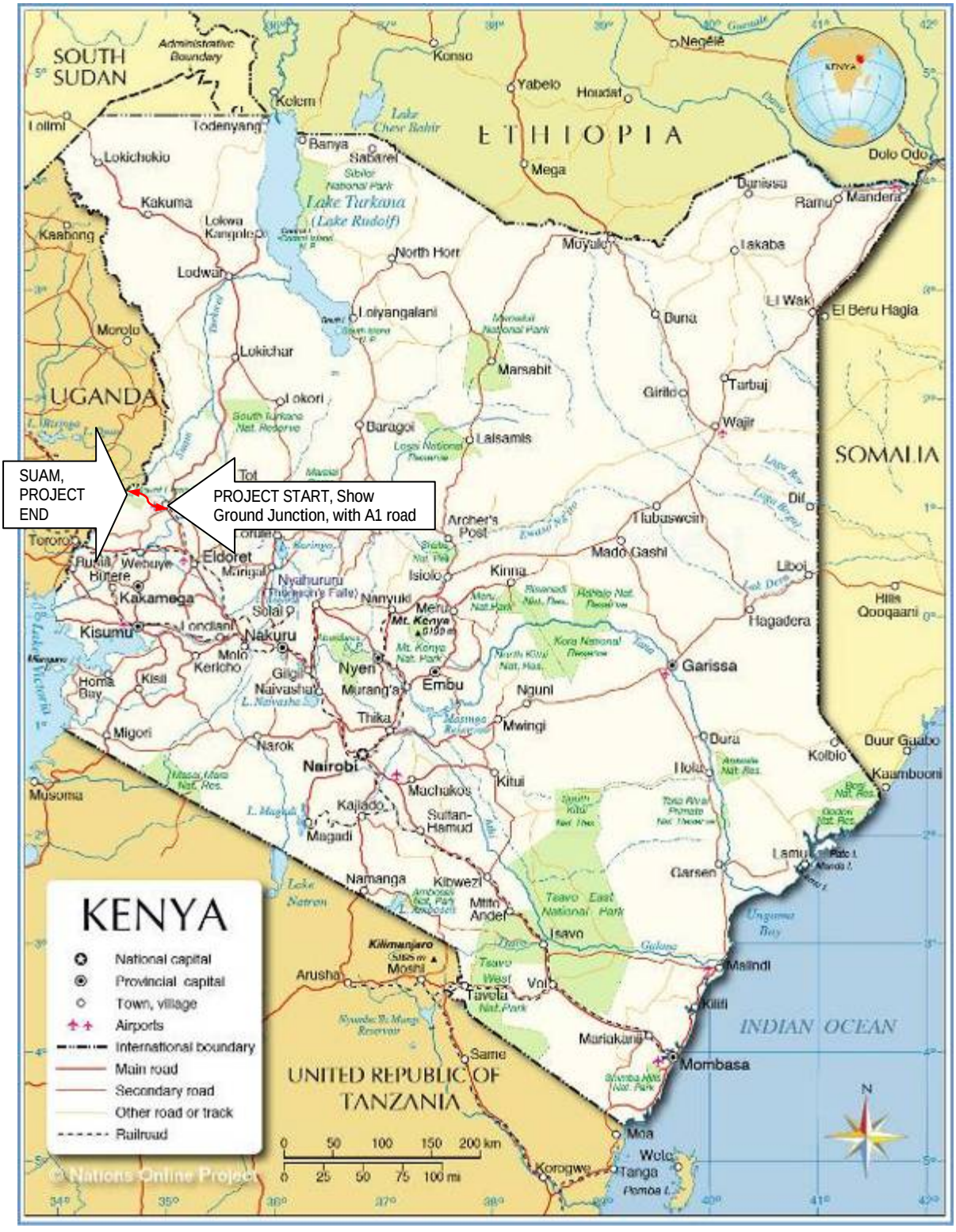


Figure 1: Project Location in the Kenyan Context

1.1.2.1 The start point

The start point is in Kitale Town, at the road A1 junction, leading to the Kitale Show Grounds. This point marks the end of the road from ELDORET to KITALE. The single carriageway road continues into Kitale Town, through to Endebess and onwards to Suam.

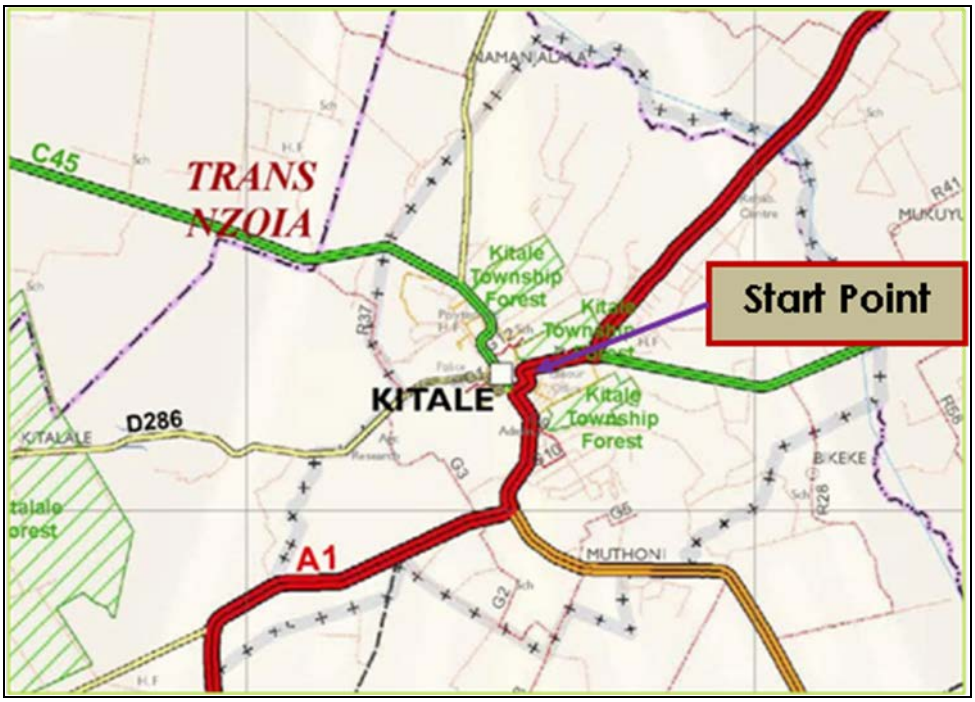


Figure 2: Start Point Map

Figure 3: Start Point Satellite Image

Plate 1: Start Point Photo

1.1.2.2 The first section

The first section of the project road is between Kitale and Endebess. Its length is about 19.00 km.

Figure 4: Google Earth Overview Section 1

1.1.2.3 The second section

The second section of the project road is between ENDEBESS and SUAM. Its length is about 26.00 km.

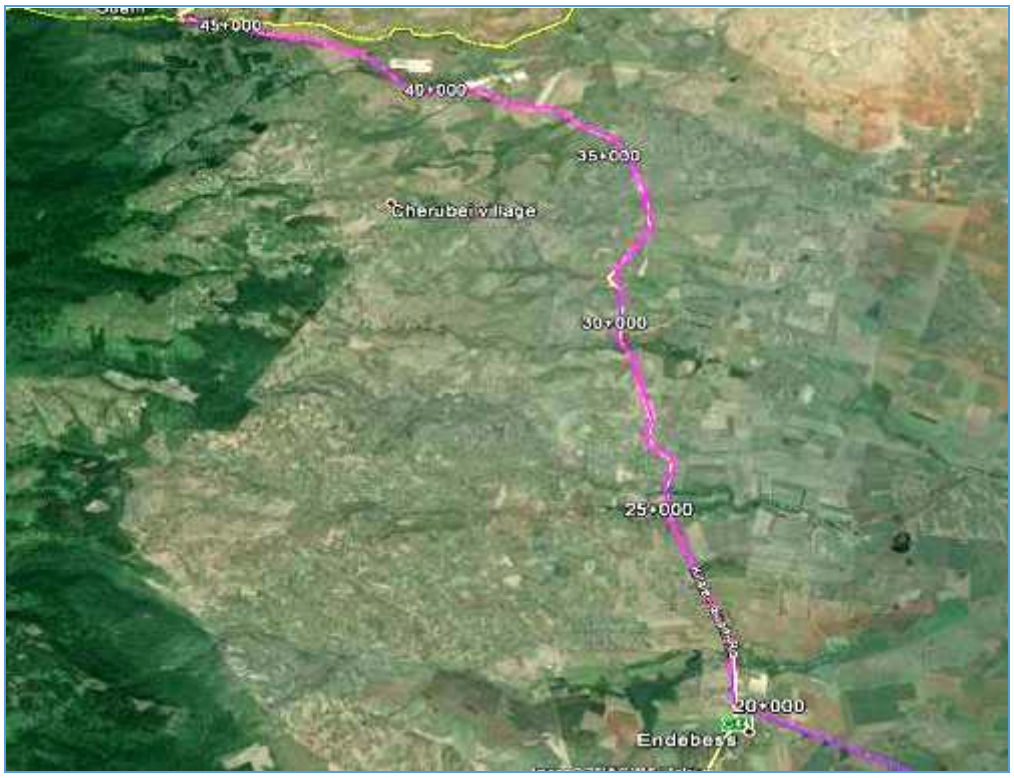


Figure 5: Google Earth Overview Section 2

The end point is in Suam, at the River Bridge crossing that marks the border between Kenya and Uganda.

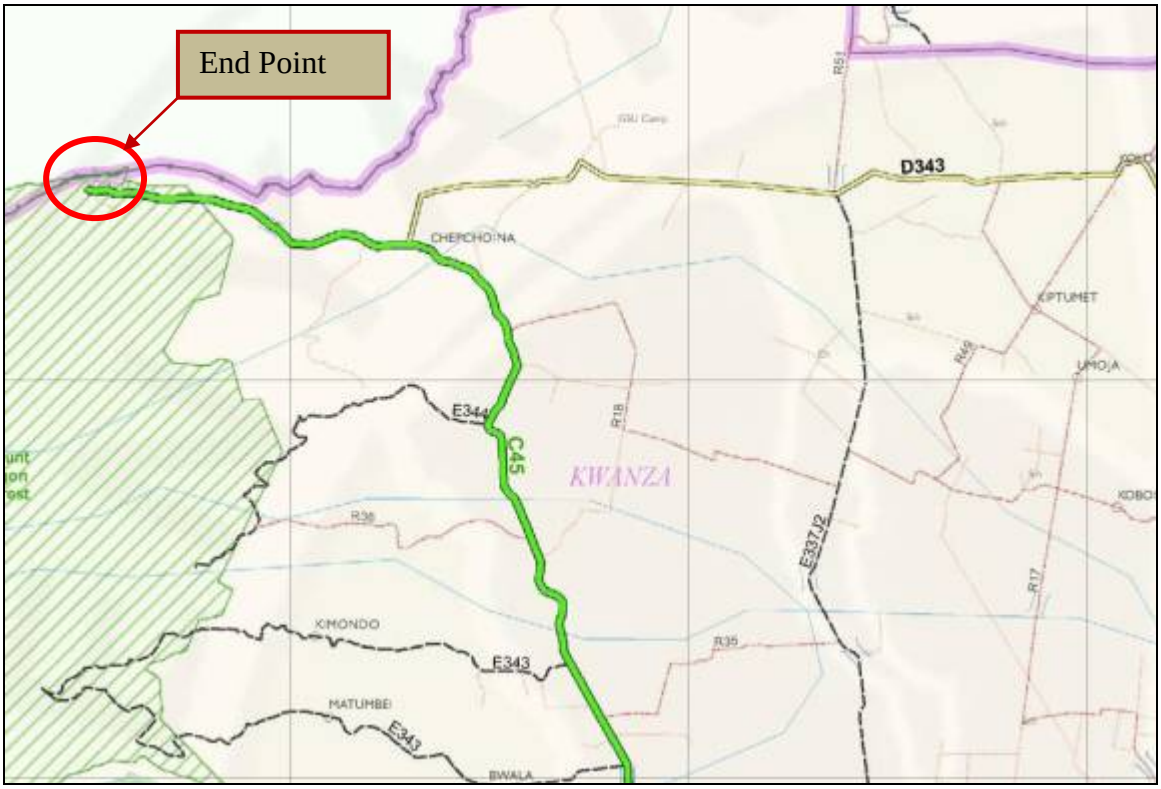


Figure 6: End Point Map

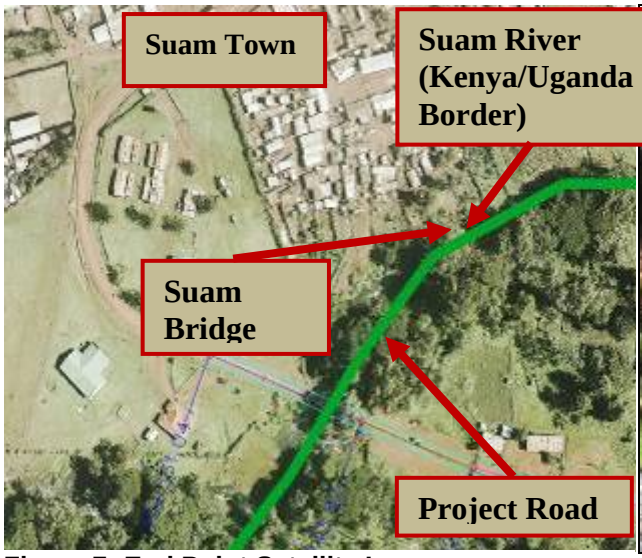


Figure 7: End Point Satellite Image

Plate 2: : End Point Picture

1.1.3 Road alignment

The project road starts at the junction with A1 road on the southern part of Kitale town at approximately 1875m above the sea level traversing Kitale town on the northerly direction for 3.1Km up to the junction with Kwanza - Kapenguria road. From this Junction, the road takes a westerly direction to Endebess town at km 19+700 and about 1964m above sea level. From Endebess town, the road takes north-Westerly direction up to Suam town at Km 45+500. Terminating at Suam River bridge approximately 2052m above sea level. Suam River provides the border line between Kenya and Uganda.

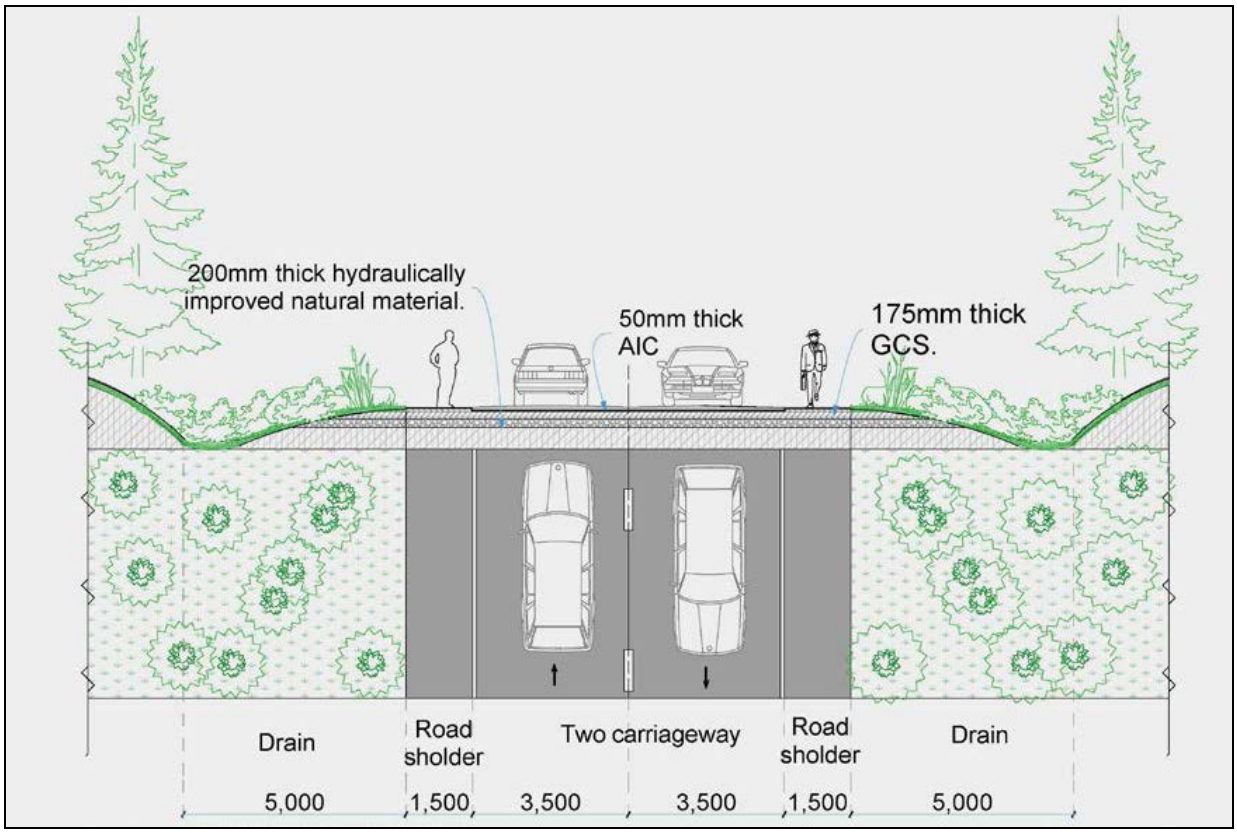


Figure 8: An artist's impression of the road cross-section

1.1.4 River crossings

The project road traverses the Nzoia River drainage system that originates from the highlands of Mount Elgon and flow from east to west direction crossing the project road from left hand side to the right hand side. The existing alignment passes over Large and Medium size river crossings like Sabueni River, Kaibei River, Mubere River and finally Suam River at the border of Kenya and Uganda which is also the project end. The rivers are currently being crossed using concrete bridges or culverts. There are several small and other medium drainage channels currently crossed using Single and multiple cells Pipe and Box culverts.

Generally most of the crossings have hydraulically deteriorated overtime with some small and medium size crossings being either silted or clogged at the entrance and the exits.

1.2 Outline of the Construction of the Road

1.2.1 Construction Overview

A pre-qualified contractor capable of carrying out roads construction will undertake construction of the road and associated works. The construction will require a number of temporary facilities such as equipment & workshop yard, labour camp and site offices.

The Construction contract will be based on FIDIC (International Federation of Consulting Engineers) conditions which stipulates that the Contractor must provide a performance bond as well as the following insurances:-

I. Insurance of Works and Contractors Equipment
II. Third Party Insurance

Ground Investigations

Prior to actual construction works, the Contractor will undertake additional ground investigations over and above the one done by the Consultant. These additional ground investigations will be more elaborate. Samples from test pits will be subjected to both visual observations and laboratory tests.

Demolition and Site Clearance

This will include general site clearance of vegetation including their disposal. Where necessary, trees may be cut, their stumps removed and resulting holes backfilled. Where the road requires slight realignment, or there is need to clear the entire width of the road reserve, existing structures, which are in the way of the construction, will be demolished and disposed. This is likely to be intense in the project towns where there is substantial encroachment into the road reserve. The demolished elements will include brickwork, concrete, masonry blocks, metal (largely steel) and timber.

Concrete Works

There will be concrete works at certain sections of the road that require reinforcement. In addition new culverts and other drainage structures will be required.

Earthworks

Earthworks operations will be for preparation of road sub grade and drainage, in addition to auxiliary works within the road corridor. Earthworks will include:-

- Site Survey and Setting out.
- Excavation by cutting into topsoil, normal soil, rock or artificial material.
- Trimming some excavated surfaces and disposing of excavated material(s).
- Filling to Embankment and General Filling with imported natural material other than topsoil. These natural materials include rock; sand and other approved naturally occurring materials.
- Scarifying, watering and compaction of fill layers or in situ road formation level.
- Providing, placing and lapping geo textile materials.

Roads and Paving

The Roads Pavement comprises of the following: -

- Construction of the carriageway
- Precast Concrete Kerbs and Channels to act as restraint to road edges
- Non Illuminated Traffic Signs
- Reflective Road Studs along centre line of carriageway
- Road Markings to designate carriageway from shoulders

Steel Works

The steel works in the Project are in the viaduct bridge guardrails and related subsidiary works of site bolts.

1.2.2 Commissioning (Operation and Maintenance)

Structural and Civil Engineering Works

These types of works are usually ready for use after construction and construction testing. These works will be commissioned if and when, their functionality can be substantially achieved.
As a part of the commissioning activity, the Consultant will prepare and finalize as built drawings for the entire structural and civil engineering works.

Site Reinstatement

Prior to the commencement of the reinstatement program, the contractor will be required to develop a project specific reinstatement plan.

Reinstatement Philosophy

The reinstatement of the Project will be based on the following principles:-

- Disturbed areas which are not permanent works, will be reinstated to pre-construction conditions to the greatest practicable extent
- Disturbed areas will be stabilized to protect the integrity of permanent works.
- Disturbed areas will be re-vegetated to achieve good and natural landscape ambience.
- Regular monitoring of reinstated areas will be undertaken until environmental requirements and goals have been achieved.

Timing of Reinstatement

Reinstatement of the Project area will be undertaken on a sequential basis dependent on the completion of construction and testing in each area. The site will be cleared of residual construction debris, construction signs and equipment as part of activities associated with reinstatement.

Site Clean Up

Prior to de-mobilization of construction personnel and equipment, cleanup activities will be carried out in accordance with environmental standards and industry best practice. Cleanup activities will consist of the removal and/or disposal of temporary structures, equipment, tools and excess material brought on site or generated during the construction and commissioning program.

Permanent Reinstatement

Permanent reinstatement will be undertaken in all the areas that have been subjected to disturbance by the roads and viaduct bridge construction.
To facilitate natural re-vegetation of disturbed areas, the separately stockpiled excavated material and topsoil will be spread back in the reverse order in which they were excavated.

The key reinstatement principles are summarized below:-

- Minimize reduction in soil quality and structure during construction
- Reinstate all third party assets affected by project activities in accordance with the construction contract documents and other pre-entry agreements.
- Carry out site landscape on the basis of a landscape plan prepared by a landscape professional.
- A target minimum cover of pre-existing ground vegetation established within one year of final reinstatement will be set.
- An aftercare monitoring and corrective action program will be developed and implemented based on examining the bio-restoration process periodically after reinstatement.
- Any fences, services, structures or other facility affected by the construction works will be repaired or replaced to a condition that is at least as good as that found prior to construction.

1.2.3 Decommissioning and Abandonment Plans

Decommissioning of the road is not foreseen, however, decommissioning of related facilities especially contractor's camps and workshops are inevitable. Further, decommissioning of quarries and borrow sites will be done upon completion of construction works.

Legal Basis

For the components that will require decommissioning, the proponent will prepare a written abandonment plan within 30 days of determining decommissioning. The Plan will detail how the decommissioning will be carried out.

The abandonment plan will be subject to approval by NEMA. An Environment Project Report (EPR) will be prepared prior to implementation of this plan, to assess and minimize potential environmental and social impacts arising from the abandonment operations. This abandonment EPR Study to be submitted to NEMA for consideration.

Upon completion of the abandonment operations, an assessment of contaminated land will be prepared recording the final contamination status of the location of the project facilities. This assessment will be subjected to NEMA approval.

Technical Solutions for Abandonment

The exact details of how facilities will be abandoned will be determined prior to abandonment and agreed with the Government. Therefore it is not possible to determine at this stage exactly what techniques will be used. However this will be in accordance with recognized international standards.

1.3 Products, by – Products and Waste

The construction of the project will generate inert, non-hazardous and hazardous waste over the period of construction. Operation of the roads will result in relatively small volumes of routine waste generation for the life of the Project. Maintenance and repair activities conducted during the operational lifetime of the project may generate limited volume of waste.

2 ANALYSIS OF ALTERNATIVES

2.1 This Project

For any given road whose pavement is in poor condition, the higher order functions suffer first. In the case of the Kitale-Endebess-Suam road, its transboundary function remains latent and its function as a local road that supports agribusiness is way below optimal. The same is true of its national role within the Kenyan economy and transport system. What remains, and even that is severely constrained, is the project road's local function. That is, facilitating relatively short local trips along its length linking local communities and settlements such as Tuwan to Matisi, Mowlem to Endebess, Chepchoina to Suam and so on.

The Kitale – Suam road holds economic advantages for Kenya – given that is links Kenya with Uganda which is a landlocked country. It is envisaged that improvement of this road could bring business opportunities, employment, and increased economic prosperity to both Kenya and Uganda.

Additionally Kitale - Endebess - Suam road is classified at class C implying it is a primary road which links district head quarters to each other such as the County head quarters of Kitale to some of the major commercially and agriculturally rich towns of Trans Nzoia County, North Rift region and the Western Kenya including Bungoma and Kakamega. Administratively, the C45 road is the major link between the sub-counties such as Cheranganyi, Kwanza, Saboti, Endebess and with the County government of Trans Nzoia and subsequently, the National government.

The North Rift region of Kenya is known for the production of large volumes of cereals and has been rated as the grain basket of the country. The project road in its current state has been used by farmers as the major link road from the farm to Eldoret where crops are repackaged for transportation all over the country. The current state of the road has continued to pose a great challenge to these farmers resulting in high production cost in terms of high vehicle operation cost and longer travel times.

The project region has a vibrant agricultural economy stemming from the economic activities as listed above and these activities involve mobility and accessibility of goods and services within the individual areas and within the county. This has resulted into high number of local traffic being served by the project road. Given its proximity to Eldoret, the project road also provides local link between its sub-counties and Eldoret. It is believed that most of the region's economic products find their market in Nairobi with high number of locally generated traffic using the road on daily basis to and from Nairobi.

2.2 NO PROJECT ALTERNATIVE

This alternative means fore-going all the potential benefits of the project listed in the section above. Below is a synthesis of additional direct benefits that will be fore-gone:

1. Despite the fact that the first section of the existing road, about 16 km, is in fairly good condition allowing good average speeds overall, improvement of the entire 42km road will definitely improve socio-economic conditions of the region.

Table 1: The traffic counts below give an idea of the volumes

Station Name	No		Station	Direction	M/Cycle	Medium Car	4x4	Pick-up	Matatu	Medium Bus	Heavy Bus	LGV	MGV	HGV	Articu.	TOTALS	
1. Sudi Way Makasembo Junction	1	1	Nairobi/Kitale/Nairobi	N-B	2,408	2,377	761	198	1,202	37	43	148	135	81	48	7,438	16,683
		2		S-B	3,170	2,690	861	265	1,661	42	56	181	154	103	61	9,245	
	2	3	Nairobi/Kapenguria/Nairobi	N-B	241	268	137	98	62	28	18	54	35	38	34	1,014	2,352
		4		S-B	462	380	196	81	70	12	12	19	53	30	24	1,338	
	3	5	Nairobi/Makasembo/Nairobi	N-B	1,164	1,160	530	220	97	12	20	52	45	15	4	3,320	6,135
		6		S-B	969	859	300	365	167	18	17	26	69	17	5	2,815	
	4	7	Makasembo/Kitale/Makasembo	N-B	233	228	95	73	30	4	4	10	3	3	0	684	1,272
		8		S-B	179	210	68	64	28	5	5	14	6	8	1	588	
	5	9	Kapenguria/Kitale/Kapenguria	N-B	1,727	1,434	172	265	96	7	9	30	39	8	4	3,791	8,103
		10		S-B	2,449	1,249	222	228	77	8	11	27	34	6	2	4,313	
2. Ravine Road Junction	6	11	Kitale/Endebes/Kitale	N-B	8,393	685	141	171	171	8	10	56	53	42	26	9,756	19,245
		12		S-B	8,094	553	145	185	214	12	4	99	61	83	38	9,489	
	7	13	Kitale/Ravine/Kitale	N-B	664	173	54	58	30	5	11	6	11	22	10	1,043	2,060
		14		S-B	659	175	48	48	29	2	5	8	9	28	6	1,017	
	8	15	Ravine/Endebes/Ravine	N-B	987	188	36	72	18	3	0	20	24	22	4	1,375	3,004
		16		S-B	1,169	203	51	93	20	3	1	24	35	21	7	1,629	
3. D 341 Junction to Kwanza (Veterinary Area)	9	17	Kitale/Endebes/Kitale	N-B	8,096	442	147	231	110	6	3	61	69	43	24	9,232	17,213
		18		S-B	6,962	406	118	178	118	3	3	49	81	32	31	7,981	
	10	19	Kitale/Kwanza/Kitale	N-B	2,529	294	57	69	49	2	1	11	11	6	1	3,028	6,445
		20		S-B	2,872	322	68	76	42	2	2	9	15	8	1	3,417	
	11	21	Kwanza/Endebes/Kwanza	N-B	654	31	15	18	9	4	1	4	5	1	0	741	1,335
		22		S-B	496	48	13	13	8	3	2	2	7	1	0	594	
4. Endebes Turbo Junction (C 45/C 44) Road	12	23	Kitale/Suam/Kitale	N-B	154	43	44	23	69	0	0	9	11	3	2	359	741
		24		S-B	157	42	36	39	74	1	0	14	12	4	2	381	
	13	25	Kitale/Turbo/Kitale	N-B	121	18	23	14	5	2	1	4	6	3	2	197	410
		26		S-B	142	24	18	14	5	1	0	2	4	2	1	214	
	14	27	Turbo/Suam/Turbo	N-B	206	20	21	14	3	0	0	4	3	1	0	273	530
		28		S-B	208	21	13	6	3	0	0	2	3	1	0	258	
5. Mowlem Town Center	15	29	Endebes/Suam/Endebes	N-B	284	11	25	7	44	0	0	5	11	4	1	393	799
		30		S-B	273	11	20	20	49	1	0	13	10	6	2	406	
TOTAL				N-B	27,861	7,373	2,257	1,529	1,996	119	121	473	461	292	161	42,707	86,458
				S-B	28,262	7,195	2,178	1,674	2,568	115	119	491	552	352	179	43,751	

2. The new road will improve travel times and if travel times decrease passengers would be expected to increase their trip frequency (i.e. demand for travel would go up) in all directions and for all trips that include wholly or partially the project road in their itinerary (provided the decrease represented a significant portion of current travel time).

   So for example trips using the project road along its entire length from, say, Kitale to Suam, would experience a perceptible improvement after dualling the sections that experience heavy traffic.

3. Road User Costs (RUCs) and Road Agency Costs (RACs). ***Savings (reductions) in RUCs and RACs are considered as 'benefits'.*** When a road improvement is undertaken road users whether as vehicle owners or passengers benefits from reduced vehicle operating costs or reduced travel time costs. These effects are known as Road User Costs and they are composed of Vehicle Operating Costs (VOCs) plus Value of Travel Time costs. In the project area in particular, where road condition is relatively poor, the bulk of benefits is made up of Vehicle Operating Costs savings.

4. Accident reduction benefits are a useful measurable addition to overall benefits of the project. In the project area however there are no reliable statistics on which to base any sort of

conclusion. Qualitatively there will be a reduction in the accident rate. Numbers of accidents are measured as a rate per million veh-kms. This means that in absolute numbers the number of accidents will increase as there will be much more traffic on the project road. However in terms of accidents per million veh-kms there will be a reduction

These benefits that will be foregone must be looked at in the framework of Kenya's overall economic ambitions in the future. Being an important artery to trade and social benefits in the region and nationally, this alternative would be a major drawback.

3 RELEVANT LAWS, POLICY, REGULATORY AND ADMINISTRATIVE FRAMEWORK IN KENYA

3.1 The Kenyan Constitution

Section 42 of the Constitution states that every person has the right to a clean and healthy environment, which includes the right a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69, and b) to have obligations relating to the environment fulfilled under Article 70.

Chapter five of the new constitution covers "Land and Environment" and includes the aforementioned articles 69 and 70. The Chapter seeks to eliminate processes & activities likely to endanger the environment. Article 69 states that 1) The State shall a) ensure sustainable exploitation, utilisation, management and conservation of the environmental and natural resources, and ensure the equitable sharing of the accruing benefits; b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya; c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities; d) encourage public participation in the management, protection and conservation of the environment; e) protect genetic resources and biological diversity; f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment; g) eliminate processes and activities that are likely to endanger the environment; and h) utilise the environment and natural resources for the benefit of the people of Kenya.

3.2 Legislative Framework

3.2.1 Environmental Management and Coordination Act No 8 of 1999

This ESIA report has been undertaken in accordance with the Part VI of EMCA 1999 and its subsequent supplements. Part II of the Act states that every person is entitled to a clean and healthy environment and has the duty to safeguard the same. An improvement in the drainage system and road curvature whose current status is very poor will, for example ensure that this Section of the Act is well adhered to. The Act also proposes that projects listed under the Second Schedule of the Act must undergo an Environmental and Social Impact Assessment. This Schedule listing includes, amongst others the establishment of roads (No. 3(a).)

Section 73 requires that all operators of projects which discharge effluent or other pollutants to the environment submit to NEMA accurate information on the quality and quantity of the waste thereof. In this respect, it is noteworthy to mention that materials used in road construction have the potential of intoxicating both the above and underground water bodies and as such it is recommended that the

project meets the pertinent requirements of the Act which aims to reduce environmental pollution by appropriate controls.

The Section herein below reviews the relevant statutes that guide the development and management of roads projects, so as to ensure environmental and socio-economic sustainability.

3.2.2 Environmental (Impact Assessment and Audit) Regulations, 2003

These Regulations guides on the procedures of conducting an ESIA study by detailing the parameters to be evaluated during the Assessment. It also provides for guidelines on the payment of the ESIA license fees, conducting of environmental audits and development of project monitoring plans. The ESIA license application fee is 0.1% of the project cost.

This ESIA, as done is in compliance with the requirements of the regulation. It is therefore recommended that the subsequent requirements of the Regulations which include the conducting of continuous monitoring and annual audits be fully observed.

3.2.3 EMCA (Waste Management) Regulations, 2006

These Regulations guides on the appropriate waste handling procedures and practices. It is anticipated that, the proposed project will generate a large quantity of solid waste during construction and these will need to be managed through reduction, reuse, and recycling or appropriate disposal. It is therefore anticipated that, the amount of materials to be discarded as waste during the project implementation will be minimum.

As regards waste reduction, it is recommended that the proponent put in place measures to ensure that construction materials requirements are carefully budgeted for so as to ensure that the amount of construction materials left on site after construction is kept minimal. It is further recommended that the proponent considers the use of recycled or refurbished construction materials including those excavated from the existing roads. Purchasing and using once used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

In addition to the above-mentioned recommendations and in order to comply with the requirements of these regulations; the proponent should undertake the following;

1. NOT allow disposal of any wastes on the highway, street, road, recreational area and public places;
2. Encourage segregation of wastes and grouping them according to their similarity, for example plastics, toxics, organics, etc;

3. Ensure all wastes are deposited in designated dumping sites are approved by the local authority;
4. Ensure all waste handlers engaged by the proponent are licensed by NEMA and possess all relevant waste handling equipment and documentations, such as waste transport license, tracking documents, license to operate a waste yard, insurance cover, and vehicle inspection documents, amongst others;
5. Implement cleaner production principles of waste management namely reduce, reuse and recycle;
6. Label all hazardous wastes as specified in Section 24 (1-3) of the regulation.

The fourth schedule lists wastes considered as hazardous and these include solvents, emulsifiers/emulsion, waste oil/water and hydrocarbon/water mixtures. As regards, road projects involve use of inputs which are likely to generate the fore-mentioned wastes and thus, these will need to be handled as required of by the regulations.

3.2.4 EMCA (Water Quality) Regulations, 2006

These Regulations provide guidelines on the use and management of water sources; and the quality of water for domestic use and irrigation. The proponent will be required to observe the requirements of these Regulations that prohibit anyone from undertaking development within a minimum of 6m from the highest ever recorded flood level. Section 4(2), 6 and Section 24 of the regulation prohibits pollution of water bodies and requires that all substances discharged into the water bodies should meet the standards set under the Third schedule of the regulation.

In response to the above, the project design team should be advised on the requirements of this regulation and appropriately incorporate the regulations in the project design document.

3.2.5 EMCA (Controlled Substances) Regulations, 2007

These Regulations controls the production, and consumption, as well as exports and imports of controlled substances. As regards, controlled substances are herein grouped into three lists, as below:

- Group 1 list consists of halogenated flourochemicals with ozone depleting substances
- Group 2 list consist of hydrobromoflourocarbons with ozone depleting substances
- Group 3 list consist of bromochloromethane with ozone depleting substances

Products containing controlled substances include: air conditioners, air coolers, refrigerants, portable fire extinguishers, heat pump equipment, dehumidifiers, insulation boards, panels and pipe covers, pre-polymers etc. It is thus recommended that this regulation be observed so as to ensure that equipment, machinery, vehicles and chemicals containing such components are not imported for project use.

3.2.6 EMCA (Noise and Vibration Control) Regulation, 2009

These Regulations provide guidelines for acceptable levels of noise and vibration for different environments during the construction and operation phase. Section 5 of the regulation warns on operating beyond the permissible noise levels while Section 6 gives guidelines on the control measures for managing excessive noises. In this context, the project team should observe the noise regimes for the different zones especially so for working in areas termed as silent zones which include institutions, and worship places, amongst others. These areas are permitted exposure to Sound Level Limits of not exceeding 40 dB (A) during the day and 35 dB (A) at night.

The regulation states that a day starts from 6.01 a.m. to 8.00 p.m., while night starts from 8.01 p.m. – 6.00 a.m. Construction sites near the silent zones are allowed maximum noise level of 60 dB (A) during the day, whilst night levels are maintained at 35 dB (A). The time frame for construction sites is adjusted and the day is considered to start at 6.01 a.m. and ends at 6.00 p.m while night duration starts from 6.01 p.m. and ends at 6.00 a.m.

Part III of the regulation gives guidelines on noise and vibration management from different sources. Sections 11, 12 and 13 of the stated part give guidelines on noise and vibration management from machines, motor vehicles and night time construction respectively. Section15 requires owners of activities likely to generate excessive noise to conduct an ESIA.

It is anticipated that the proposed project will generate excessive noise and/or vibration due demolition of structures which have encroached into the road reserves. This noise will essentially originate from the construction equipment and machinery. The above time limits must therefore be observed.

3.2.7 EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006:-

The Regulations requires proponents to conduct ESIA if their activities may have adverse impacts on ecosystems or lead to unsustainable use of natural resources or/and lead to introduction of exotic species. The regulation aims at increasing the coverage of protected areas and establishing new special status sites by providing guidelines for protecting endangered species. Section 5 of the regulation provides guidelines on Conservation of threatened species and Part III of the regulation guides on the access to genetic materials. The Section states that, the Authority shall, in consultation with the relevant lead agencies, impose bans, restrictions or similar measures on the access and use of any threatened species in order to ensure its regeneration and maximum sustainable yield.

It is recommended that landscaping programmes should involve use of certified plant species to prevent them from affecting project area negatively in terms of invading wetlands, vegetation and even farmlands.

3.2.8 EMCA (Fossil Fuel Emission Control) Regulations, 2006

This Regulation aims at eliminating or reducing emissions generated by internal combustion engines to acceptable standards. The Regulations provides guidelines on use of clean fuels, as well as use of catalysts and inspection procedures for engines and generators. These regulations are triggered in that the proponent will use vehicles and equipment that depend on fossil fuel as their source of energy. As such, it is recommended the requirements of the regulation are implemented in order to eliminate or reduce negative air quality impacts. All equipment that will be used in the project should be kept to manufacturers' specifications to reduce any incomplete combustion.

3.3 The National Land Commission Act, 2012;

The Act establishes the National Land Commission. The National Land Commission (the "Commission") will have wide powers in the management and administration of public, private and community land. In order to carry out its functions effectively, the Commission is required to devolve the administration of land. Consequently the Commission, when fully functional will have offices and land management boards at the county level.

3.4 The Lands Act, 2012

The new laws require all land in Kenya, whether private, public or community land, to be registered. The new laws therefore make provision for the registration of community land, which is the predominant land tenure system in the project area. However, substantive provisions on the administration and management of community land will be enacted by 2015 as required by the Constitution.

The process of compulsory acquisition of land is now more transparent and will be managed by the Commission. In addition, the process requires that the award of compensation (determination of amount payable) will be made prior to the Government taking possession of the land. The Commission is expected to promulgate rules to regulate the assessment of just compensation.

Where there is a dispute in the amount awarded, the Commission is required to place the compensation awarded in a special account, which will earn interest at prevailing bank interest rates, before taking possession of the land. This is a new requirement aimed at making the process of compulsory acquisition more just and fair.

3.5 The Occupation Safety and Health Act, 2007

This Act applies to all workplaces and workers associated with it; whether temporary or permanent. The main aim of the Act is to safeguard the safety, health and welfare of workers and non-workers.

It is thus recommended that all Sections of the Act related to this project, such as provision of protective clothing, clean water, and insurance cover are observed so as to protect all from work related injuries or other health hazards.

3.6 Public Health Act Cap 232

Part IX Section 115 of the Act states that no person or 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 watercourse is deemed as a nuisance. Section 116 requires that local Authorities to take all lawful necessary and reasonable practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to injuries or dangerous to human health. Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests shall be deemed as nuisance.

The Act addresses matters of sanitation, hygiene and general environmental health and safety which is directly related to road projects and associated activities. It is therefore recommended that measures be taken in accordance to the Act in order to safeguard the health of the workers and the public at large.

3.7 Sexual Offences Act No. 3 of 2006

An Act of Parliament to make provision about sexual offences, their definition, prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes.

Section 8, (1) asserts that “A person who commits an act which causes penetration with a child is guilty of an offence termed defilement”. Sub section 2 further explain that if the person commits an offence of defilement with a child aged eleven years or less shall upon conviction be sentenced to imprisonment for life. Section (3) clarifies that any person who commits an offence of defilement with a child between the age of twelve and fifteen years is liable upon conviction to imprisonment for a term of not less than twenty years. The Act on section 23 gives more details on any one in position of authority, or holding a public office, who persistently makes any sexual advances or requests which are unwelcome, is guilty of the offence of sexual harassment and shall be liable to imprisonment for a term of not less than three years or to a fine of not less than one hundred thousand shillings or to both. This Act therefore gives the public and the workers of the road project the right to report any indecent behaviour to a court of law and protects children and young girls from defilement.

Section 26. (1) of the Act states that any person who, having actual knowledge that he or she is infected with HIV or any other life threatening sexually transmitted disease intentionally, knowingly and wilfully does anything or permits the doing of anything which he or she knows or ought to reasonably know -

(a) will infect another person with HIV or any other life threatening sexually transmitted disease;

(b) is likely to lead to another person being infected with HIV or any other life threatening sexually transmitted disease;

(c) will infect another person with any other sexually transmitted disease,

The Act prohibits a wide range of sexual offences including rape of all kinds, indecent acts, incest, pornography, child trafficking, etc.

3.8 Water Act 2002

The Act provides guidelines on use and management of the of the water resources in the country. This Act prohibits the pollution of water. Part II, Section 3 of this Act states that “every water resource is hereby vested in the state, subject to any rights of user granted by or under the Act or any other law”. The Act and its subsequent supplementary, namely the Water Regulations of 2007 requires that, any organization/person intending to abstract water for supply to over twenty (20) users should obtain a permit from the Water Resource Management Authority via a Water Users Association (WUA). The Act further notes that, the issuance of the permit is subject to public consultation as well as an Environmental and Social Impact Assessment. It is recommended that abstraction in all water bodies during the road project must involve the local users to avert any possible water related conflicts.

3.9 Work Injury compensation Benefit Act 2007

This Act provides guidelines for compensating employees on work related injuries and diseases contacted in the course of employment and for connected purposes. The Act includes the provision of compulsory insurance for employees. The Act also defines an employee as any worker on contract of service with an employer. This Act is triggered by the proposed project and it is thus recommended that all workers contracted during the project implementation phase have the required insurance covers so that they can be compensated in case of injuries while working.

3.10 Public Roads and Roads of Access Act (Cap. 399)

Section 8 and 9 of the Act provides for the dedication, conservation or alignment of public travel lines including construction of access roads adjacent to lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads. Already public meetings were held during public consultations and notifications to effect this.

3.11 Traffic Act, Chapter 403

This Act consolidates the laws relating to traffic on all public roads. It also prohibits the encroachment on and damage of roads including land reserved for roads. The proposed project is essentially under the provision of this Act.

3.12 The Kenya Roads Act, 2007

The Act established the Kenya National Highways Authority in addition to other Authorities with clear and separated mandates. The Kenya National Highways Authority has the responsibility for the management, development, rehabilitation and maintenance of all public roads of class C and above.

For the purposes of discharging its responsibility, the Authority shall have the powers and duties to construct, upgrade, rehabilitate and maintain roads under its control.

3.13 Compliance with the stated legislation

Legislation	Compliance with the legislation
Water Act, 2002	The proposed project does not include any disturbance of jurisdictional waters. However, there will be need to design and implement an effective drainage and sediment control plan to contain excessive sediments that may be washed into the adjacent streams.
Traffic Act	Engineering design will include road furniture that will assist motorists comply with the Act. The design is based on Kenyan Roads Design Manual
Environmental (Impact Assessment and Audit) Regulations, 2003:-	This ESIA report as done is in compliance with the requirements of the regulation. It is therefore recommended that the subsequent requirements of the Regulations which include monitoring and annual audits be fully observed.
EMCA (Waste Management) Regulations, 2006:-	It is recommended that the proponent put in place measures to ensure that construction materials requirements are carefully budgeted for so as to ensure that the amount of construction materials left on site after construction is kept minimal It is further recommended that the proponent considers the use of recycled or refurbished construction materials including those excavated from the existing roads Ensure all waste handlers engaged by the proponent are licensed by NEMA and possess all relevant waste handling equipment and documentations, such as waste transport license, tracking documents, license to operate a waste yard, insurance cover, and vehicle inspection documents, amongst others
EMCA (Water Quality) Regulations, 2006:-	The contractor must obtain abstraction permits before commencement of the project. In addition he should adhere to the recommended quantities to avert any possible conflicts with local users
EMCA (Controlled Substances) Regulations, 2007:-	It is recommended that the contractor of the proposed road project ensures that equipment, machinery, vehicles and chemicals containing such components are not imported for project use.
EMCA (Noise and Vibration Control) Regulation, 2009:-	The project team should observe the noise regimes for the different zones especially so for working in areas termed as silent zones which include proximity to educational and health institutions. Construction sites near the silent zones should be allowed maximum noise level of 60 dB (A) during the day, whilst night levels are maintained at 35 dB

	(A).
EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006:-	Protection of Mt. Elgon conservation area from direct unauthorized access through better surveillance. Landscaping programmes should involve use of certified plant species to prevent them from affecting project area negatively in terms of invading wetlands, vegetation and even farmlands. Erosion prevention techniques used by the contractor should not involve use of untested exotic plant species that might eventually colonize the project area
EMCA (Fossil Fuel Emission Control) Regulations, 2006:	The contractor must use clean fuels, as well as use of catalysts and inspection procedures for engines and generators must be observed at all times All equipments and machinery used by the contractor must be kept to manufacturers specification so as to discourage incomplete combustion resulting from poorly maintained machinery
Relevant Lands Acts	Although the Acts allow the government to use any land for public good, where local land owners are required to ease their land, adequate notice must be issued prior to any demolitions For those who have obstructed the right of way, prior notice should be served on the intention to demolish while those who will be required to ease their land, compensation by the proponent must follow.
Public Health Act Cap 232	The contractor must ensure all collection of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests are avoided especially at workmen camp site. The contractor must provide sanitary facilities to prevent open defecation in the project area
Public Roads and Roads of Access Act (Cap. 399)	Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads. Already public meetings were held during public consultations and notifications to effect this
Physical Planning Act, 1999	Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. The project road already exists and therefore no conflicts are expected as far as the Act is concerned
Work Injury compensation Benefit Act 2007	All workers contracted during the project implementation phase must have the required insurance covers so that they can be compensated in case of injuries while working. The contractor must provide for compensating employees on work related

	injuries and diseases contacted in the course of employment and for connected purposes
Use of Poisonous Substances Act, Cap 247	All machinery / equipment imported by the contractor must be free from poisonous substances. Workers who shall be contracted by the contractor must be protected against risks of poisoning by toxic substances arising from the use, storage, importation, sale, disposal and/or transport
Forest Act, Cap 385	The road crosses Suam Forest which is part of the larger Mt. Elgon conservation area. The contractor is advised against firewood collection to be used on workmen camp. Furthermore measures will be required to deter access to the forest to avoid tree poaching.
Sexual offences Act	Code of conduct for contractors are necessary and HIV and AIDS prevention measures are mandatory

3.14 National Environmental Administrative Framework

3.14.1 The National Environment Council

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

3.14.2 The National Environment Management Authority

The responsibility of the National Environment Management Authority (NEMA) is to exercise general supervision and, co-ordination of all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. The Authority shall review the ESIA report for the proposed project, visit the project site to verify information provided in the report and issue an ESIA license if it considers that all the issues relevant to the project have been identified and mitigation measures to manage them proposed.

3.14.3 The Standards and Enforcement Review Committee

In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee (SERC). NEMA through EMCA has established standards for the various environmental parameters that require management and these include the water quality standards, noise and vibration control standards, and the waste management standards, amongst other. The committee through the Compliance and Enforcement Department of NEMA monitors the compliance level of various projects to ensure pollution control standards are implemented. The committee also follows on pollution complaints reported by the public.

3.14.4 The County Environment Committees

The County Environment Committee contributes to decentralization of activities undertaken by NEMA and thus enables local communities to have access to environmental management information. It also enables the County Environment Committees to conduct quick site visits and review reports of localized proposed project on time.

3.15 Relevant National Social Policies

3.15.1 The National Poverty Eradication Plan (NPEP)

The objective of the NPEP is to reduce the incidences of poverty in both rural and urban areas by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. It also aims to narrow the gender and geographical disparities as well as create a healthy, better-educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for Social Development (WSSD) of 1995. The plan focuses on the four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantaged people and creation of an enabling economic, political, and cultural environment which can be achieved through developing the transport and communication sector. The plan is implemented by the Poverty Eradication Commission (PEC) formed in collaboration with Government ministries, Community Based Organization (CBO), private sector, Non-Governmental Organization (NGO), as well as bilateral and multilateral donors. Through employment opportunities, the contractor is expected to positively contribute to poverty eradication while free flow of goods and services during operation will enhance timely profits.

3.15.2 Kenya National Aids Strategic Plan (KNASP III)

The communication strategy aims at supporting KNASP III to achieve its results through advocacy, information dissemination and social mobilisation. The strategy focuses on communicating KNASP III to stakeholders and providing guidelines for programmatic communication programmes. In this regard, the communication strategy targets a wide range of audiences including policy makers, development partners, implementing organisations, the media and key institutions coordinating the national response.

The key components of this strategy are as follows:

1. KNASP governance, financing and strategic information: This component lays out strategies for communicating KNASP III, the coordination structures and strategic information, leadership, roles and policies and the KNASP III resources mobilisation and allocation.

2. Advocacy, communication and social mobilisation for the National HIV and AIDS Programme component which provides guidelines for communication programmes for HIV prevention, treatment and care and social protection programmes.

3. This strategy provides guidelines for development of communication programmes and tools. The stakeholders should use it as a guide. It is mean to support programming of communication programmes and mainstreaming communication in service provision.

3.15.3 The National Policy on Gender and Development

The overall objective of the policy is " to facilitate the mainstreaming of the needs and concerns of men and women in all areas in the development process in the country. To this end, the policy identifies eight critical areas of concern: the economy; poverty and sustainable livelihoods; law; political participation and decision-making; education and training; health and population; the media; and policy implementation framework and resource mobilisation.

The policy has made several important suggestions in respect of legal, regulatory and institutional reforms that can be undertaken to ensure that obstacles to equitable sustainable development are removed. The policy arose from the Government's realisation that without a coherent and comprehensive overall framework for guiding the different sectors and agencies involved in development, tremendous resources may continue to be lost unless the thrust of mainstream development directly addresses gender concerns. The Policy recognises traditional development theories have not facilitated the participation of women in strategic areas and positions of power and influence because they are based on traditional assumptions of the roles and responsibilities of women and men. The approach also recognises that without quality gender disaggregated data, the planning and programming process cannot be efficient and productive.

With regard to the environment, the policy advocates for programmes that take into consideration environment and natural resource management issues that concern women, men, girls and boys. The Government realizes that certain environmental issues have specific relevance to women. This could be through the negative effects of some environmental concerns which could have adverse effects on the female population or some special skills and knowledge women could possess in resolving environmental problems.

For this project, it is foreseen that a majority of jobs would favour men due to the nature of the works (heavy equipment, site clearing, drilling, excavating, blasting and many long hours away from home. Social norms restrict women's sphere of activity but they are also likely to benefit if the contractor employs a quota system that would oversee a certain number of women given employment for unskilled labour. Women are also likely to take advantage of the influx of population in the area to be involved in small and medium enterprise/trade that would boost their economic well-being.

3.16 African development bank safeguard policies

The AfDB safeguards policies aim at identifying potential environmental and social impacts of their funded projects with the aim of preventing and mitigating undue harm to people and the environment in the development process. The policies provide guidelines for the banks and borrowers in the environmental and social management as part of implementation of programs and projects. The borrower is expected to comply with these policies in addition to their own domestic environmental policies and legislation.

3.16.1 AfDB Integrated Safeguard System

The objective of the AfDB's ISS is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrowers in the identification, preparation, and implementation of programs and projects.

The purpose of the ISS is to ensure social and environmental sustainability of projects it supports. The ISS is designed to promote the outcomes by protecting the environment and the potentially adverse impacts of the projects. The safeguards aim to:

Avoid adverse impacts of projects on the environment and affected people, while maximizing potential development benefits to the extent possible. Minimize, mitigate and /or compensate for adverse impacts on the environment and affected people when avoidance is not possible and help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

The bank requires that borrowers/clients comply with safeguards requirements during project preparation and implementation. The Integrated Safeguards Policy Statement sets out the basic tenets that guide and underpin the Banks approach to environmental safeguards.

Operational safeguard 1: Environmental and social assessment- These overarching safeguards governs the process of determining a project's environmental and social assessment requirements.

Operational Safeguard 2: Involuntary resettlement land acquisition, population displacement and compensation- This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement designed to improve the operational effectiveness of those requirements.

Operational safeguard 3: Biodiversity and ecosystem services- This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management into operational requirements.

Operational Safeguard 4: Pollution prevention and control, hazardous materials and resource efficiency-This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting ,that other multilateral development banks follow.

Operational Safeguard 5: Labour conditions, health and safety- This safeguard establishes the banks requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It also ensures greater harmonization with most other multilateral development banks.

3.16.2 Environmental Assessment

The principles of the policy require the environmental assessment process to undertake the following:

- Evaluate adequacy of existing legal and institution frameworks, including applicable international environmental agreements. This policy aims to ensure that projects contravening the agreements are not financed.
- Stakeholder consultation before and during project implementation.
- Engage service of independent experts to undertake the environmental assessment.
- Provide measures to link the environmental process and findings with studies of economics, financial, institutional, social and technical analysis of the proposed project.
- Develop programmes for strengthening of institutional capacity in environmental management.

The requirements of the policy are similar to those of EMCA, which aim to ensure sustainable project implementation. Most of the requirements of this safeguard policy have been responded to in this report, by evaluating the impact of the project, its alternatives, existing legislative framework and, conducting public consultations and by proposing mitigation measures for the potential impacts identified.

3.16.3 Involuntary Resettlement

The objective of this policy is to avoid where feasible, or minimize, exploring all viable alternative project designs, to avoid resettlement. This policy is triggered in situations involving involuntary taking of land and property for purposes of re-alignments and RoW preservation. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

This policy covers direct economic and social impacts that both result from Bank-assisted investment projects, and are caused by (a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets, or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to project appraisal of proposed projects.

This policy will be triggered as the project causes the involuntary taking of land and other assets resulting in:

1) Relocation or loss of shelter;
2) Loss of assets or access to assets;
3) Loss of income sources or means of livelihood, whether or not the affected persons must move to another location;
4) Loss of land.

3.16.4 Policy on Access to Information

The Bank's policy on access to information allows public access to information in its possession. In disclosing information related to borrowers in the case of documents prepared or commissioned by a borrower (in this instance, safeguards assessments and plans related to environment and resettlement the Bank takes the approach that the Borrower provides such documents to the Bank with the understanding that the Bank will make them available to the public.

3.17 Alignment of AfDB and GOK Polices relevant to this ESIA

Both the Bank safeguards and GoK laws are generally aligned in principle and objective:

- Both require Environmental Assessment before project design and implementation (which also includes an assessment of social impacts).
- The Bank requires that stakeholder consultations be undertaken during planning, implementation and operation phases of the project which is equivalent to the EMCA requirements.
- Additionally, statutory annual environmental audits are required by EMCA.

In Kenya, it is a mandatory requirement under EMCA 1999 for all development projects (Schedule Two) to be preceded by an ESIA study. Thus, under the Laws of Kenya, environmental assessment is fully mainstreamed in all development process consistent with AfDB policies.

4 ENVIRONMENTAL BASELINE CONDITIONS

4.1 General

The proposed Kitale-Endebess-Suam road project traverses the County of Trans Nzoia. From the junction with A1 road on the southern part of Kitale Town, it goes through the town in the northerly direction up to the junction with Kwanza - Kapenguria road. From this junction, the road takes a westerly direction to Endebess town from where it turns to the north-west to terminate at Suam River Bridge, which provides the border line between Kenya and Uganda.

Plate 3: Board showing junction with A1 road

Plate 4: Show grounds junction with A1 road and beginning of Project

The project road is largely rural connecting Kitale to Suam at the border with Uganda. The road is within Trans-Nzoia County. The completed road is expected to have positive impacts on the social growth and economic development of the area of influence across Kitale, Endebess and Suam areas. The road will create a dependable and efficient road transport infrastructure for access to resources, delivery of farm inputs and produce to markets as well as easy access of basic services (health, trading centres, water, etc.) within the project region. Furthermore the road is expected to enhance trade links with Eastern Uganda thereby enhancing East African trade and commerce.

Overall benefits from efficient road transport are felt at all levels of the society, directly or indirectly, such as to include improved national economy, social income, wealth and job creation, health care, public transport and general service delivery. Improvement in all these areas are desirable for the current national aspirations including enhanced local and international trading, economic empowerment of all, enhanced connectivity and inter-sectoral growth collaborations. Success of the Kenya Vision 2030 initiative and achievement of the Millennium Development Goals (MDGs) are largely functions of available infrastructure (efficient road network being the key unit) among other factors.

4.2 Administrative setting

The proposed road starts in Kitale then passes through Kwanza, Saboti and Endebess sub-counties before terminating at the Kenya-Uganda border at Suam. Trans Nzoia County is located in north rift region of Kenya bordering West Pokot County to the North, Suam (Uganda) to the West, Elgeyo Marakwet County to the East, Bungoma to the South and Uasin Gishu County to the South East, and has an area of 2,496 km^2. Trans Nzoia County has 5 constituencies (Cheranganyi, Kwanza, Saboti, Endebess and Kiminini) and its capital is in Kitale Town. The County has 7 administrative divisions (Central, Kiminini, Saboti, Kwanza, Cheranganyi, Endebess and Kaplamai). There are 2 Local Authorities: County Council of Trans Nzoia and Municipal Council of Kitale). Kitale is the largest town and the County's administrative capital.

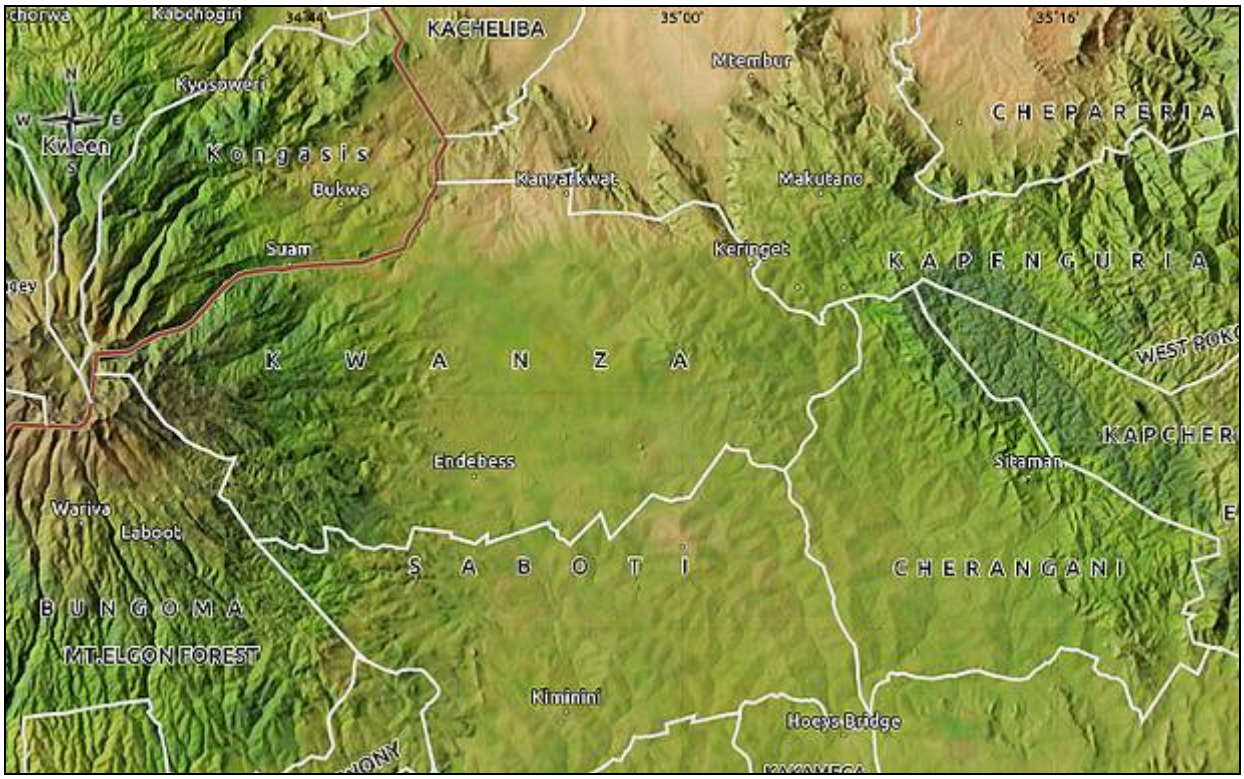


Figure 9: Location of the sub-counties covered by the proposed road

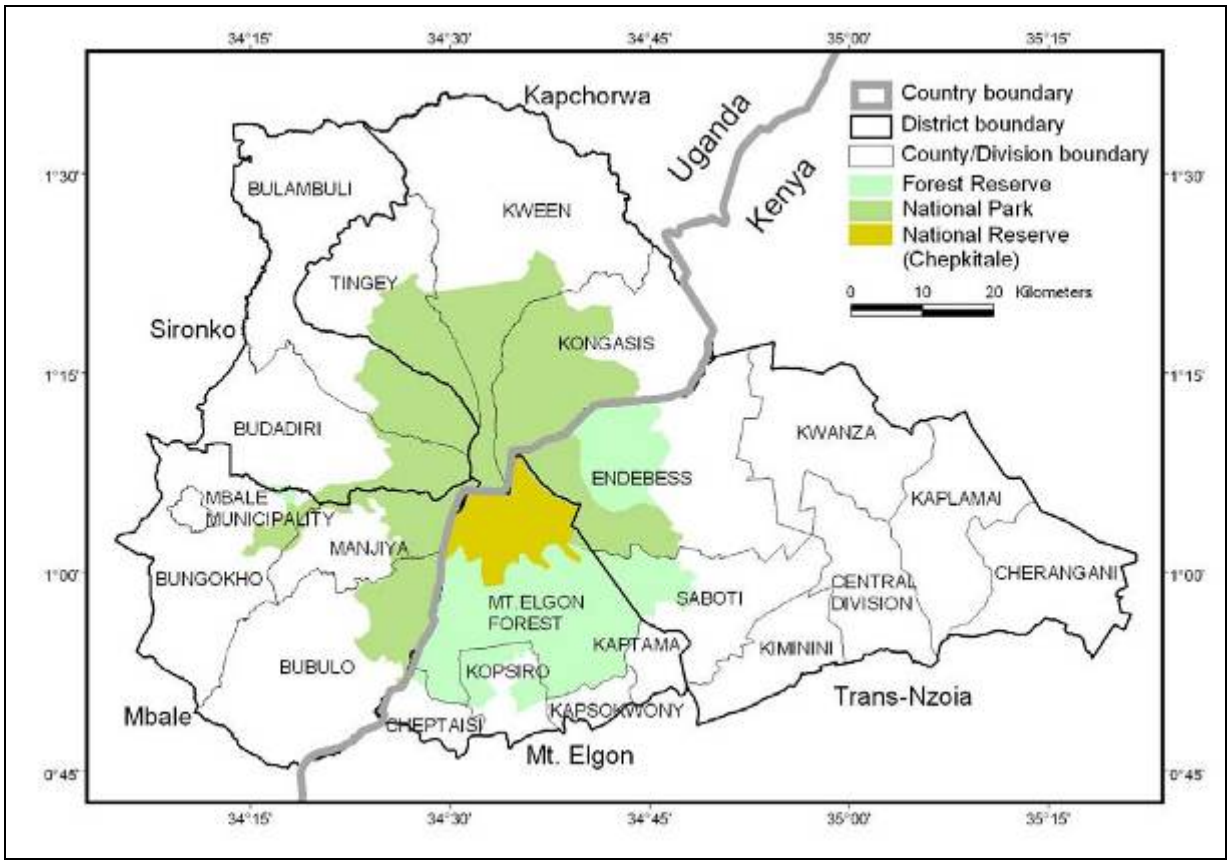


Figure 10: The project area

4.3 Topography and Relief

The Trans Nzoia region can be divided into three topographic divisions in each of which the relief, are more or less uniform: (1) The West Suk Lowlands, (2) The Kitale Plain and (3) Mount Elgon.

The West Suk Lowlands forms part of the mid-Tertiary peneplain and are separated from the Kitale Plains by a formidable escarpment ranging in height from 460 to nearly 650 meters. This escarpment is higher in the east, where the Kitale Plains rise gradually towards the Cherangani Hills, against which the escarpment abuts. In the west, towards Mount Elgon, the escarpment is less conspicuous, though still approximately 300 meters high, but it appears to die out under the mountain.

The Kitale plain, which forms part of the pre-Miocene peneplain of the former Trans-Nzoia district has a slight southerly tilt, with the principal drainage system flowing towards Lake Victoria. The maximum elevation appears to lie along an east-west line corresponding to latitude 1^0 10' N which forms a watershed between the Nyanza drainage area and that of the Lake Turkana area. North of this line, the Kitale plain dips gently northwards to the Trans-Nzoia escarpment. In the northern part of the Plain the north-flowing streams have been incised into the Basement rocks to a considerable depth, giving rise to steep-sided V-shaped valleys with many prominent interlocking spurs. On the southern side of the watershed the drainage is mainly easterly, but to the east of Kitale it flows in a

south-easterly direction. Ultimately it runs in a southerly direction just before joining the River Nzoia which flows westwards into Lake Victoria.

The principal river of the Kitale Plain is the Koitoboss which rises at the foot of Koitoboss Peak. All streams between Endebess Bluff and the Chepchoina River are tributary to it. The southern watershed separating the Koitoboss tributaries from those of the Rongai River runs in an east-west direction roughly parallel to the Endebess road.

4.4 Climate

The diurnal range of temperature is considerable. During the wet season the night temperatures of 19^0C is common, rising to 25.6°C during the hottest part of the day. The difference between the maximum and the minimum temperature in the dry season is even, greater, temperatures as low as 15.8°C and as high as 27. 9°C having been recorded, giving a range of 12°C. The road section from Kitale to Suam is within the cool to warm temperate zone and the annual mean temperature varies from 16 to 18 degrees Celsius, with the mean maximum temperature ranging between 22 and 26 degrees Celsius. The mean annual rainfall varies between 800 and 2800mm.

The principal climatic difference between the Kitale plains and the West Suk Lowlands lies in the relative humidity which is greater over the Kitale area than over the lowlands, and is due to the difference in altitude between these two levels. As would be expected, there is more rainfall in the foothill zone of Mount Elgon, with an average of 1270 mm. at the Elgon Sawmills; the minimum recorded being 1016 mm and the maximum 1549 mm.

Temperature varies with altitude and the climate on the higher volcanic places to the west is generally cooler than that of the lower lying Basement System country of Kitale. Rainfall over much of the area is fairly high. It is mainly controlled by altitude being lowest at Kitale and increasing northwards and westwards towards the lowest slopes of the Mount Elgon. The variation in altitude is shown in Figure 11.

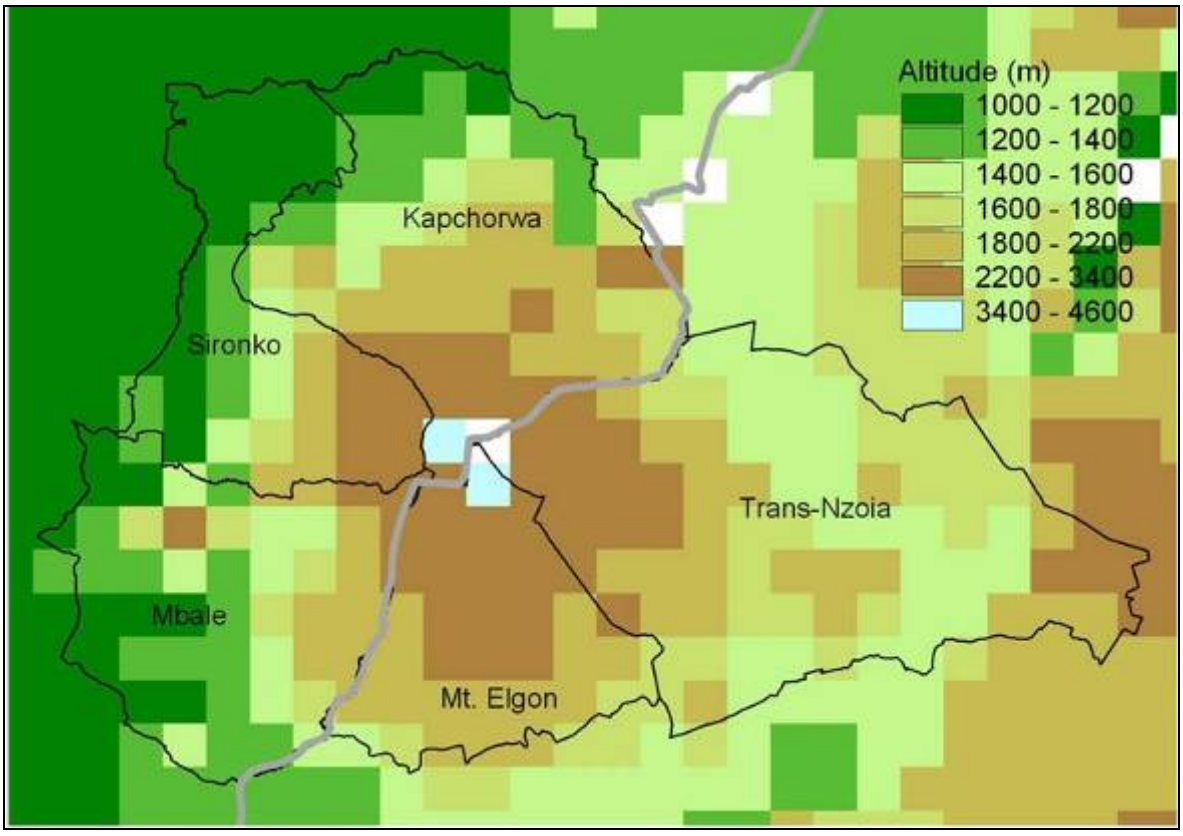


Figure 11: Altitude in Trans Nzoia region

Figure 12: Vertical Profile of the road

Climate has a considerable influence on road performance and should therefore be taken into account in the pavement design process. Some of the important factors related to climate that have great influence on pavement performance include: Moisture condition in the pavement layers; bituminous layers temperature; Problematic sub-grade properties related to the environment and climate. The variation in climatic conditions, along the project road, which is best reflected by temperature and rainfall characteristics, is illustrated in Figure 12. The road section from Kitale to Suam is within the cool to warm temperate zone and the annual mean temperature varies from 16 to 20 degrees Celsius, with the mean maximum temperature ranging between 22 and 24 degrees Celsius. Annual rainfall varies between 800 and 2700mm which are characterized as sub to semi humid.

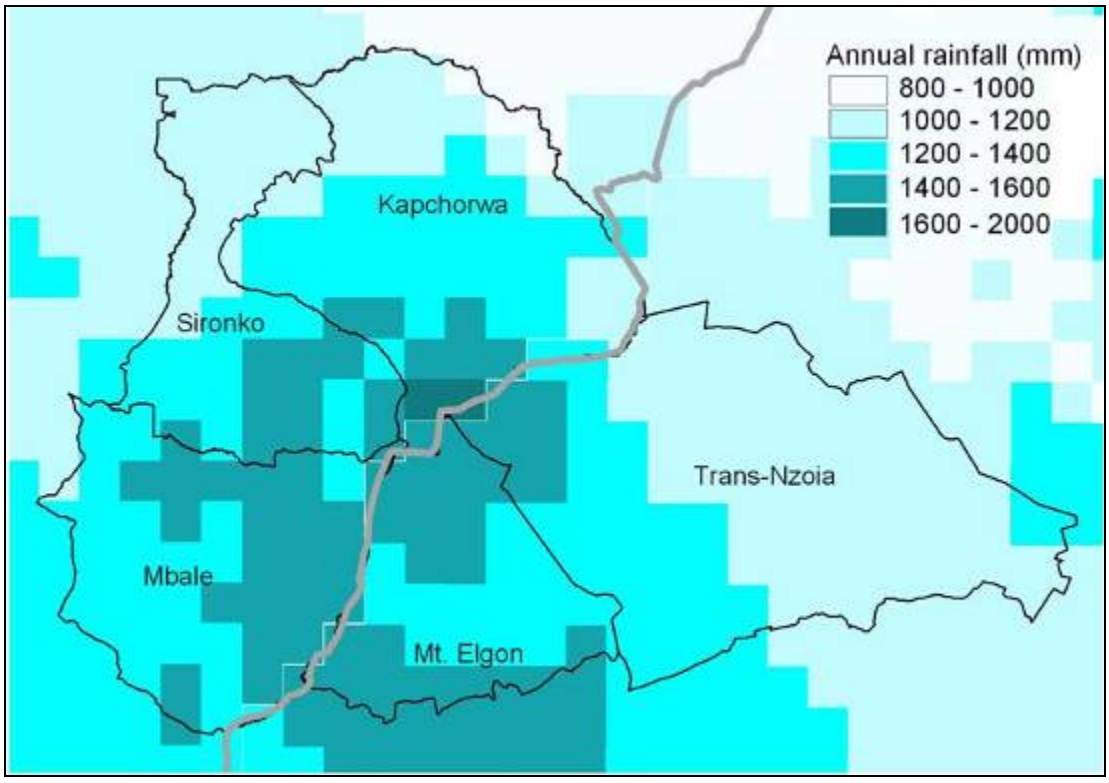


Figure 13: Annual Rainfall distribution in Trans Nzoia region

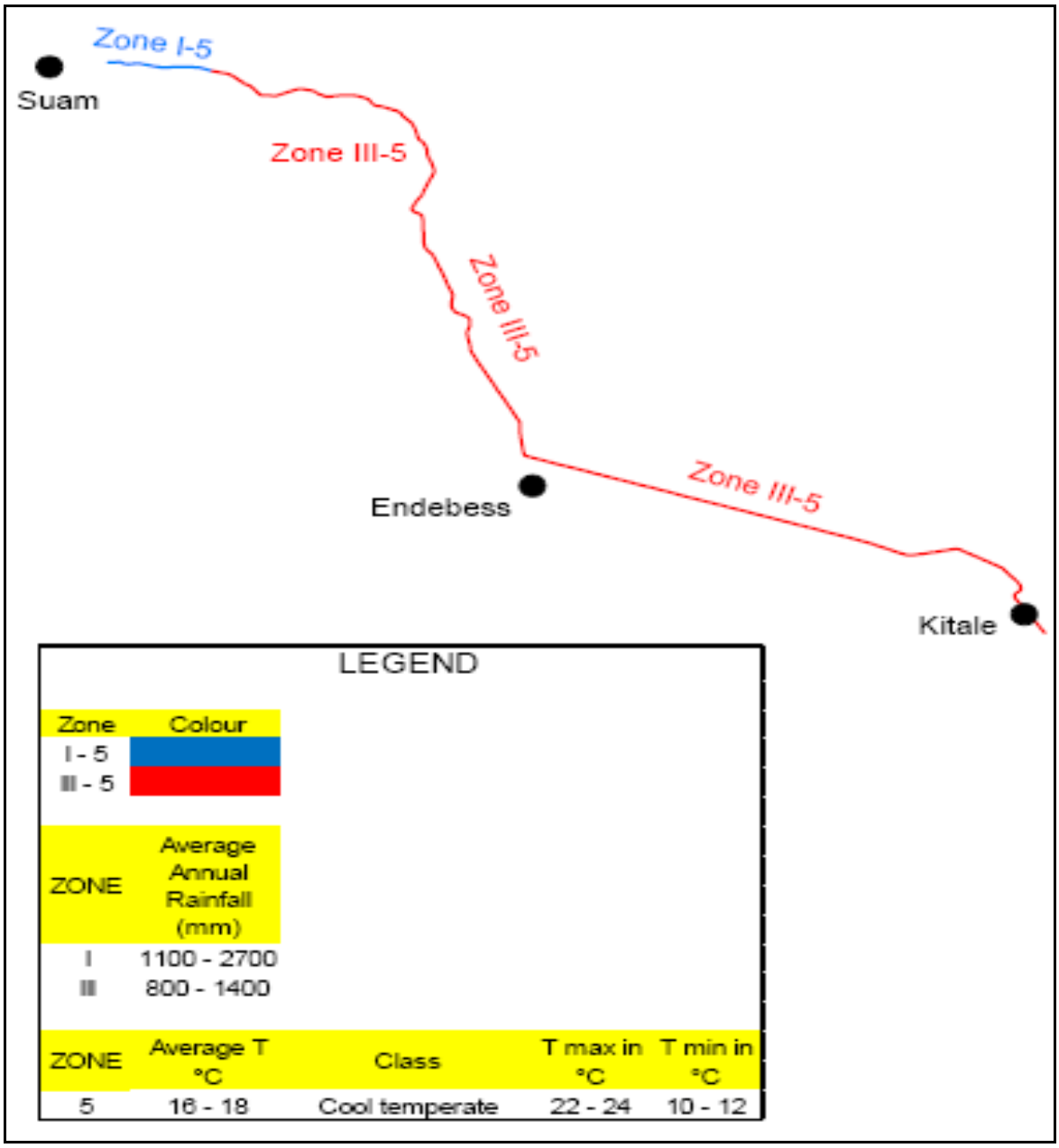


Figure 14: Variations in rainfall and temperature along the project road

4.5 Geology and Soils

4.5.1 Geology

Road sections in the neighborhood of Kitale show irregular bedded layers of coarse pebbles, coarse sands, fine sands and sills. These Pleistocene, sediments form part of old river terraces deposited during the period of glaciations of Mount Elgon when abundant water from the melting glaciers not only incised deep gorges through the volcanic rocks but, on reaching the flat Kitale Plains, spread out into broad torrential rivers, of which the limits are shown by the outcrop of black cotton soil. The Tertiary

Lavas-Mount Elgon is formed of a great mass of agglomerate, breccia and tuff with intercalated bands of lava, the whole having been ejected from a vent during Tertiary times. The boulders of lava in the agglomerate, like the lava flows themselves, are composed of nephelinites that contain much made material such as olivine, augite, magnetite, ilmenite and perovskite. Surrounding the caldera produced round the vent are lavas and breccias of phonolitic-nephelinites in which aegirine-augite and orthoclase appear. The floor of the caldera, lying over 300 meters below the caldera rim, is composed of volcanic ash, the last eruptive material ejected from the volcano. Basement System rocks in the study area consists of metamorphic rock-types which originated solely by the effect of pressure, and consequent rise in temperature. In the study area they mainly include quartzite and schists derived from argillaceous and arenaceous sediments which have been transformed by metamorphism and recrystallization into quartz and feldspar-rich rocks with much muscovite, biotite, and hornblende minerals.

Table 2: Classification and succession of the Elgon volcanic series

Volcanic Succession of Mount Elgon			
	Dominant Lavas	**Pyroclastics**	**Dyke-rocks**
Series of Gortex-Riva	Phonolite	Agglomerate Tuff	
Series of the Caldera	Phonolitic-nepheline- Basalt	Agglomerate Tuff	
Series of the Caldera-rim	Phonolitic- Nephelinites	Agglomerate Tuff	Bergalite
Basaltic Stage	Melilite-nepheline Basalt Melilite-basalt Nepheline-basalt	Agglomerate Tuff Ash	Melilite-nepheline Basalt Melilite-basalt Nepheline-basalt
Nephelinitic stage	Nephelinite	Agglomerate Tuff	

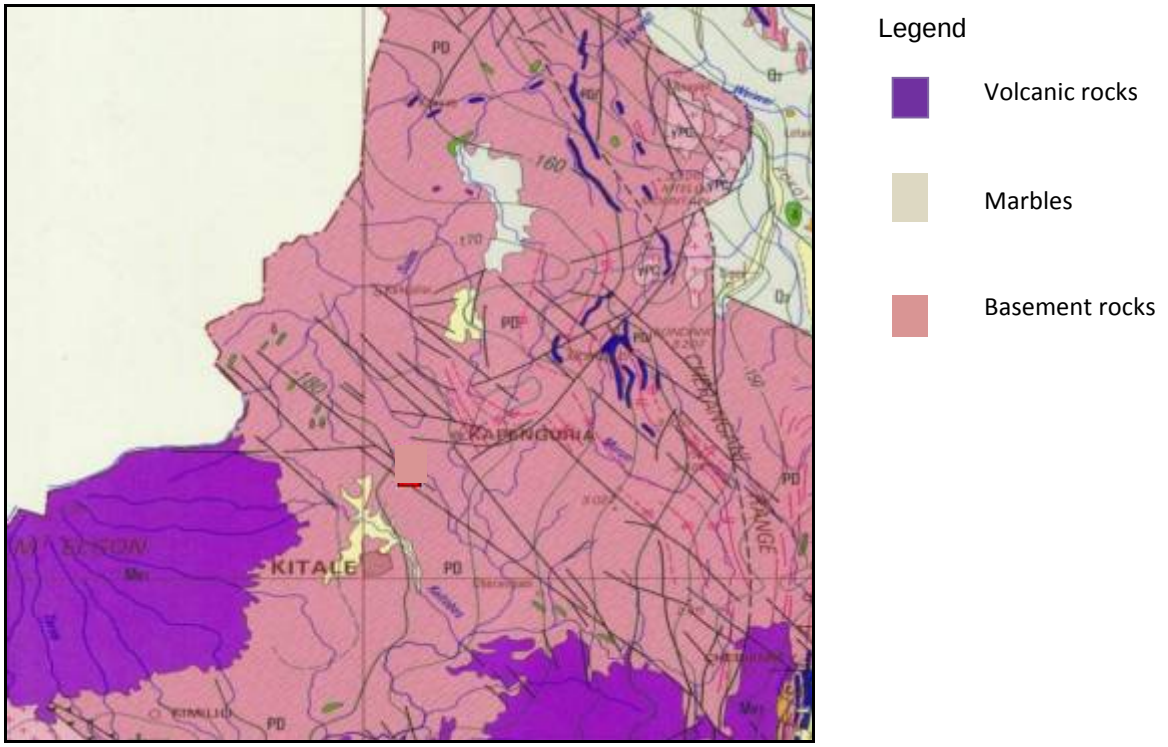


Figure 15: Geological formations of Trans Nzoia

Geology in relation to the alignment

The first 2.5 kilometres from Junction with A1 road into Kitale Town, along the project route lies on the Buff or light brown sandy soils which are produced by the breakdown of Kavirondian grits and bright red clayey soils of mud stones. The region from chainage 2+500 to 7+500 is covered with variable sandy and gravel soils. Chainage 7+500 to 13+500 is covered with Archean Basement System pediments overlain with undifferentiated semi-peltic gneissis, bitiotite and migmotite soils. Chainage 13+500 to 45+000 is covered with upper series phonolitic soils, melanephelinite, melilitite, lower and middle pyroclastic series, agglomerate, berccia and tuff of Mt. Elgon volcanic series. The above details are illustrated in Figure 15 below.

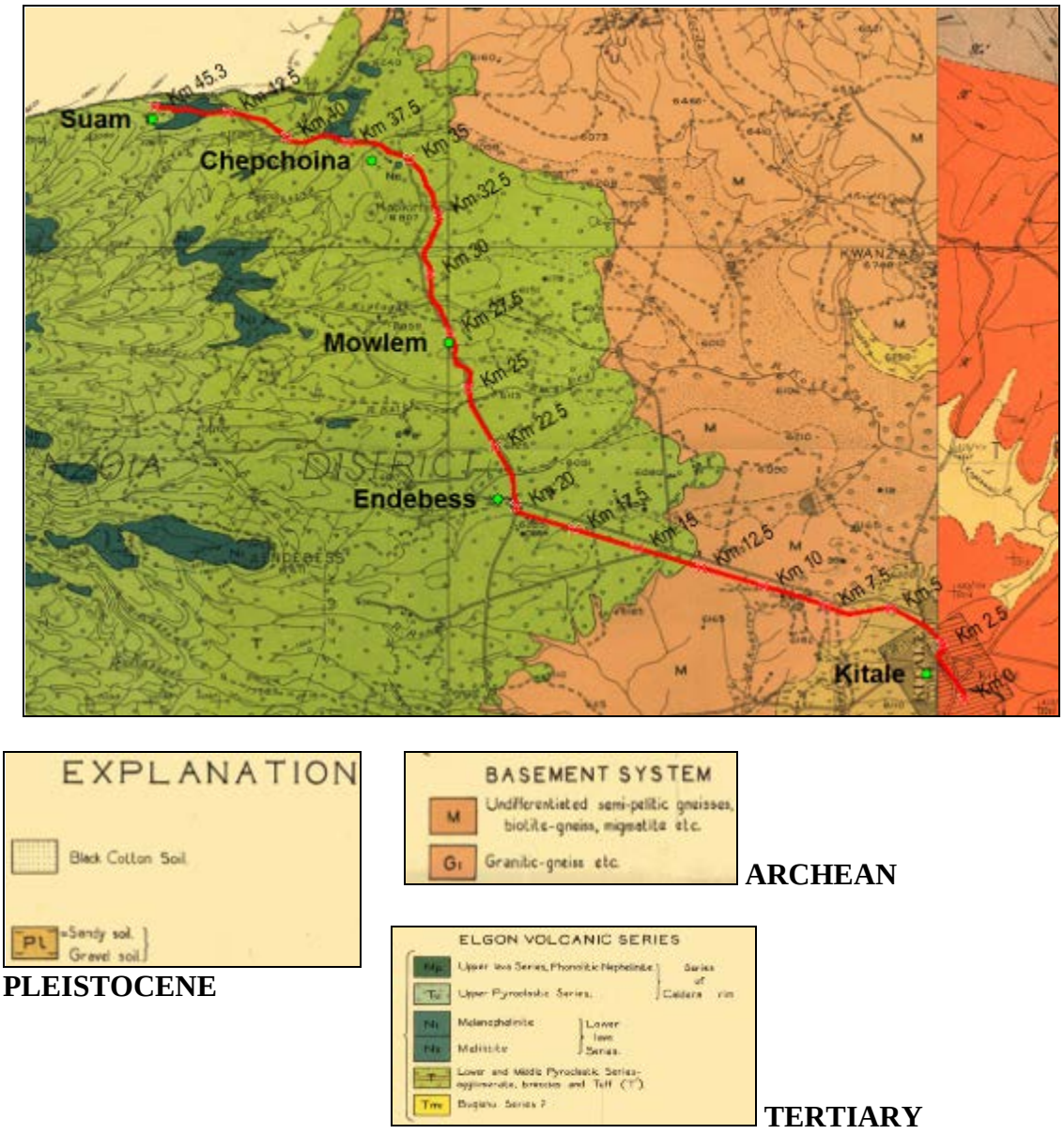


Figure 16: Geological map covering 0+000 to 45+000

4.5.2 Soils types

Soils vary in type, corresponding largely with the underlying bedrock, though there is a modification in certain portions of the area due to the disintegration of the laterite caps. Buff or light brown sandy soils are produced by the breakdown of Kavirondian grits and bright red clayey soils by the mudstones. Where, however, there is close interbanding of the grits and mudstones the grit type soils are obscured by the mudstone disintegration products. The granites give rise to coarse light brown, sandy, soils more subject to soil erosion than the more clayey varieties mentioned above, while the diorites, syeno-diorites and syenites, having a greater proportion of mafic minerals, give darker red brown, more clayey, types. This also applies to areas in the granite rich in basic xenoliths.

On the associated volcanic foot bridges of units Rnt and Rn occur. Unit Rnt: well drained, deep, reddish brown, firm clay with volcanic ash influence and a humic top soil. Unit Rn is similar although less ash enriched. Both soils are of high fertility. South of Endebess, the latter unit is associated with soils of the foot slopes, Unit Fn: well drained, very deep, dark reddish brown, firm to friable clay of moderate fertility. Soils of unit Un are similar but occur on less sloping terrain, In the North, on similar topography but different parent material, occur soils that show an increase of clay with depth, have firm consistency and clayey texture, and may show cracking (unit F1) and are of moderate fertility.

On the hills, Unit Rr: undifferentiated soils of low fertility occur. The various upland levels are sub-divided according to altitude. Highest unit is Ub occurring to the South East of the County. Soils are well drained, shallow with humic top soil with inclusions of rock outcrop. To the North, this unit is associated with Unit Ua, consisting of well drained, brown clayey soils with humic top soils but of low fertility. Unit Uf is the most extensive in Trans Nzoia: well drained, deep, dark red, very friable clay of low fertility. North wards, this unit borders Unit U1, which is similar to Unit F1 but less sloping. The low lying areas within the uplands are occupied by soils of Unit Bv : poorly drained, deep dark grey to black, very firm, cracking clay soils of moderate fertility and are subject to flooding, and Unit Bg: imperfectly drained, deep, dark brown to dark grayish brown, mottled, firm clays also subject to flooding. The bottom lands are mainly used for grazing while the uplands support good yielding cereals of which maize is the most important.

4.5.3 Soil erosion

The main types of erosion occurring in the area are splash erosion, rills, gullies and sediment deposition. A steep slope, low vegetation cover, erosive soil, high intensity rainfall and improper soil, crop and water management are factors leading to, or increasing, erosion.

Plate 5: Soil erosion concerns along the alignment in Chepchoina area

4.6 Agro-ecological Zonation

The combination of topography, soils and climate in the Trans Nzoia region yields a complex series of ecological zones. There are three main agro-ecological zones which cross the proposed project area in Trans Nzoia, ranging from LH1 (tea and dairy) in higher areas north to LM (lowland midland zones) in the lower areas as follows:

Upper Highland Zone: The Upper Highland Zone covers the hills and slopes of Mt. Elgon, Cherangany hills and the boundary zone towards West Pokot County. This zone lies between altitude 2,400 and 4,313 metres above sea level and constitutes about 16 percent of the county land area. The area is covered with high vegetation, shallow stony soils with rocky outcrop. Mt. Elgon National Park situated in this zone is a major tourist attraction. Establishment of a transition zone around the Mount Elgon National Park would play a significant role as a buffer zone for the protected area and mitigation against human-wildlife conflicts. The area also has limited potential for sheep and dairy especially at the transition area.

Lower Highland Zone: The Lower Highland Zone covers the slopes of Mt Elgon and Cherangany Hills with an altitude ranging from 1,800 - 2,400 metres above sea level. This zone covers 848.64 km2 and it constitutes 34 percent of the total area of the County. The soils found in this zone are red and brown clays derived from volcanic ash. These soils are fertile with a high content of clay mineral which gives a continuous supply of plant nutrients.

This is mainly a transitional zone in the county with high potential for various agricultural and livestock activities. The activities in this region include growing pyrethrum, wheat, tea, maize, barley, sunflower, coffee and horticulture as well as rearing of cattle and sheep. Despite the high potential of these areas the major set-back to the exploitation of this potential is the poor communication network for efficient transportation of the farm produce to the markets.

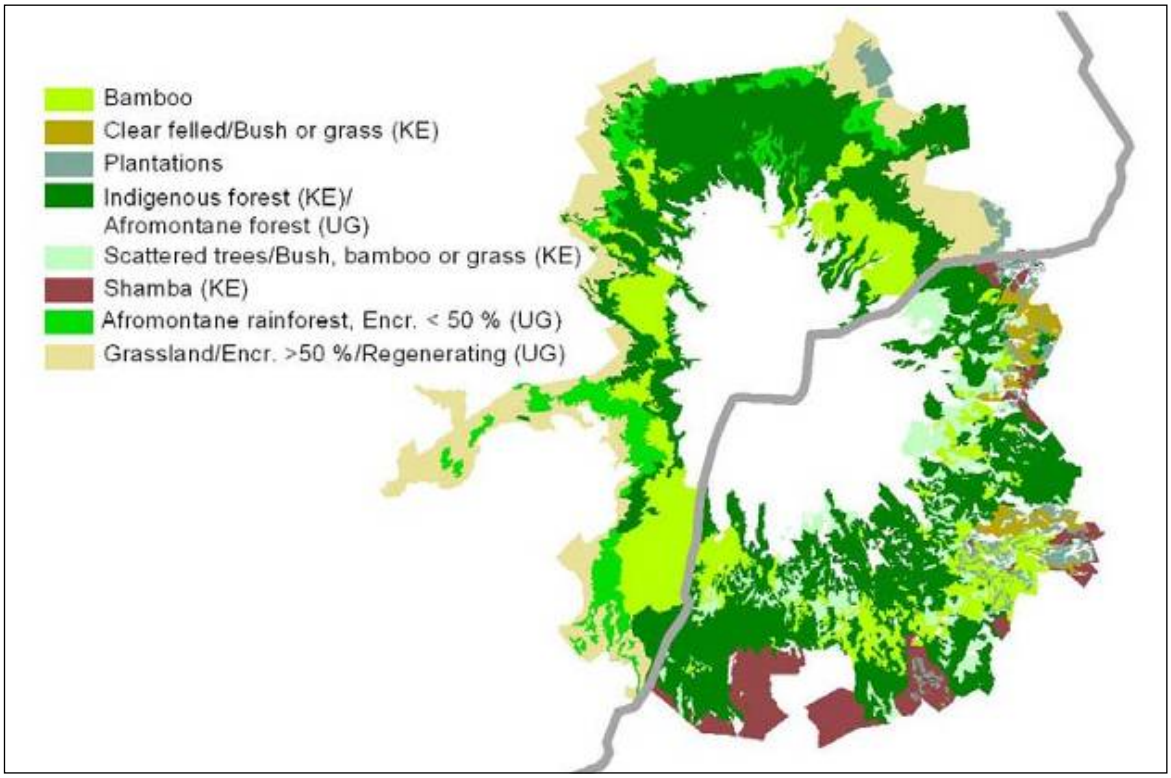
Upper Midland Zone: This zone which covers 1,248 km2 comprises about 50 percent of the total area of the County. The zone lies between altitudes 1,700 and 2,000 metres above sea level. The mean annual rainfall in this zone is between 900 to 1,400 mm per annum. The region includes the Endebess Plains stretching east to the Kitale Plains and further towards the areas below the slopes of Cherangany Hills. To the south, the zone stretches to the border of Tongaren Scheme in Bungoma County and northwards towards West Pokot County.

The Zone is covered with well drained deep red and brown clays and sandy clays derived from the basement complex. There is a considerable size of land with black cotton soil along the Koitobos River in the Endebess Plains. Land use in this region includes cultivation of maize, sunflower, coffee, wheat and barley as well as dairy, beef, sheep and horticulture production.

4.6.1 Vegetation Cover

Vegetation in the Mt. Elgon's ecosystem is banded into broad zones whose characteristics are dictated by altitude and rainfall. The lower mountain slopes reaching the Suam project area are covered with

dense forest and regenerating forests, hung with vine-like lianas, epiphytes and lichens. The floor is covered with a carpet of ferns, orchids and flowering plants. Common tree species encountered in the tropical montane forest (1,500-2,500m asl) are olive *Oleahochstetteri*, *prunus africanas*, Elgon teak, podocarpus, cedar, *Cordia*, *Neoboutani*a, *allophyllus tombea* and *Aningueriaadolfi-friedericii*.



Of the 400 plant species recorded for the area the following are of particular note as they only occur in high altitude broad-leaf montane forest: *Ardisiandra wettsteinii, Carduus afromontanus, Echinops hoehnelii, Ranunculus keniensis* (previously thought endemic to Mount Kenya), and *Romulea keniensis*. The woodland communities found in pockets of the project area are composed of several indigenous trees including *Croton macrostachus, Croton megalocarpus, Bridelia micrantha, Erythrina abyssinica, Cussonia holstii, Markhamia lutea* and *Ekebergia capensis*. In this zone there is also a large percentage of introduced species of which the most dominant is the *Grevillea robusta.* Other exotic species include *Cuppressus lusitanica, Eucalyptus saligna, Eucalyptus camaldulensis, Cassia siamea* and *Leucaena leucocephala*. Further down towards Kitale, where the rainfall ranges between 900 and 1200mm, with a prolonged dry season, the characteristic vegetation is Combretum woodland, *Terminalia brownie* interspersed with cultivated areas. The dominant grass is *Themeda triandra*.

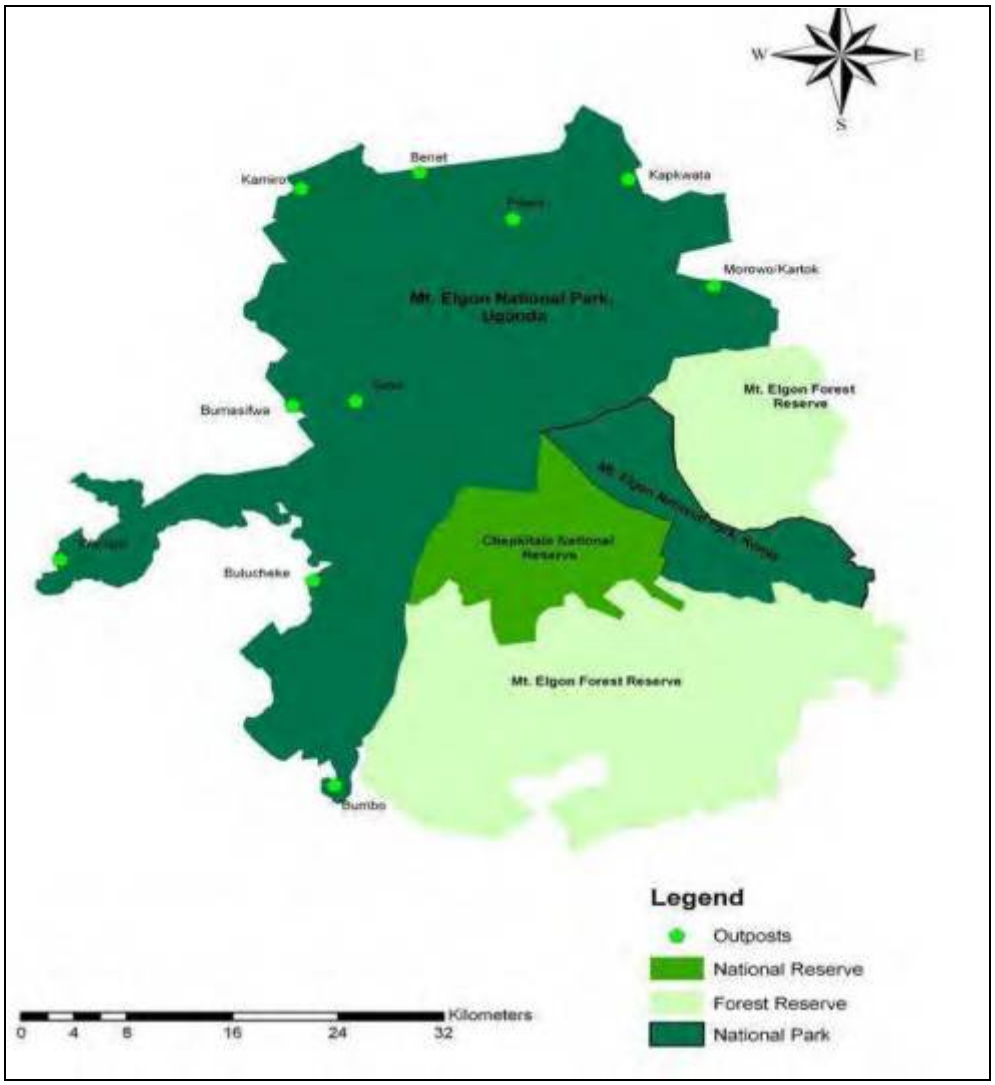


Figure 17: Protected areas in the project region

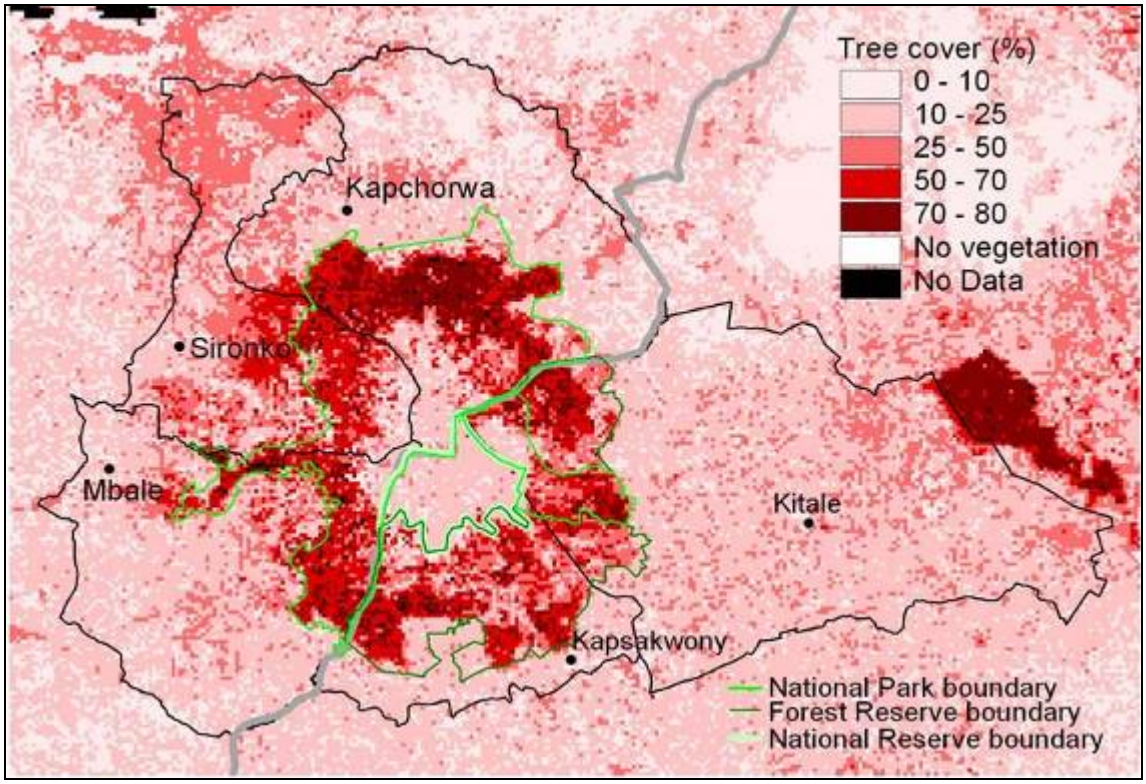


Figure 18: Tree cover in the project region

4.6.2 Fauna

Wildlife are found in the protected areas, forests, rivers and farmland. Different animal species are found in a variety of places such as on trees, rocks, rivers, swamps, caves, and other microhabitats situated in the region. They are comprised of mammals, birds, reptiles, insects, amphibians and mollusks.

There are 37 'globally threatened' species in the Mt Elgon ecosystem (22 mammals, 2 insects and 13 bird species) such as cave elephants, giant forest hog, oribi, rothschild girrafe, turacos and red-fronted parrots. Other mammals present in the region are leopards, waterbuck, bushbuck, duiker, black and white colobus monkey, blue monkey, spotted red tailed monkey and de brazza's monkey. Trans Nzoia region has several wildlife protected areas including the Mt Elgon national park, Saiwa swamp national reserve, Chepkitale National Park, Kitale Nature Conservancy and Kitale Museum, but these are outside the alignment of the proposed route.

4.7 Drainage and Water resources

4.7.1 Rivers and drainage

There are a number of rivers in the project region with River Nzoia catchment forming the dominant drainage system in the Lake Victoria North Drainage Basin. The river drains the region with its major

tributaries Ewaso, Rongai, Koitobos and Ainomaget rivers. These rivers flow into Lake Victoria through River Nzoia while Suam River drains into Lake Turkana. Most rivers flow all year round causing some flooding in Namanjalala and Endebess due to vegetation cover depletion.

The principal river of the Kitale Plain is the Koitoboss which rises at the foot of Koitoboss Peak. All streams between Endebess Bluff and the Chepchoina River are tributary, to it. The southern watershed separating the Koitoboss tributaries from those of the Rongai River runs in an east-west direction roughly parallel to the Endebess road. The county has two water towers namely Mount Elgon and Cherangany Hills. Conservation of these water catchments is crucial for the County's ecosystem.

c) Prevention

Plate 6: (a) Sabueni River at 20 km +826 of the alignment (b) Mubere River at km 40+477

The water from all the rivers sources is reported to be diminishing over the years. Although river flow data is limited, available evidence seems to suggest that quantities of surface water flowing out of the forest into the tea zones is rather constant. Therefore, reduced surface water availability observed downstream the mountain, seems to be mainly the result of reduced inflow from sources outside the forest area; and increased abstraction.

Plate 7:Kaibei River and bridge at 24 km+290 (b) Suam River and bridge at km 45+200

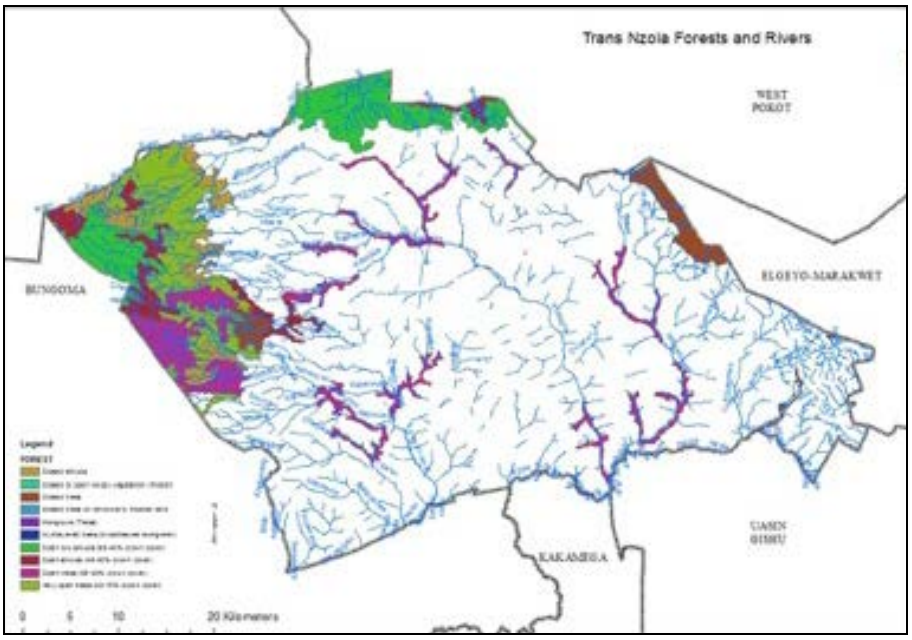
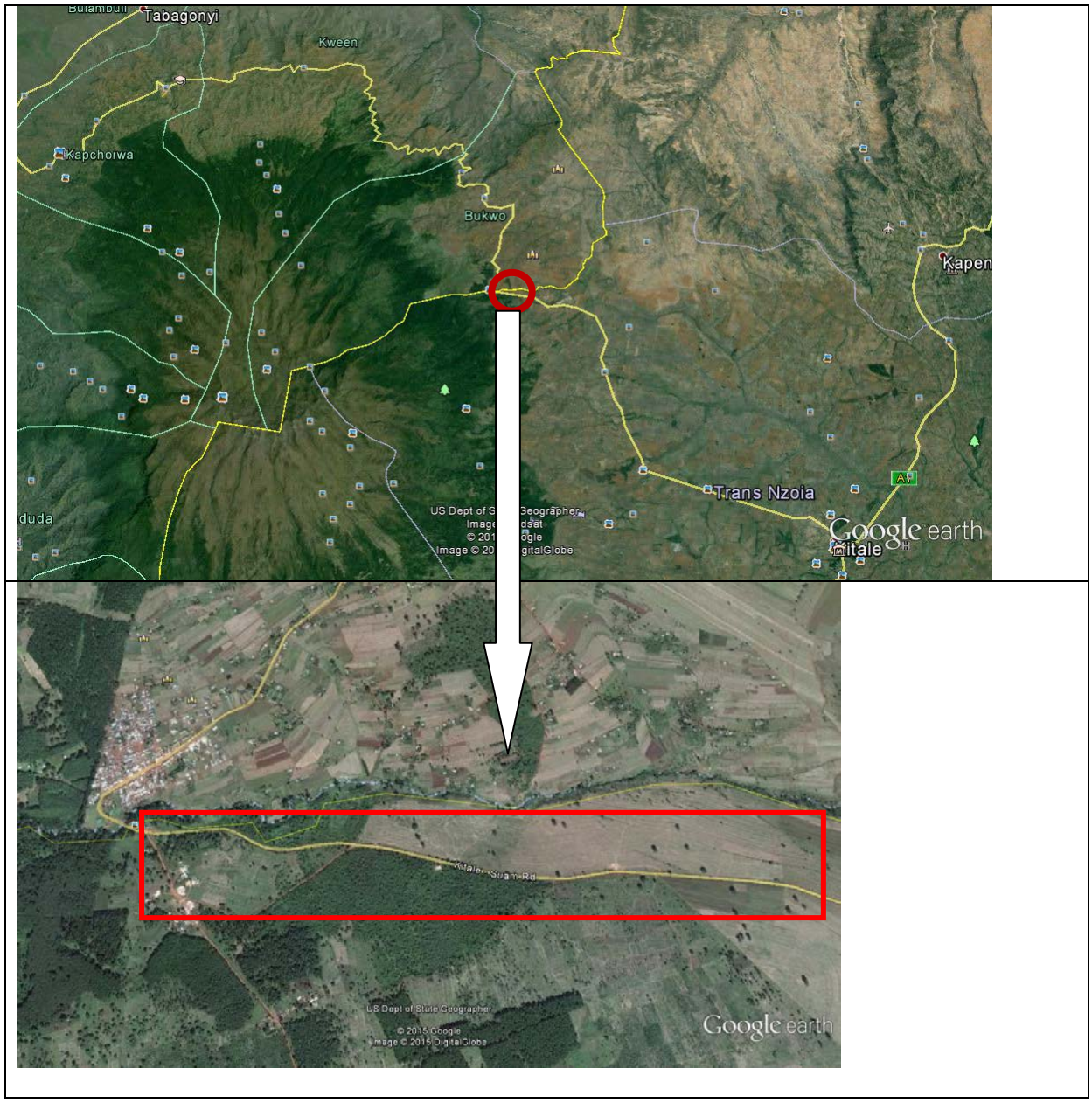


Figure 19: Drainage system within the proposed project region

4.8 Mt. Elgon as a Man and Biosphere Reserve

Mount Elgon itself is a volcanic massif, well known for its outstanding plant diversity, its role as a vital “water tower” for the region, and for its cultural significance. Over 100,000 people live here from subsistence and commercial cropping, pastoralism, and ecotourism. There are three research stations and many educational programmes for local communities and visitors. The Biosphere Reserve is providing a framework for coordinating the work of the Mount Elgon National Park (16,916 ha) which forms the core area; the Mount Elgon Forest Reserve and Chepkitale National Reserve, together forming a buffer zone of 90,905 ha ; and a 10 km strip of intensively used land in the foothills of the mountain range, covering some 101,000 ha, making up the transition area. An Ecosystem Management Committee, drawing membership from all local stakeholders, has been set up to steer the implementation of an overall management plan. Community Conservation Teams and Community Action Plan Committees ensure community mobilisation, awareness creation and implementation of alternative income-generating activities such as sale of farm produce for hotels and agroforestry. Cooperation is already underway with Uganda to create a future transboundary biosphere reserve for the whole Mount Elgon ecosystem.


Tabagonyi
Kween
Kapchorwa
Bukwo
Trans Nzoia
Kitale
Google earth
US Dept of State Geographer
Image © 2015 DigitalGlobe
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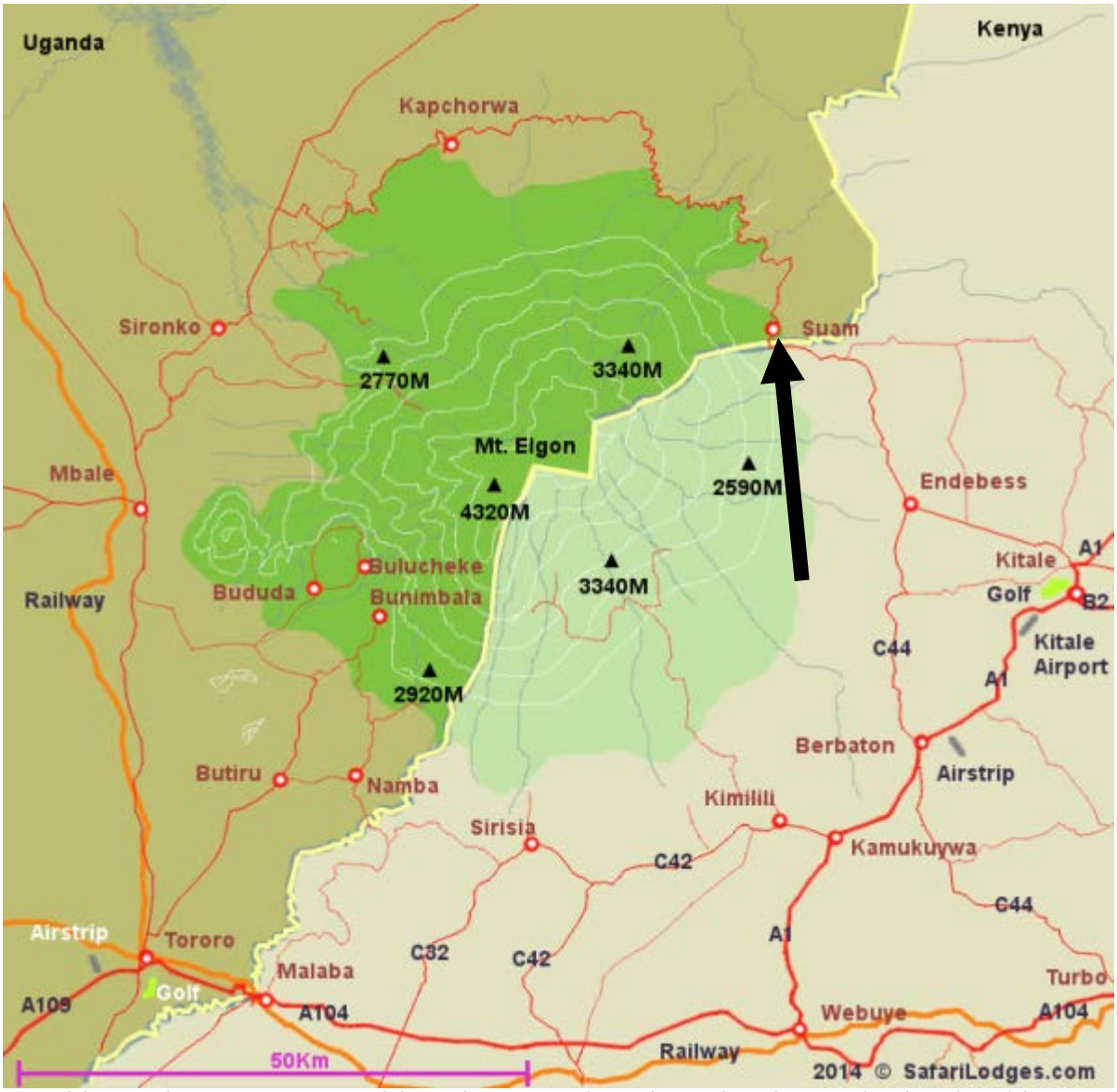

Map of the Mt. Elgon MAB reserve and the project. Arrow shows the road section crossing the edge of the reserve

The road crosses the edge of the reserve for about 1.5 km and up to the Suam border. Although not in the immediate plans, it is projected that a one-stop-border-post will be constructed at Suam as traffic of both people and goods begin to increase.

5 SOCIO-ECONOMIC BASELINE

5.1 Administrative Setting

The Project Road is located within Trans Nzoia County. Trans Nzoia County borders the Republic of Uganda to the North West, and the following counties; West Pokot to North, Elgeyo Marakwet to the East, Uasin Gishu and Kakamega to the South, and Bungoma to the West and South West. The County covers an area of 2495.5km2. Kitale – Endebess – Suam road traverses over the two sub-counties of Trans Nzoia West and Kwanza. It passes over Kibomet, Municipality and Matisi locations in Trans – Nzoia West Sub-County and Endebess, Kaibei and Chepchoina, locations in Kwanza Sub-County. The sub-locations traversed by the project road include: Bidii, Twiga, Endebess, Matumbei, Mubere, Matisi, Tuwani and Milimani. The location of the project County within Kenya is presented in the following figure:

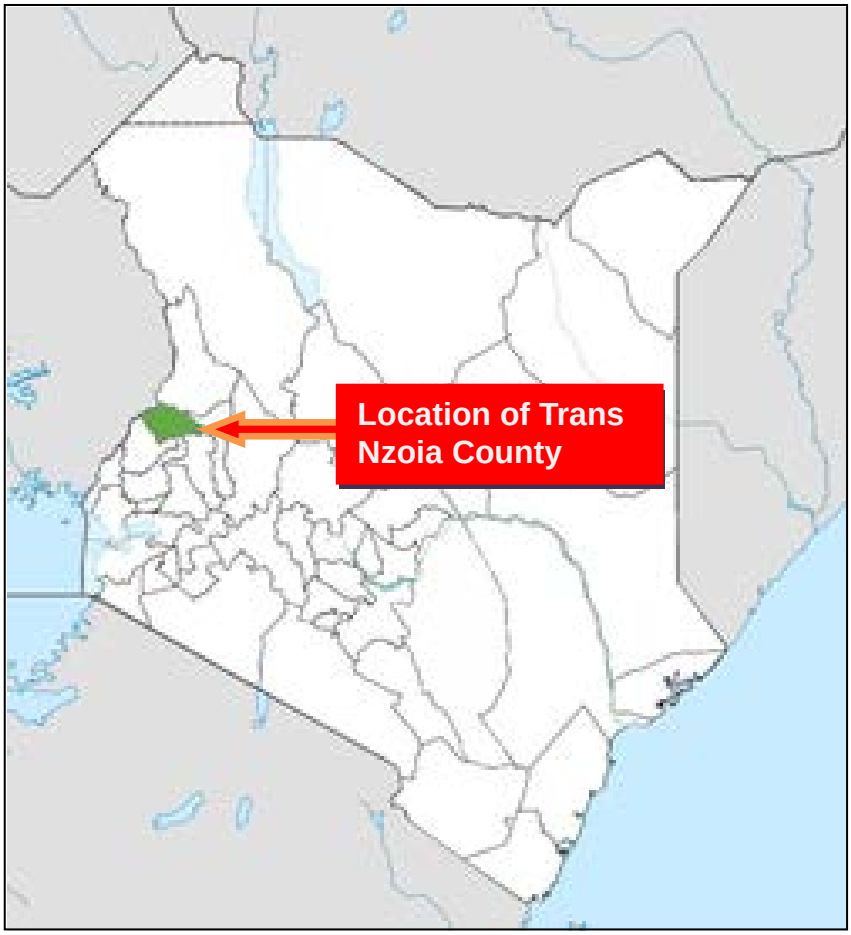

Figure 20: Location of the project county

Trans Nzoia County has five constituencies namely Cherangany, Endebess, Kiminini, Kwanza and Saboti The project road traverses four constituencies namely Kiminini, Saboti, Endebess and Kwanza.. The county assembly wards traversed by the project road include Endebess, Hospital, ,Kibomet, Matisi, Milimani, Sokoni and Tuwani.

Construction of Kitale – Endebess – Suam road will therefore enhance cross – Boarder access to Uganda and various rich agricultural and touristic sites served by the road.

5.1 Population

The 2009 Population and Housing Census enumerated a total of 818,757 persons in Trans Nzoia County. Of these 407,172 were male and 411,585 were female. The intercensal growth rate was 3.7 percent between 1999 and 2009 which is above the national average of 3.0 percent. Assuming the growth rate is maintained, the population for the County in 2013 is projected to be 949,359 persons of which 472,121 are male and 477,238 are female. The population is projected to increase to 1,100,794 by 2017.

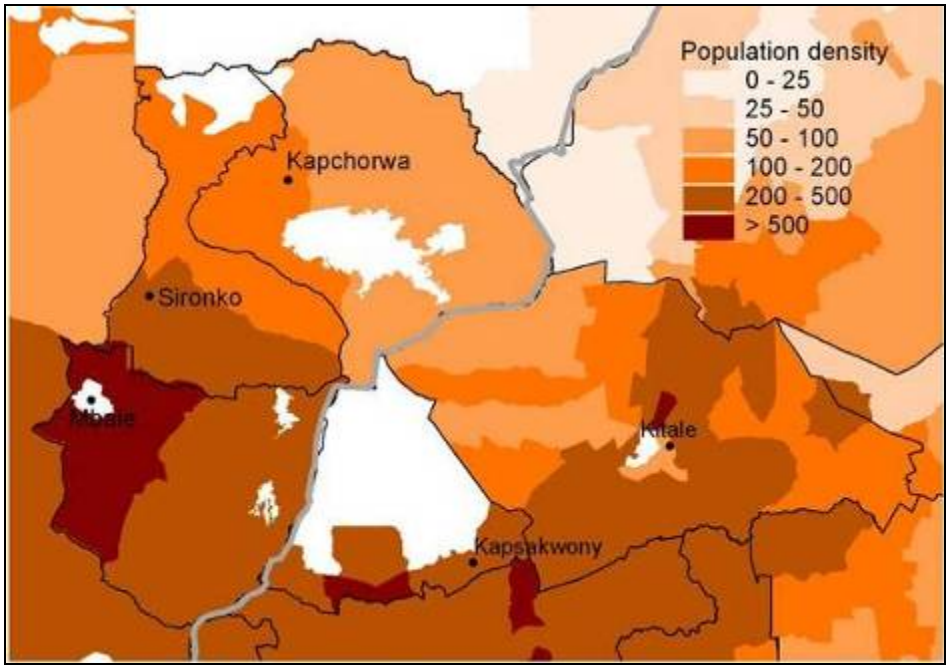

Figure 21: Population density around project area

The highest proportion of the population in Trans Nzoia is Children of Age Cohorts 0-4, 5-9 and 10-14 which accounts for over 47 percent of the projected county population in 2013. The county has generally a youthful population with 740,420 of her population below 35 years of age, representing 80.9 per cent of the total projected population for the county in 2013 and only 6,512 persons in the age cohort, 80+. On the other hand, the labor force mainly of ages 15-64 years has a projected population of 459,225 persons in 2013 representing 50 percent of the total county population.

The high population growth rate in the county has seen the population density rise from 328 persons per square kilometer in 2009, to 367 people per square kilometer in 2013. This is expected to rise further to 441 by 2017. This is a fairly densely populated county; it is among the top 15 densely populated counties in the country (Kenya County Data sheets).

Table 3: Population density by sub-county

Constituency	Area	2009 Pop	Density	2013 Pop	Density	2015 Pop	Density	2017 Pop	Density
Kiminini	395.3	199,386	504	231,191	585	248,948	630	268,069	678
Saboti	323.6	166,482	514	193,038	597	207,865	642	223,830	692
Kwanza	466.9	166,524	357	193,087	414	207,917	445	223,887	480
Endebess	680	91,192	134	105,738	155	113,860	167	122,605	180
Cherangany	629.8	195,173	310	226,306	359	243,687	387	262,404	417
Total	**2495.6**	**818,757**	**328**	**949,359**	**380**	**1,022,277**	**410**	**1,100,795**	**441**

Kiminini Sub County had the highest population of 199,386 people in 2009; it's projected to have risen to 231,191 and 268,069 persons in 2013 and 2017 respectively. Cherangany with 226,306 persons in 2013 follows closely. Kwanza, Saboti and Endebess sub counties had 193,087, 193,038 and 113,860 persons respectively in 2013. As shown in the table, Saboti Sub County has a projected population density of 597 in 2013 is the most populated Sub County followed by Kiminini Sub County with a population density of 78 while Endebess Sub County with a population density of 155 persons per square kilometre is the least populated.

5.2 Human Settlement

Trans-Nzoia was opened up as a settler-farming district. This happened around 1910, although Boer settlers had come even earlier, in 1908, and when they were allotted 2000-3000 acre farms. In 1912, the first survey of Trans-Nzoia was conducted, but by then the forest had already been gazetted. When the first 50 farms were auctioned in 1913, 35 remained unsold.

Work on the large farms also attracted people. However, by January 1914 all were sold. Another 120 farms were auctioned in that year. The whole of Trans-Nzoia was part of the 'white highlands'. According to Waweru (Waweru 1974), allocation of land to the settlers often resulted in displacement of the local people called El-Gonyi. Original inhabitants were few and as they were pastoralists the land appeared practically empty to the colonialists. As a result local people became workers on the farms, squatting on large white-owned farms. Work on the large farms also attracted people from outside Trans-Nzoia.

After independence, the white farms in Trans-Nzoia were disposed of. There were basically four ways in which the land ended up in the hands of new owners:

- Kenyan individuals bought whole farms
- Cooperatives bought the land collectively and divided it among their members.
- Government bought the farms, some of which was put under the ADC farms and others sub-divided for smallholder settlement schemes.
- Settlement Funds Trustee bought and sub-divided them for small-scale farming.

Large chunks of land in Trans-Nzoia are currently under the management of the Agricultural Development Corporation (ADC). Some of the original ADC farms have been sub-divided for small-scale agriculture. Currently, there are eight ADC farms in Tran-Nzoia. They cover about 40,000 acres

in total, mainly in the Endebess region. These farms concentrate on seed production and bulking, together with Kenya Agricultural Research Institute and Kenya Seed Company. Large-scale farming is an important source of employment in the district. Although most of the farm employees are usually given small pieces of land to cultivate, they are squatters kept on the farms to provide casual labour. In May-August, there are about 2000 of these landless workers on each of the ADC farms.

In 2005, the forest boundaries in the County were resurveyed and part of the population was found to reside in the forest reserve. This led to another major 'reshuffling' of land. The process led to widespread dissatisfaction, as former investments in land were not given consideration when the area was re-divided amongst 'eligible' land applicants. Village elders were and are still used in identifying 'original' or 'indigenous' people who can get land in the area. Thousands have been left landless (more in Medard). Up to date, the Chepyuk area has remained government land. The moorland area is now Trust land called Chepkitale National Reserve. In Trans-Nzoia, smaller areas of land disputes exist. These are forest areas that have been irregularly given out for settlement without being degazzetted by the government.

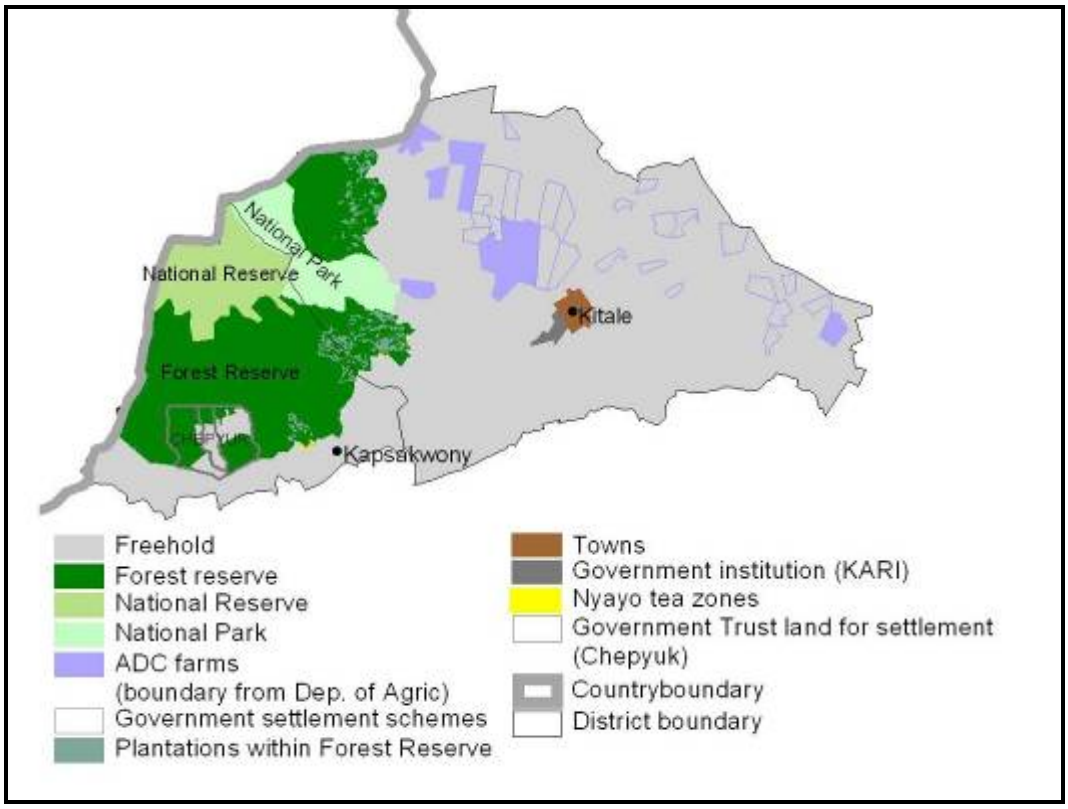

Figure 22: Land tenure map of Trans Nzoia

The Endebess to Suam area was badly affected by the ethnic clashes and hostility has not fully been faced out. From Endebess to Suam, most houses are grass thatched, have mud walls and look relatively new, indicating recent resettlement after the ethnic clashes.

Figure 23: Sample Housing Structures and Settlement patterns

5.3 Land Tenure and Land Use

Trans Nzoia County has a land tenure system such that there is trust land and leasehold (99 years) in urban centres. There is also leasehold tenure in the rural part of the county where Africans bought the large farms owned by the White Settlers while other parts of the County are under freehold land tenure system. The combination of the tenure systems offers both opportunities and constraints. Areas under freehold tenure pose difficulties in enforcing regulations on land. Small scale land holdings range from 1 to 5 acres where some (mainly in Endebess) have been surveyed but no title deeds have been issued.

Land tenure is a sensitive issue to discuss and most people feel uncomfortable to talk about it. One reason for this is that several people have not finished paying for their land parcels and fear they might lose them. The other reason is that the effect of the ethnic clashes has made them develop fear on how permanent their settlement in this place is. The effect of this is that the farmers are reluctant to put up permanent structures in form of houses or even plant trees.

The general land use in the County is characterized by large scale maize and sugarcane growing with scattered human settlements. Other significant land use features include;

(i) Institutional presence along the corridor including, schools and churches, etc.

(ii) Markets and small scale trading activities at some points along the route,

(iii) Public amenities such as Provincial Administration offices

The percentage of persons with title deeds in the county is 45 percent while the rest have no title deeds and can therefore get credit against their land as collateral. There has also been increasing instances of landlessness in the County due to internal displacement of persons arising from the 2007 post elections violence which displaced people in parts of Chepchoina in Kwanza Sub County along the project road and cattle rustling.

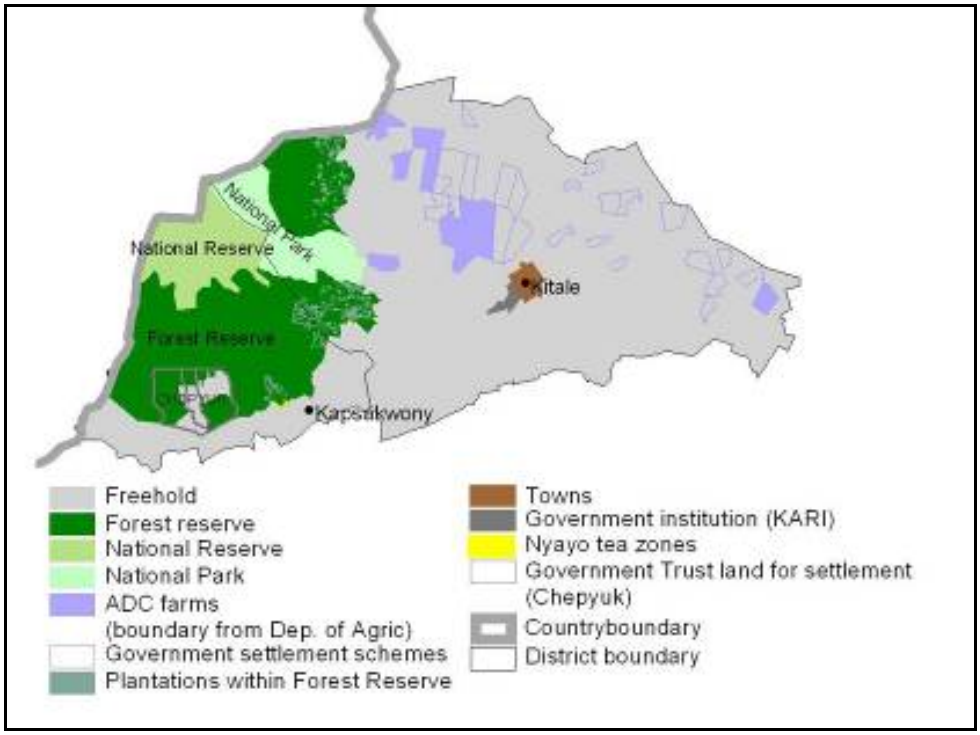

Figure 24: Land tenure in the project region

Plate 8: ADC farm in Trans Nzoia

Plate 9: Agricultural and settlement landscape in Trans Nzoia

5.4 Livelihood activities

5.4.1 Agriculture and Livestock production

Trans-Nzoia has large areas under large-scale farming. Large-scale farming is found especially in the Endebess-Kitale plain (1800-2000m), (total of 66,000 ha). Most of the large-scale farms belong to the Agricultural Development Corporation (ADC).

In Trans-Nzoia, the main crops include tea, coffee, pyrethrum, maize, beans and sunflower. Particular cash crops are sunflower, tea and coffee. Maize and beans serve the dual purpose of food and cash. Other food crops include, finger millet, sorghum, potatoes (sweet and Irish). Fruits include citrus, bananas, apples and avocados. Cotton has been introduced recently. In large farms maize and dairy are important. Food processing includes oil processing, flour milling, and tea and coffee production. Fish farming also plays a significant role due to the number of fish farmers and ponds in Trans-Nzoia County.

Plate 10: (a) Maize plantation in the County (b) Sunflower farming in the project area

In Mt. Elgon, maize, tomatoes, fruits, tea, sunflower, wheat pulses, coffee, pyrethrum are cultivated. In Kaptama, wheat is also grown. Horticultural crops and coffee are more common in Cheptais and Kopsiro. Dairy plays in important role. Coffee, pyrethrum, bananas, avocado and oranges are important cash crops in the district. However, market crops in Chepyuk include maize, cabbages and onions. Chepyuk is also exceptional in that sense that farmers still keep only traditional cattle. In Cheptais, irrigation is used. Apples are a special crop in Kaptama.

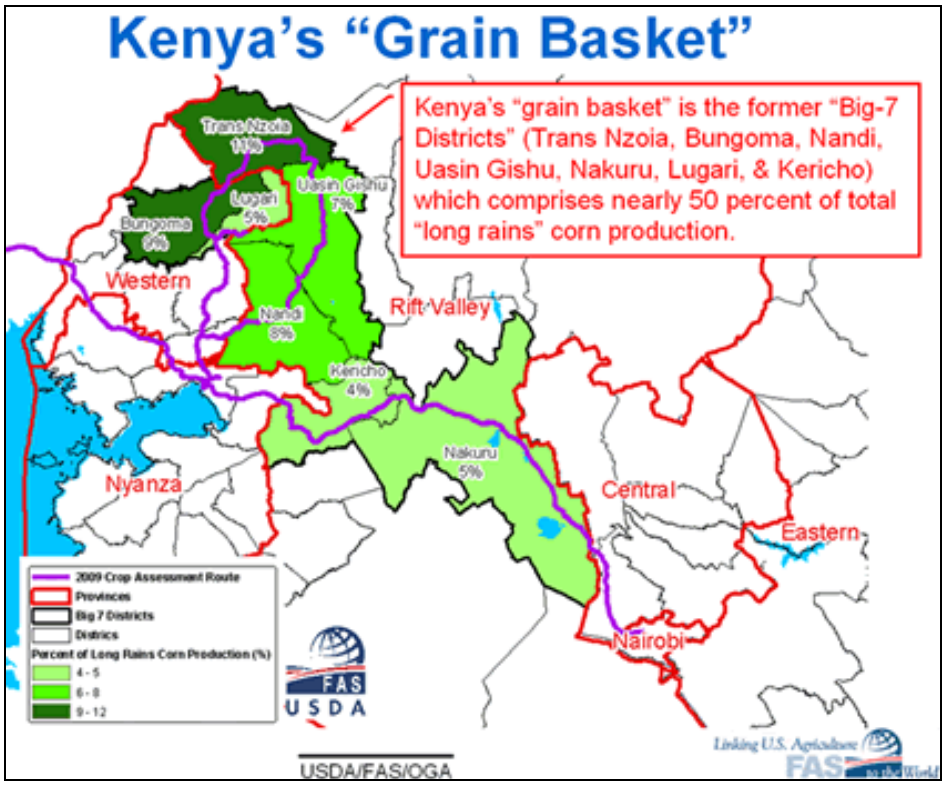

Figure 25: Trans Nzoia as a major grain producer in the country

Trans Nzoia County does not have lakes therefore fish farming is limited to ponds and dams. Tilapia and catfish are the most commonly types of fish reared. There are 7 dams and 1500 fish ponds in the County. In the recent past, fish farming has become popular in the County mainly due to the national government support through the Economic Stimulus Programme. The most used tool for fishing is the net. Cattle and sheep are the main livestock kept in the region. The number of different types of livestock is shown in Table below.

Table 4: Estimated Livestock Population

Type	Numbers
Cattle	174,500
Sheep	160,100
Goats	85,000
Pigs	4,180
Poultry	757,000
Rabbits	6,690
Camels	39
Donkeys	6,580
Horses	24
Ostriches	5

Source: Kenya Population and Housing Census (2009)

Dairy farming is considered to be a reliable and stable source of income that can be managed by both small scale and large scale farmers in Trans Nzoia County. Majority of farmers in the County embrace paddock rearing of cattle and some have partial zero grazing which do not guarantee the dairy animal sufficient food

to enable it produce to its full potential of a minimum of 15 to 25 liters of milk per day. Trans Nzoia County has the potential of leading in milk production though there are challenges faced in milk production. Among these are poor feeding of the cows, inadequate extension services and poor infrastructure especially roads to get milk produce to the creameries while it is still fresh.

Plate 11: A farmer milking his cow in Endebess

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Plate 12: (a) Agricultural and (b) settlement landscapes in Trans Nzoia

5.4.2 Tourism

The main tourist attraction sites in the project counties are the *Mt Elgon* National Park, Saiwa Swam National Reserve, Chepkitale National Park, Kitale Museum and Kitale Nature Conservancy. There are also wildlife including elephants in the Kitale and Mt Elgon Forest forest as well as Columbus monkeys and a variety of birds, buffaloes, hippos, bushbucks, crocodiles and snakes.

Plate 13: Sample tourist attractions in the project area

5.4.3 Trade, Commerce and Industry

In the County, it is only Kitale town in which is classified as an urban centre according to the Urban Areas and Cities Act 2011, however, the other upcoming major urban centre is Kiminini. The main market centres include Kachibora, Endebess, Gitwamba, Maili Saba, Sikhendu, Mucharage, Sibanga, and Kesogon. The number of trading centres in the County is 169. The development of markets and urban centres lead to an influx of people and increase in economic activities thereby leading to higher demand for facilities, services therefore exerting pressure on available facilities and space. This implies that there is an increased demand for employment creation, innovation and markets for goods and services. These issues are therefore critical in planning for the County. If not provided for, here will be possibilities for crime, pestilence and other undesirable social habits.

Endebess shopping centre *Open air market in Kitale town*

Plate 14: Sample commercial activities along the project road

5.4.4 Access to Finance: Banks, SACCOs, Micro Finance Institutions

In the last few years the country has experienced an explosion in financial inclusion mostly driven by the mobile money transfer. The bank mobile money interface has greatly reduced the costs of

transactions especially for small to medium money transactions. Traders can borrow bank money through mobile money without going to a banking hall. 14 banks have an established branch network in the County, this include Kenya Commercial Bank, Barclays Bank of Kenya, Cooperative Bank, National Bank, TransNational Bank, Standard Chartered Bank, Equity Bank, Family Bank, Postbank, Diamond Trust Bank, K-Rep Bank, Kenya Women Finance Trust, Oriental and EcoBank.

5.5 Water supply

Improved sources of water comprise protected spring, protected well, borehole, piped into dwelling, piped and rain water collection while unimproved sources include pond, dam, lake, stream/river, unprotected spring, unprotected well, jabia, water vendor and others.

In Trans Nzoia County, 65% of residents use improved sources of water, with the rest relying on unimproved sources. There is no gender differential as both male and female headed households are at 65% each in use of improved sources of water.

Kiminini constituency has the highest share of residents using improved sources of water at 79%.That is almost twice Endebess constituency, which has the lowest share using improved sources of water. Kiminini constituency is 14 percentage points above the county average. Matisi ward has the highest share of residents using improved sources of water at 87%.That is thrice Chepsiro/Kiptoror ward, which has the lowest share using improved sources of water. Matisi ward is 22 percentage points above the county average.

A total of 74% of residents in Trans Nzoia County use improved sanitation, while the rest use unimproved sanitation. There is no significant differential by gender as male headed households at 75% as compared with female headed households at 74% in use of improved sanitation.

Kiminini constituency has the highest share of residents with improved sanitation at 84%.That is almost twice Endebess constituency, which has the lowest share using improved sanitation. Kiminini constituency is 10 percentage points above the county average. Tuwani ward has the highest share of residents using improved sanitation at 89%.That is seven times Machewa ward, which has the lowest share using improved sanitation. Tuwani ward is 15 percentage points above the county average.

Information category	Statistics
HH with access to piped water	28,855
HH with access to portable water	279,060 (People) – 46,510 HH
Number of permanent rivers	11
No. of shallow wells	5813

No. of protected springs	375
No. of un-protected springs	520
No. of water pans	48
No. of Dams	48
No. of Bore holes	79
HH with roof catchment systems	35,426
Mean distance to nearest water point (km)	1
Percentage distribution of households by source of safe drinking water	
Safe Source	40.6
Unsafe Source	59.4
Not stated	0
Main water supply sources/schemes (Kitale water works,Kapolet,saboti,Kiminini,Kwanza-Kolongolo,Kiboroa,Masaba,Kimondo,Endebess,suam-Orchad,Matumaini,Chepkoiyo)	12

Source: Trans Nzoia County Development Plan (2013-2017)

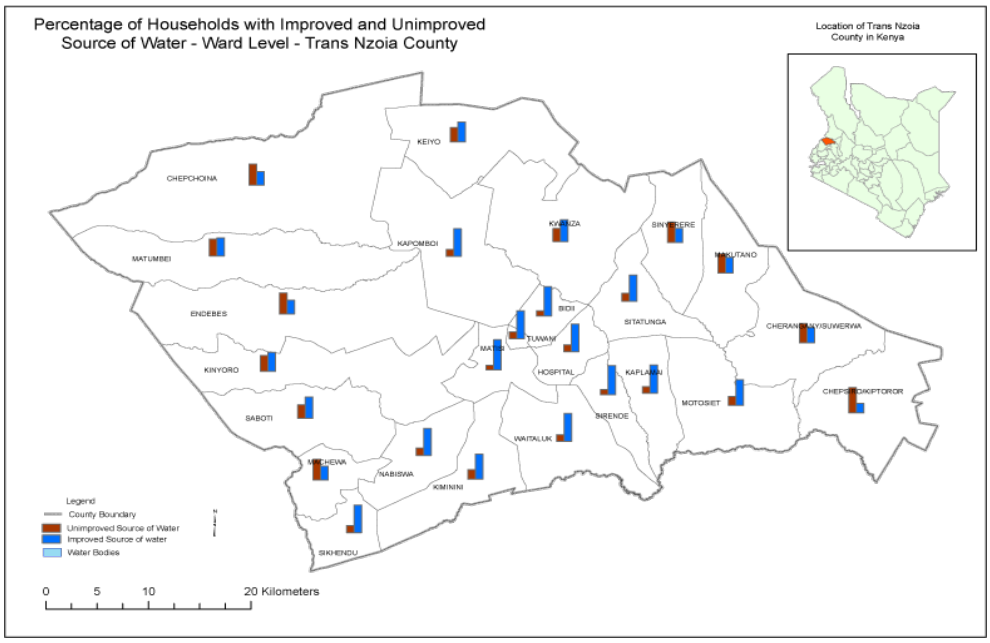

Figure 26: Households with improved sources of drinking water

The main modes of human waste disposal by households are pit latrines, main sewer, septic tanks and cess pools. Other waste disposal modes include bucket and bushes as indicated in the table provided below.

Table 5: Households by Main Mode of Human Waste Disposal

Mode of disposal	No. of households
Pit latrines (covered/uncovered)	33,075
Main sewer	2,699
Septic tank	1,131
Cess pool tank	128
VIP latrine	3,682
Bush	458
Bucket	42
Other	32

Source: Kenya Population and Housing Census (2009)

Plate 15: (a) Local creativity in trapping water (b) Abandoned quarry at Km 26 is a water source for livestock

5.6 Energy supply and Use

Energy supplies include electricity, wood fuel, Liquefied petroleum gas, solar, wind and petroleum based fuels. Electricity supply is connected in major and minor urban centres along the proposed road alignment. Just 1% of residents in Trans Nzoia County use liquefied petroleum gas (LPG), and 3% use paraffin.

5.6.1 Fuel wood

77% of the residents use firewood and 18% use charcoal. Firewood is the most common cooking fuel by gender with 75% of male headed households using it as compared with 80% in female headed households. Petroleum products are mainly used in the transport sector although products like kerosene are also consumed in great quantities by the households. These products are readily available in the markets. Energy sources like wind and solar are not fully utilized although there is a high potential mainly because of lack of appropriate technology especially in the rural interior.

Cherangany and Endebess constituencies have the highest level of firewood use in Trans Nzoia County at 91%.This is 38 percentage points above Saboti constituency, which has the lowest share. Endebess constituency is 14 percentage points above the county average. Machewa ward has the highest level of firewood use in Trans Nzoia County at 97%.This is 24 times Tuwani ward, which has the lowest share. Machewa ward is 20 percentage points above the county average.

Saboti constituency has the highest level of charcoal use in Trans Nzoia County at 38%.This is seven times Endebess constituency, which has the lowest share. Saboti constituency is 20 points above the county average. Tuwani ward has the highest level of charcoal use in Trans Nzoia County at 79%.This is almost 40 times Machewa ward, which has the lowest share. Tuwani ward is 61 percentage points above the county average.

5.6.2 Electricity

Even though important to spur economic growth, the county is inadequately covered by the electricity network. Only 9% of residents in Trans Nzoia County use electricity as their main source of lighting. A further 39% use lanterns, and 49% use tin lamps. 1% use fuel wood. Electricity use is almost similar in male headed households at 9% as compared with female headed households at 8%.

Saboti constituency has the highest level of electricity use at 13%.That is 11 percentage points above Endebess constituency, which has the lowest level of electricity use. Saboti constituency is 4 percentage points above the county average. Bidii ward has the highest level of electricity use at 47%.That is 47 percentage points above Machewa ward, which has the lowest level of electricity use. Bidii ward is 38 percentage points above the county average.

5.6.3 Solar

This is the least utilized yet most abundant energy resource. The use of solar energy is limited to a few households especially within the urban and trading centres, while between a quarter to half a percent of households use solar power. This is mainly due to inaccessibility of the necessary technology to the majority of the population and lack of promotion of solar energy as alternative energy source especially to electricity.

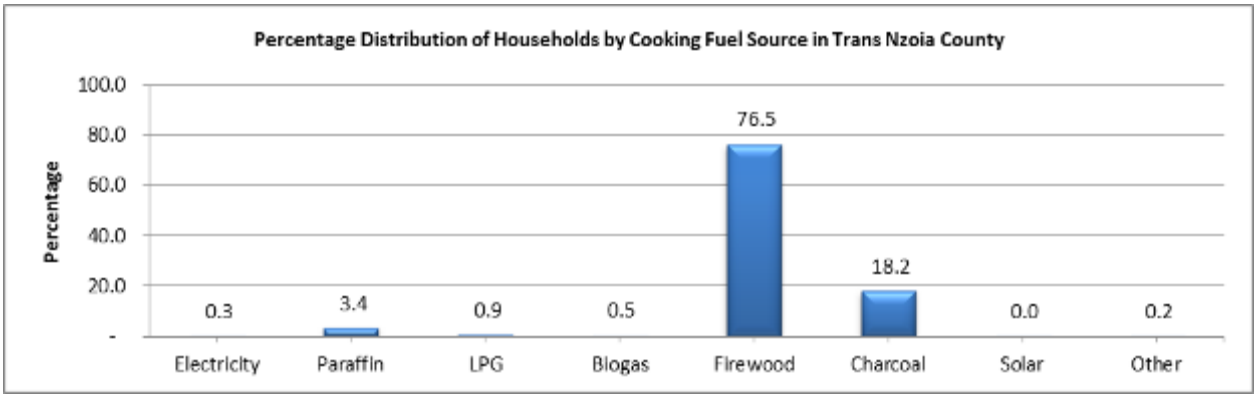

Figure 27: Percentage of households' source of cooking fuel in Trans Nzoia County

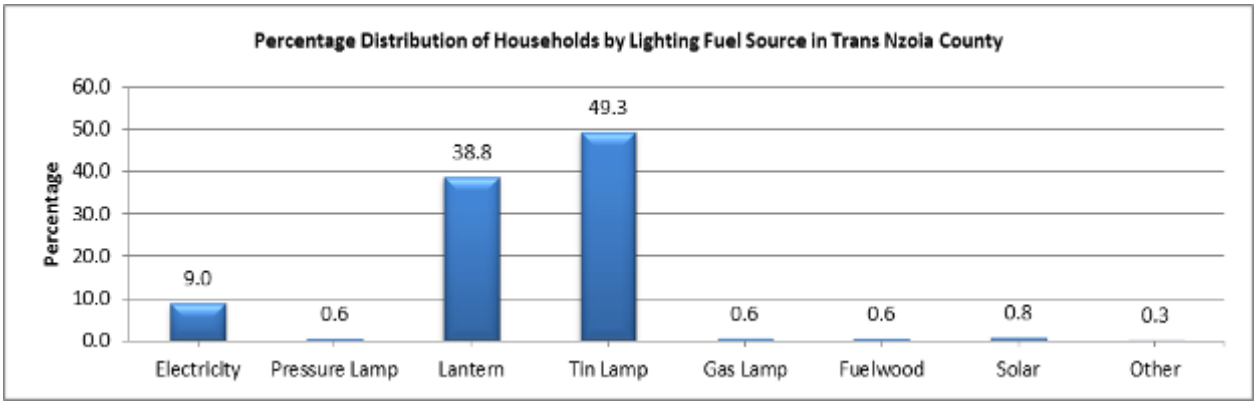

Figure 28: Percentage of households' source of lighting in Trans Nzoia County

5.7 Education

A total of 21% of Trans Nzoia County residents have secondary level of education or above. Kiminini constituency has the highest share of residents with secondary or above at 24%. This is twice Endebess constituency, which has the lowest share of residents with a secondary level of education or above. Kiminini constituency is 3 percentage points above the county average. Hospital ward has the highest share of residents with a secondary level of education or above at 41%. This is 31 percentage points above Chepchoina ward, which has the lowest share of residents with a secondary level of education or above. Hospital ward is 20 percentage points above the county average.

A total of 59% of Trans Nzoia County residents have a primary level of education only. Endebess constituency has the highest share of residents with a primary level of education only at 64%. This is 6 percentage points above Kiminini constituency, which has the lowest share of residents with a primary level of education only. Endebess constituency is 5 percentage points above the county average. Matumbei ward has the highest share of residents with a primary level of education only at 66%. This is almost 21 percentage points above Hospital ward, which has the lowest share of

residents with a primary level of education only. Matumbei ward is 7 percentage points above the county average.

A total of 20% of Trans Nzoia County residents have no formal education. Endebess constituency has the highest share of residents with no formal education at 24%.This is 6 percentage points above Kiminini constituency, which has the lowest share of residents with no formal education. Endebess constituency is 4 percentage points above the county average. Chepchoina ward has the highest percentage of residents with no formal education at 29%. This is twice Hospital ward with the lowest percentage of residents with no formal education. Chepchoina ward is 9 percentage points above the county average.

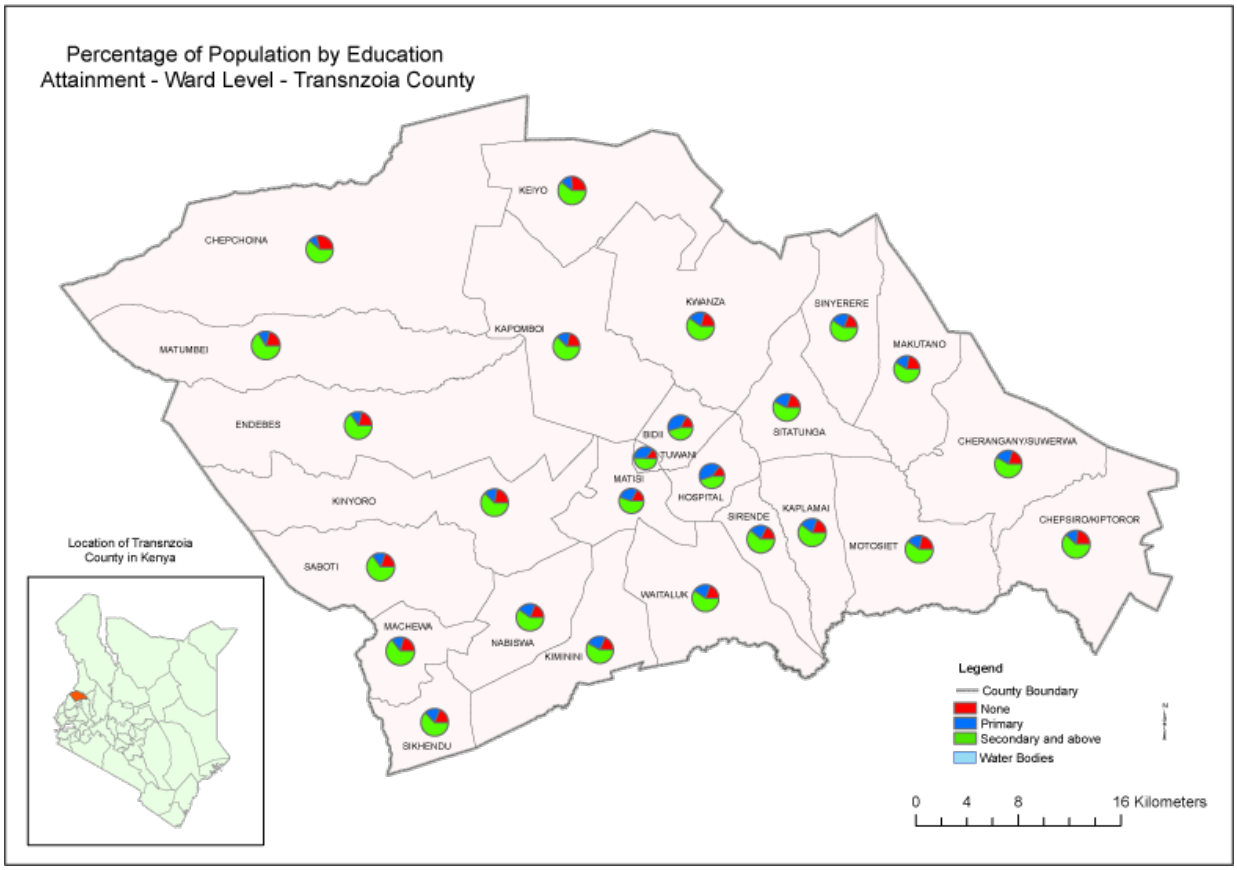

Figure 29: Education levels in Trans Nzoia County

(a) Mt. Elgon Academy at 2+600 LHS

(b) Township Education Centre at 21+500 LHS

(c.) Naifarm Primary School at 29+100 LHS

(d) St. Mary's Nai Secondary School at 29+400 LHS

Japata Secondary School at 36+200 RHS

Anderson High School at 38+800LHS

Plate 16: Schools and other educational institutions along the proposed alignment

5.8 Poverty

The vulnerable groups hardest hit by poverty in the area include the women, the unemployed youth, widows and orphans, neglected retired old people, the street children and those living in the more marginal areas. Gender inequality is a common phenomenon in the county and is deeply rooted in the cultural and traditional values. Women are disadvantaged in terms of access and ownership to

resources and decision-making. Women do not own household resources and they have limited decision-making power on the use of resources. Further, women lack exposure as they do not attend development meetings and extension services hardly reach them despite the fact they perform most of the duties at the farm level.

The poverty situation in the Trans Nzoia region is manifested in various forms such as inaccessibility to health services, food security, inadequate potable water, inadequate shelter, poor sanitation, inaccessibility to education and landlessness. Most of Endebess division in Trans-Nzoia, and parts of Cheptais and Kapsokwony have highest percentages of poor households.

5.9 Health

In the year 2012, Trans Nzoia County had 45 public health facilities, 32 private facilities, 10 run by non-governmental organizations and 10 faith-based facilities. The health facilities are fairly distributed with the average distance to a health facility standing at 5-7 Km. The number of nurses, doctors and clinical officers was 42, 5, 6 respectively per 100,000 people in 2011 and the number of nurses, doctors and clinical officers was 49, 7, 8 in 2012 per 100,000 people.

Table 6: Health facilities along the project road

Name of facility	MFL Code	Approx. distance from road (in meters)	No of patients seen (OPD) per year
1. Nekeki Ngo	15332	150	150
2. Kitale Referral	14947	200	95,000
3. Marie Stopes	15134	20	230
4. Tom Mboya HC	15732	200	11,820
5. GK Remand Prison	14528	50	15,870
6. Jesus Responding	14603	50	
7. St. Raphael	18515	50	5,895
8. Modern Clinic		50	
9. Endebess Sub County Hospital	14455	200	16,330
10. Chepchoina HC	14332	20	15,000
11. Andersen M.C.	14203	200	9,300

Source: State Department of Health, County Government of Trans Nzoia, 2015

There are 11 health facilities located within 200 meters along the Kitale – Endebess – Suam road corridor serving approximately 169,595 clients per year. Except Kitale referal hospital, there other health facilities are under equipped and deal with uncomplicated cases of diseases such as malaria,

scabies and typhoid among others. Kitale referral serves over 50% of the patients followed by Endebess Sub County Hospital and then GK Remand Prison and Chepchoina health centre

The most prevalent diseases are Malaria, HIV/AID and Tuberculosis. The number of people suffering from tuberculosis per 100,000 people is 155, while those suffering from malaria are 18,053 per 100,000 people. 42.3% of children in the County had undergone full immunization as at the year 2012. 15 % of the children are underweight for their age while 29% have stunted height for their age, an indicator that nutrition is not adequate. 21.5 % of all deliveries in the County happened at health facilities. Contraceptive use improved from 26.4% in 2011 to 27.4 % in 2012.

One of the major health concerns related to the project is its potential to significantly increase the spread of HIV/AIDS and other sexually transmitted infections (STIs) in the local population and among the workers. The mobilization of a large workforce over a long period is likely to increase sexual activities in the area and the presence of the workforce may even bring in a number of commercial sex workers. From the data provided, a large number of the population is under the age of 50 (see section on demography) and being an active age group, the impacts of new relationships are likely to affect them. HIV/AIDS poses a big threat to development of the area because of increasing dependency ratio with an increasing number of orphans and street children. These could reverse progressive gains made in poverty reduction. The youth (15-49 years) are the hardest hit and this is a threat to the labour force of the region. This group is also important because of the labour force they are likely to provide during the construction phase of the project. In 2012, mother-to-child transmission of HIV/AIDS was reported to be at 6.5%. The number of people living with HIV/AIDS and n antiretroviral therapy is 6,248.

Approximately 1,100 adults and 270 children died of AIDS-related conditions in 2011 in Trans Nzoia County.The proportion of men living with HIV in Trans Nzoia County is higher than that of women. However, the women living in the county remain vulnerable to HIV infection. The HIV prevalence in Trans Nzoia County as at 2012 is shown in Table 9.

Table 7: HIV prevalence in Trans Nzoia County

Total population	**818,757**	**Ranking out of 47 counties**
HIV adult prevalence overall	7.2%	39
Number of adults living with HIV	30,094	36
Number of children living with HIV	4,707	35
Total number of people living with HIV	34,801	36

5.10 Physical Infrastructure

Vision 2030 development agenda by the Ministry of Planning and National Devolution mainly comprise roads and housing and are described as the basic foundations for national transformation. The poor road network is of a major concern to the area residents since it is the only link to markets

for farm produce. This limits the farmers' accessibility to markets and at the same time, perishable farm produce do not always reach the markets on time.

5.10.1 Transport Infrastructure

The County has a total road network of 4,060.94 kilometres comprising of 154 kilometres of bitumen roads, 167.07 kilometres of gravel, and 786.37 kilometres earth roads and 2953.5 kilometres of rural access roads. Most of the roads are in poor condition and are usually impassable during the rainy season. The poor condition of the roads is a major bottleneck to development in the County which is rich in agricultural produce. It makes it difficult for farmers to access the market; especially for perishable produce.

Plate 17: Trucks stuck along the project road in Endebess during rainy season

Trans Nzoia County has 23 kilometres of railway line that ends in Kitale Town (from Eldoret). The rail transport has been dormant but there is a possibility of revival if the national plans on the revival of the railway transport will be implemented as planned. The County anticipates benefiting from railway transport through transportation of bulky goods to and from the County in addition to its strategic position in road transportation to and from South Sudan. The County has only an air strip but the Eldoret International Airports is within its proximity which provides an opportunity for the growth of horticulture as well as reduced travel time for air passengers.

5.11 Social and Cultural Aspects

The dominant ethnic group in the project area is the Luhya who consists of several sub-tribes, the Teso (in the lowlands) and the Sabaots on the higher slopes. However, there are other ethnic groups mainly concentrated in urban areas including Asians. Thus the project area generally has monolithic cultural based on Luhya customs and traditions. However, modern influence has eroded the traditional way of life for this community. The project corridor is dotted with many religious institutions

including churches and mosques. Both Christianity and Islamic religions exists in addition to traditional practices.

Majority of the county's population is organized into community self-help groups, and both producer and marketing cooperative societies. There are a number of other non-state actors operating in the county including local and international Non-Governmental Organizations whose objective is to improve the socio-economic well-being of the local people.

Table 8: Registered groups in the County by Constituency

Constituency	No. of SHGs	No. of CBOs	No. of women's groups	No. of youth groups	No. of disabled persons organizations	Total
Saboti	535	45	640	389	30	1,639
Kwanza	329	15	362	273	27	1,006
Cherangany	79	12	60	30	0	181
Kiminini	567	43	615	389	615	2,229
Endebess	168	35	250	152	250	855
Total	**1,678**	**150**	**1,927**	**1,233**	**922**	**5,910**

Source: Department of Gender and Social Services, Trans Nzoia (2014)

The County has 234 registered cooperatives but only 110 of these are active while 120 are dormant and four have collapsed. Most of these are formed by employees of government departments, farmers groups, private sector organizations and transport associations. The main types of cooperative societies in the County include dairy and coffee farmers SACCOs; transport SACCOs, rural SACCOs, urban SACCOs, land purchasing SACCOs, housing, consumer and investment SACCOs. The land buying, dairy consumer, housing and investment cooperatives are spread across the entire County, the coffee cooperatives are found in the coffee producing areas such as Muroki in Saboti Constituency. The transport and urban SACCOs are found mainly in the urban areas such as Kitale Town. The registered membership for the cooperatives societies is 39,655 and the turnover is KShs. 77,310, 588 while the share capital is KSHs.1,266,596,246 (County Development Plan 2013-2017).

5.11.1 HIV/Aids

Kenya is one of the six HIV 'high burden' countries in Africa – about 1.6 million people were living with HIV infection at the end of 2011. Women in Kenya are more vulnerable to HIV infection compared to Kenyan men, with the national HIV prevalence at 8 per cent for women and 4.3 per cent

for men (Kenya Demographic and Health Survey 2008-2009). HIV/AIDS is a serious health and development problem in the project area. The HIV/AIDS prevalence rate stands at 7.2% in the County.

The major drivers of HIV/AIDS in the counties include engaging in unprotected sex, ignorance on safe sex practices, unwillingness to use condoms, ignorance on HIV status, commercial sex workers, unsafe sexual behaviour, drug abuse (drinking of illicit brews), high levels of peer pressure and family breakdowns. The age group between 15 and 45 years is mainly affected by the HIV/AIDS as it constitutes the sexually active and women being the majority.

Construction of the Kitale-Endebess-Suam road may lead to an increase in HIV/AIDS mainly resulting from “imported” prostitution. The road should therefore incorporate a major component in HIV/AIDS prevention activities.

5.12 Gender Analysis

5.12.1 Rationale for Gender Analysis

The Feasibility Study, Environmental and Social Impact Assessment and Detailed Engineering Design of the Kitale - Endebess - Suam (C45) Road are financed by AfDB who also has expressed interest in financing construction of the road. One of the main principles of the Africa Development Bank (AfDB) is to promote gender mainstreaming in the Bank operations including its funded projects.

5.12.2 Methodology

Gender analysis was aimed at understanding the gender dimensions of road infrastructure development among communities living along the road corridor through identification of barriers to women’s full participation in economic development. It was carried out using the rapid assessment procedures (RAP) methodology. The RAP methodology adopted qualitative and quantitative data collection tools including semi-structured questionnaires, observations and focused group discussions – tools which are attached as annexes to this report

A total of 222 individuals operating and living along the full road length corridor were randomly selected and interviewed and seven focus group discussions were conducted with men, women and mixed youth and the physically challenged persons.

5.12.3 Demographic data

The socio-economic data for this gender analysis from an interview of 222 (84 female headed and 138 male headed) household heads carried out from 2nd to 8thJune 2015. The households had between one and eight members whereby male headed household had an average of 2.33 males and 2.44 females while female headed household had 1.97 males and 2.33 females. 66% of the respondents were married, 26% were single, 2% were divorced and 4% were widowed while 2% were

separated. The average age for male household heads was 37.1 years while that for females was 36.2 years.

5.12.4 Education and health

Seven percent of males compared to 6% of females had no education, 32% of men compared to 40% of women had attained primary education and 38% of both genders had attained secondary school education. There were more males who had attained technical and university education level than the women. Morbidity incidences among females were higher (35.6%) than that of males (29.2%). HIV prevalence among women in the County is higher (7.3%) than that of men (4.4%) and the women continue to be more vulnerable to HIV infection than men.

The commonest form of Gender Based Violence in Trans Nzoia County is economic deprivation (child neglect/abandoned children, property disinheritance, land conflicts; changing of boundaries, neglected families and child labor) and women complained that their husbands take away their earnings. Other forms of GBV in the county include physical, sexual, psychological and emotional violence.

5.12.5 Ownership and access to resources

Resources identified and useful to both genders along the road corridor included land, forestry, wild animals, water, stones sand human resources. More females than males occupied their land through informal occupation. Women don't possess ownership documents and in most cases the land is considered as family land while men have both access and control over land through buying or inheritance from their parents

5.12.6 Livelihoods and income levels

The women are involved in various activities including selling of chicken, fruits and vegetables, table banking, fetching wood, religious meetings and on/off farm work at payment of 100 shillings per day. Men practice dairy farming and horticultural farming.

In the project area, residents earn their livelihoods from agriculture, self-employment and wage employment. 95% of the females compared to 78% of the males are Self-employed including trade. Men are self-employed in bodaboda, masonry and motorbike repairing while women are engaged in food preparation and sales, charcoal selling, Boutique operation, fruit selling and maize roasting. The lowest income earned by men is KShs 1500.00 while that earned by females is KShs. 1000.00

5.12.7 Transport

The main modes of transport along the road are private vehicles, bicycles, matatus, motorbikes donkey and animal drawn carts, Tuktuk and tractors. Children, youth, women, men, the elderly and people with disabilities use the Kitale- Endebess- Suam road for basic transportation of goods and people. However, it is impassable during rainy seasons, has potholes, is narrow, dusty during the dry season, roadsides are very bushy and there is presence of sharp bends and corners. The road has no signs and bumps. The main challenge faced by women in the current road status is congestion & traffic jam which ranks 3rd for men. The second most important challenge for women is high cost of transport followed by accidents for which among men, these ranks in the 4th and 11th respectively.

5.12.8 Participation

20% of the males compared to 21% of the females participated in community works through various local associations. The respondents participated through self-help groups, religious associations, and SACCOS. The youth are willing to be involved in providing food to workers, operating heavy machines, providing security for construction materials, taking roll calls and assisting in maintenance. Women will participate in fetching of water, preparing of tea, cooking food, collection of stones, clearing of small bushes and clerical activities. They also hope to participate in activities such as cooking, sweeping, providing security banners, maintaining cleanliness and doing clerk work. Men can be assigned security roles during construction of roads. They assist in resolving disputes among workers on site. They can also put up businesses that benefit the workers on site.

5.12.9 Anticipated Impacts

According to women, easing transport and travel ranked the most notable impact of the road construction seconded by business improvement and economic development compared to men who ranked reducing cost of production and easing transport and travel as the first and second impact respectively.

The road is expected to lead to displacement of respective business places and this results to reduced income, loss of customer base and higher restarting costs. Advance notices should be given prior to construction and relocation areas of people who had been displaced were suggested to be placed near their earlier areas of residence. Compensation should be deposited in joint accounts of both spouses.

Women may face restriction to work by spouses, house responsibilities, pride, weather, diseases, young mothers and the wages provided may hinder women from participating in the roles mentioned above. Men may be limited from participating by their age given most of the construction work as the work is best suited for young and energetic individuals.

5.12.10 Conclusion and recommendations

Construction of the proposed road received unanimous approval from both genders. Women felt the need for the road to be built was high despite the given disadvantages. The men generally were of the opinion that construction should take the shortest possible time, locals should be used as much as possible, prompt payment of affected persons needs to be done and adequate time for relocation be allowed. The youth were of the opinion that they would be absorbed and get a permanent job. The construction company will promote business, ease transportation and reduce poverty levels.

The proposed Kitale - Endebess – suam road is located within a corridor with adequate manpower resources of both genders and will have to integrate males, females and the youth in the proposed endeavours. Preference for employment should be given to female headed households as many of them are vulnerable to changes that occur.

There is need to entrench gender issues in ownership, access and control of productive resources notably Land, Water and construction materials as well as transportation means. Strategies will include women empowerment through education/capacity building, organisation and provision of soft loans and capital.

Awareness about the risks of diseases brought about by engaging in sexual activities with strangers needs to be created. Youth also need to be aware of the dangers of roads. The laws on protection of the girl child rights need to be emphasized.

6 RESETTLEMENT ACTION PLAN

The TOR for the design of Kitale - Endebess - Suam (C45) Road to bitumen standard required that a Resettlement Action Plan should be prepared. A full RAP has been undertaken for this project road after establishing that the PAPs were over 200 as required by the AfDB policy.

The overall objective of the Resettlement Action Plan was to identify and value property that will be affected by the road upgrading works and the establishment of the road reserve. The process involved consultation and agreement with the affected people and communities, as well as scheduled actions and costs that are needed to fairly resettle and compensate affected people and communities in accordance with the Kenyan constitution and AfDB policies.

1.1 Socio-economic survey

The collection of socio-economic data for the potential project affected persons was conducted through a structured questionnaire administered in the field by research assistants. Further, five PAPs consultations were conducted. Valuation of the asset that were to be affected by the project was based on the Land Act (2012) that outlines the process of carrying out compulsory acquisition valuation. It will also put into consideration policies in Eviction and Resettlement Bill (2010) and AfDB resettlement policies.

In the project area, residents earn their livelihoods from diverse economic activities including farming, employment (civil servant, teacher), trading and doing other jobs including electrical, bodaboda and security. 36% of the PAPs were students, 39% were employed and the rest were either housewives or retired.

1.2 Potential Impacts

Resettlement will be triggered by constructing the dual carriage within Kitale town and upto Matisi and shoulders, improving the horizontal alignment at selected locations so as to provide safe driving conditions and providing service roads, bus stops and lorry park as well as NMT lanes. The Project Affected Areas for the Kitale – Endebess – Suam will be concentrated along the road corridor including the Municipality, Bidii, Matisi, Endebess, Kwanza, Kaibei and Chepchoina administrative locations traversed. In total, 405 PAPs will be affected comprising households, churches, schools, and administrative office. A total of 1091 hawkers will also be affected.

The PAPs include hawkers using the road reserve to sell their merchandise totalling to approximately 606 in Kitale town alone, those whose private structures will be affected due to extension of the road and those whose private land will be affected. Impacted properties include land, trees, structures

(including business, residential, public and utilities). A total of 12 public and private institutions will be affected

The construction of the proposed Kitale – Endebess – Suam corridor will generally follow the current road alignment. The measures to minimise resettlement include Consultation and participation with the project affected persons (PAPs), the entire road should be expanded to one side only, instead of both sides. Other measures to minimize impacts during construction will include hiring existing rental houses instead of establishing workers camps.

1.3 Organizational Responsibility and Grievance redress strategies

The implementation management organization for this RAP will be at three levels namely national (MOTI-PIU), County Resettlement Committee (CRC) and a Locational Project Affected Persons Committees (LPAPCs) composed of both the resettlers and the host communities. The process for the resettlement implementation is that once the RAP is approved, KeNHA will formally disclose it to the affected persons following which the national government will assist in community sensitization. Appropriate display materials to assist in the sensitization process should be developed and utilized. There may arise grievances /disputes varying from mistakes on inventory of the affected properties that might have occurred during the census survey to delays in compensation payment. These will be settled through a GRM at PAPC, CRC or land tribunal/court levels.

1.4 Integration with host communities

The RAP did not identify any resettlement site. However, majority of the PAPs likely to lose their structures stated that if they were to choose their preferred area of resettlement, they would prefer remaining on the same piece of land where only a part of it is acquired or purchasing land within or beyond the same neighbourhood.

1.5 Indigenous Groups

With reference to World Bank Safeguard Policy OP 4.10, the term “Indigenous Peoples” is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

i. Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
ii. Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories[7];
iii. Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
iv. An indigenous language, often different from the official language of the country or region.

The Kitale-Endebess-Suam road traverses areas that are largely occupied by multiple ethnic groups with different traditional practices and land-based modes of production. Indigenous peoples - defined here as social groups with identities that are distinct from dominant groups, who are usually marginalised and vulnerable segments of society in the project area are the *Dorobos*. They number approximately 430 and live in Endebess location.

1.6 Legal framework

This process is grounded on various regulations both international and local. Internationally, it triggers the African Development Bank Policy on Involuntary resettlement. Locally it triggers several regulations among them the Constitution, Land Act, the Eviction and Resettlement Procedures Bill (2013), Land Act (2012), Prevention, protection and Assistance to internally displaced persons and affected communities Act (2013), Land Registration Act (2012), National Land Commission Act (2007), EMCA, Wayleave Act, and others.

Institutionally, implementation of the RAP will be undertaken by the Ministries of Lands and Urbanisation, Public Works (for providing and approving compensation rates), the yet to be sourced developer who will effect the compensation/resettlement, and Ministry of infrastructure and Transport, NEMA to monitor implementation of the RAP.

Grievances redress mechanisms and procedures which are simple, transparent, accessible to all the PAPs, flexible and speedy/just/fair are available. The main conflicts and grievances are likely to arise from mistakes on inventory of the affected properties, disagreements over land parcel ownership and boundaries, pending court cases, disagreements on plot /asset valuation and delays in compensation payment. These grievances will be settled through a step by step process from the PAPC through the CRC, the Public Compliant Committee/Land Compensation as well as seeking legal redress from the courts.

1.7 Institutional arrangement

Implementation of this RAP and compensation requires the Ministries of Lands, Agriculture, Forestry and Public Works (for providing and approving compensation rates), the yet to be sourced developer and Ministry of Transport and Infrastructure through KeNHA (for sourcing the contractor, financing, co-ordinating and monitoring the resettlement), National Land Commission, the County Trans Nzoia and NEMA to monitor implementation of the RAP.

The eligible individual(s) are those who are directly affected socially and economically as a result of improvements of the project road which in effect results to compulsory acquisition of land and other assets as well as displacement of hawkers. Properties that are eligible for compensation are

buildings, land, assets on the land and affected public social utilities such as power supply and water pipelines. The compulsory acquisition of land and other assets will result to relocation or loss of shelter; assets, loss of access to assets (including structures); loss of income sources or means of livelihoods even if the affected persons is not forced to relocate and; forceful denial to access to legally designated social and economic services. The economic census covered all categories of PAPs based on their site location as at 30th June 2015 which is the cut-off date for eligibility to resettlement entitlements for this RAP.

1.8 Resettlement Site

The affected rural community members except in Kitale town, were not ready to move out of their communities. Majority opted to resettle within their remaining land parcels. There was therefore no host communities considered under this RAP as PAPs will fizzle into their existing communities.

The hawkers in Kitale town emphasized that they should be relocated to areas with similar trading opportunities. Further, where they are relocated to, a PSV terminus should be established to sustainably provide them with the much needed customers.

1.9 Implementation Schedule

The Resettlement Action Plan Activity Schedule (RAPAS) is spread over twelve months including approval of the RAP. The RAPAS will include the following:

i. Preparation of RAP
ii. Mobilisation and consultation with PAPs
iii. Verification of property/asset ownership and valuation for compensation including offering of awards
iv. Bank account opening and/or revival for those that are dormant
v. Payment of compensation and delivery of other entitlements within 6 months after serving notices;
vi. Issue a vacate communiqué for removal of all movable structures and assets, six months for complete remove of all affected structures and assets ;
vii. Dispute /grievances resolution;
viii. Complete removal of all affected structures and assets, six months after issuing of the vacate communiqué
ix. Monitoring, evaluation and final audit

1.10 Cost and Budget

The compensation cost caters for loss of land, trees, crops and structures by the PAPs, and disturbance allowance. It was estimated to be approximately Kshs.390,000,000 (Read Kenya shillings

three ninety million only) as summarized on the tables below and presented in detail in the annexes attached.

Item	Estimated cost
Land	181,501,253
Structures	166,610,684
Trees	2,014,250
Crops	34,698
Facilitation fees for hawkers	4,308,000
One grave	20,000
10% monitoring costs and contingency	35,488,885
TOTAL	**389,977,770**

1.11 Monitoring and Evaluation

Monitoring, evaluation and final audit (EMA) of the resettlement implementation will be founded on the baseline survey generated in the RAP and ESIA reports for Kitale – Endebess – Suam road.

The subjects for monitoring and evaluation will include acquisition of land, buildings/structures and Trees/Crops; compensation, Re-establishment and Rehabilitation; Hazards and Disturbances; Social/ Demographic; Consultation; Training and; Management.

7 CONSULTATIVE PUBLIC PARTICIPATION

6.1 Overview

It is a Government policy that beneficiaries and members of the public living near new or improvement project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. Consultative Public Participation is therefore an important process in ESIA studies. Through this process, stakeholders have an opportunity to contribute to the overall project design by making recommendations and raising concerns. In addition, the process creates a sense of responsibility, commitment and local ownership for smooth implementation of the project.

6.2 Consultation and public participation

6.3 Overview

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6.4 Consultation and public participation

Consultations for the proposed construction of Kitale – Endebess – Suam Road was carried out in two phases namely general indepth interviews followed by consultative stakeholder and public participation. In-depth consultations were conducted with key informants including the County Government and National Government Coordinators (the County and deputy Commissioners, Chiefs and Assistant Chiefs), as well as GoK heads of departments (NEMA and agriculture), civil society, CBOs, farmers, land owners and traders along the road corridor.

The in-depth interviews were used as a tool for stakeholder identification and mobilization as well as collection of baseline data and information. In addition, it provided an opportunity to the participants to raise their fears and concerns and make recommendations as pertains to the project road. The persons consulted during the project review activities are presented in the annex.

6.5 Stakeholder consultation meetings

Two stakeholder consultative participation meetings were held at Kitale club on 14th/4/2015 and another at Aturkana hotel. In both meetings, participants included the National and County Government, Civil society and the private sector. A list of participants including minutes of this meeting is attached to this report.

6.6 Public consultation meetings

A total of seven consultative public meetings were held along the project road between 13th and 117th April 2015. The venues of these meetings including dates is presented in the following table while detailed minutes of the proceedings are annexed to this report:

Table 9: Stakeholder/CPP Venues and Levels Of Participation

SUB-COUNTY	LOCATION	VENUE	DATE	TIME
Trans Nzoia West	Milimani, Grassland, Municipality and Kibomet	Kitale museum	15/04/2015	9.30 am
	Tuwani & Bidii	Barabara Mpya	15/04/2015	2.30 am
	Matisi	Matisi market	16/03/2015	9.30 am
Kwanza	Endebess	Endebess	13/04/2015	9.30 am
	Chepchoina	Mowlem Market	13/04/2015	2.30 am
	Chepchoina	Kimase Market (assistant Chief's Office)	16/03/2015	2.30 pm
	Chepchoina	Chepchoina Market	17/04/2015	9.30 am

Consultatations with Mt. Elgon flower staff

Stakeholder meeting at Kitale Club

	
CPP meeting at Matisi	CPP meeting at Kimasei

Plate 18: Consultative meetings

6.7 Summary proposals from stakeholder and public consultations

6.7.1 Community facilities

1. Mowlem dam should be filled with cotton soil from the road or be given protection like fencing. During procurement, use local resources to alleviate poverty and reduce costs. In addition, all quarries – existing or to be done should be refilled. This will reduce Malaria vector breeding and increase.

2. Construct a community social hall at Mowlem in liason with a local CBO which will be left manning it for sustainability purposes

3. Provide hawkers with modern stalls near the road which will be managed by the well organized group of traders (e.g BP Traders, Kamukunji Kiosk Owners, Laini Moja Furniture And Welding Workshop Owners, Kitale Tomto Wholsellers/Loading and Offloading, Chanuka Market Vegetable Sellers, LainiMoja Nursery Tree Sellers and Chanuka Fish Mongers). Each of these groups will however need to formalize their registration status and be trained (capacity building in management) through KeNHA's CSR.

6.7.2 Administrative/Government facilities

1. Provide houses for the police to enhance and improve security as crime rate at Mowlem is high

2. Provide office for the Chief at Chepchoina

3. Tom Mboya health centre should be incorporated for improvement/modernization and used as the treatment center for workers during road construction
4. Social facilities within 600meters along the project road should be provided with access roads. The access roads proposed for tarmacing include:
    i. Trans Nzoia County hospital
    ii. Endebess health centre
    iii. DC's office in Endebess
    iv. At the stadium there is a land with a bus park and the access road to this park should be accommodated.
    v. Improve access to Mt. kenya university by repairing the timber bridge
    vi. Suam in Uganda side has security roads. There is therefore a need to incooperate these on Kenyan side
    vii. Extend the road to the cold room in Mt. Elgon flowers

6.7.3 Design and traffic management

1. The Webuye road interchange should have an overpass.
2. The dual road should start from Maili Nne and proceed all the way through Kitale town until the Olobolo junction including Chanuka area.
3. Provide a lorry parking near the show ground to ease traffic during construction.
4. Construct lorry parks at Endebbess and at Suam include where also a lane for the lorries heading to the borders should be provided. These lorry parks should be provided with enough lighting and sanitation facilities.
5. Suam boarder point should be designed and constructed to a one stop boarder post standards
6. At the junction to former DC's office and the new one, the two round-about should be merged to be one to ease traffic.
7. Provide appropriately designed stage at the school of the disability in Kitale for the physically challenged in this institution.
8. A bypass for Kitale town should be considered.

9. We Provide pedestrians and Bodaboda lanes along the road as you enter and leave Kitale town.
10. Laini Moja road should be joined to the main road.
11. In Kitale town, provide street lights along the full length of the dual carriage.
12. The hawkers between Kitale and Chanuka should be compensated and provided with modern stalls for to continue their business.
13. At Matisi, put up trader's stalls along the road
14. At Endebess the road should be widened to ease vehicles movement from both sides.
15. Harmonize the two roads leading to Suam at Endebess and put up road signs
16. The road past Endebess should be re-aligned
17. Matisi to Endebbes is swampy and the design should emphasize on road strengthening in this area with appropriate drainages

6.7.4 General

1. Reforestation and restoration of trees removed during construction along the road should be undertaken. More important is that the project should avoid aged trees along the Kitale town road section
2. Quarries should be hired from the locals to promote their welfare
3. Facilities constructed during construction (buildings, water, etc) should be left behind at the end of the project to be used as for public means.
4. Social facilities within 600m along the roads should be provided with access roads.
5. Provide hawkers with modern stalls near the road in every market centre or alternatively put up an open air facility to assist those trading there.
6. Provide Mlika Mwizi lights in every market along the project road

8 ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS

The purpose of the ESIA of the road project is to improve decision making and to ensure that the project progresses in a sustainable approach. The ESIA identifies ways of improving the project environmentally and socially by preventing, minimizing, mitigating, or compensating for adverse impacts.

These measures will help to avoid potentially costly remedial measures. The proposed road project activities are likely to have potential impacts on natural and human environment. These impacts can be categorized in various ways. They can be grouped according to their nature, into positive or negative impacts, random or predictable impacts, cumulative, local or widespread impacts, temporary or permanent impacts, short- or long-term impacts or even their level of magnitude.

8.1 Sensitive Environmental and Social Features along the Road

The Table below lists the environmental and social features along the road which will require special care during construction.

S/N	Chainage	Features	Comments	Picture
1	0+000	End of Eldoret-Kitale Road and start of the project road at show ground junction.	Possible losss of trees. Predominantly; Eucalyptus, Nandi Flame, ficus benjamina and Jacaranda spp.	 
2	0+400	Kitale Museum on the left side of the alignment		
3	0+500	Approximately 50 trees on the right of the alignment	Eucalyptus, Jacaranda and croton megalocarpus spp.	

S/N	Chainage	Features	Comments	Picture
4	0+700	Kiboswa petrol station on the right of the alignment	Care should be taken to avoid damage that could lead to ground water seepage	
5	1+900	Highway KAG church	Noise receptor during worship hours	
6	2+600	Mt. Elgon Academy to the left of the alignment and Deep sea resort on the right	Noise and dust receptor during construction phase	 
7	2+700	Stretch of Eucalyptus trees on the right of the alignment	Possible loss of trees	
8	3+000	Kenya Assemblies of God Kitale on the left of the alignment	Possible noise receptor during worship hours	
9	3+100	The Heart of Worship Family Church on the right of the alignment	Possible noise receptor during hours of worship	

S/N	Chainage	Features	Comments	Picture
10	3+200	Kanisa la Kristo on the right of the alignment	Noise receptor during worship hours	
11	3+300	Veterinary shopping centre	Possibility of noise pollution, dust pollution and safety concerns especially during the construction phase	
12	3+400	Wells of Restoration Church on the right side	Noise receptor during worship hours	
13	3+500	Bethel Church on the left side	Noise receptor during worship hours	
14	3+550	Apostolic Faith Church on the left of the alignment	Noise receptor during worship hours	
15	3+800	Redeemers Faith Ministry on the right		
16	3+900	Faith Care School on the right side of the alignment	Possibility of noise pollution, dust pollution and safety concerns especially during the construction phase	
17	4+000	Lifeline of Churches Ministry and School on the right of the alignment	Noise receptor during construction phase	

S/N	Chainage	Features	Comments	Picture
18	4+200	Frana Academy and Apostles of Christ on the left of the alignment	Noise receptor during construction phase	 
19	4+400	CFF Church on the left side	Noise receptor during worship hours	
20	4+500	Kenya Assemblies of God Tumaini Church	Noise receptor during worship hours	
21	4+600	Tumaini Baptist Church on the left of the alignment	Noise receptor during worship hours	
22	4+700	Catholic Diocese of Kitale on the right side	Noise receptor during worship	
23	5+000	Resa Preparatory on the left of the alignment		
24	7+100 to 19+000	Start and end of eucalyptus, cypress, neem, whistling pines, croton megalorcapus and young grevillea trees both on the right and left of the alignment	Possibility of tree loss	 

S/N	Chainage	Features	Comments	Picture
25	11+400	Kenya Seed Company Staff Houses and Seed Driers Section on the left of the alignment	Possibility of noise pollution, dust pollution and safety concerns especially during the construction phase	
26	11+700	Agricultural Development Corporation Engineering Services	Possibility of noise and dust pollution especially during the construction phase, possible loss of trees if clearance extends beyond road reserve	
27	19+600	Office of the Deputy County Commissioner Kwanza Sub-County on the right of the alignment	Possibility of noise and dust pollution especially during the construction phase	
28	19+900	Bright Star Hotel on the right of the alignment	Noise receptor during construction phase	
29	20+000	Kenya Assemblies of God Endebess Church on the left of the alignment	Noise receptor during worship hours	
30	20+800	River Sabwari bridge	Care should be taken during construction to prevent siltation of the river	
31	21+500	Township Education Centre on the left of the alignment	Possibility of noise, dust generation and safety concerns especially during the construction phase and operational due to anticipated increase in traffic	

S/N	Chainage	Features	Comments	Picture
32	21+800	St. Pius Catholic Mission Endebess	Noise receptor during worship hours	
33	23+000 to 24+100	Start and end of Jacaranda trees on both the right and left side of the alignment	Possible loss of trees	
34	24+290	River Kaibei Bridge	Care should be taken to prevent siltation of the river.	
35	25+600	Low lying power lines within road reserve	Caution should be exercised during pre-construction and construction phase	
36	26+500	Abandoned quarry filled with turbid water on the left of the alignment. Provides water for livestock and is one of the proposed hardcore sites	Consultation required with locals to avoid conflict over water. Rock may require blasting hence causing noise and vibrations in the neighborhood	
37	29+100	Naifarm Primary School on the left of the alignment	Noise and dust receptor especially during construction. Expected increase of traffic raises safety concerns for pupils	

S/N	Chainage	Features	Comments	Picture
38	29+300	St. Mary's Naifarm Secondary School on the left of the alignment	Noise and dust receptor especially during construction. Expected increase of traffic raises safety concerns for students	
39	31+300	Assistant Chief's Office Chepchoina Sub-Location on the left of the alignment	Noise receptor during construction	
40	34+100	Chepchoina Ward Office on the right of the alignment	Noise receptor during construction	
41	36+600	Japata Secondary School on the right of the alignment	Noise receptor during construction	
42	40+500	River Kaptega Bridge	Care should be taken to prevent siltation of the river.	
43	41+000	Kenya Forest Camp on the left of the alignment	Noise and dust receptor during construction phase	

S/N	Chainage	Features	Comments	Picture
44	45+-200	End of project road, River Suam Bridge at the Kenya-Uganda border.	Care should to prevent siltation of the river. Offices will be a noise receptor during construction	
		Government of Kenya Immigration Offices/ KRA Offices		

8.2 POTENTIAL POSITIVE IMPACTS

- The additional benefits from the expected increase in economic activities will translate into higher income levels of the households and therefore reduced poverty levels.
- Improved transport system and accessibility will reduce travel time, enhance comfort and safety and lower costs associated with an increase in public service vehicles. It will also enhance accessibility to the various institutions namely health centers, places of worship and educational facilities.
- A majority of unskilled labour will be sourced from the local residents during the construction of the road thereby creating new jobs. Indirect employment will include sub-contracted works and support businesses including food kiosks
- Through labour recruitment locally the workers will have an opportunity to learn an array of skills that relate to road construction.
- The anticipated efficient, reliable and cheap transport, will enhance rapid transportation of perishable farm produces (vegetables and fruits) to markets, increase acreages under crop production and improve marketing of agricultural products. Improved production of crops and enhanced transport may call for establishment of agro-processing plants to process the huge supply of fruits and vegetables. Improved transport means will induce for efficiency and multiplicity of transport alternatives to be availed as currently, farmers rely on trucks and drought animals to transport farm produce
- The upgrading of the project road can be expected to increase women's access to and utilization of education and healthcare, thereby improving their general well-being.
- Reduced routine maintenance and vehicle operating costs as the road is currently an earth road and the government and the local authorities spend substantial resources in its maintenance each year,

- Increase in land values along the project corridor by over 40%;
- Improved response to emergency services.

Suggestions on enhancing the positive impacts

Most of the aforementioned positive impacts are socio-economic in nature. To enhance their impacts will require a programmatic approach. This will include, but not be limited to the following:

- The Contractor(s) who carry out the construction works should consider sourcing non-skilled labour from the project area.
- Long-term regional economic planning taking into account the improved infrastructure as the key economic driver.
- The Government could provide incentives to investors in the area, and promote development of sectors such as agriculture, industries, tourism and livestock.
- Regular maintenance of the road
- Pro-active planning in anticipation of enhanced immigration to the area.

The above measures are of course beyond the scope of the Ministry of Roads and KeNHA since they are cross-sectoral in nature.

8.3 POTENTIAL ADVERSE IMPACTS DURING CONSTRUCTION AND OPERATION

8.3.1 Soil Resources

Background

The main types of erosion occurring in the area are splash erosion, rills, gullies, sediment deposition and landslides. A steep slope, low vegetation cover, erosive soil, high intensity rainfall and improper soil, crop and water management are factors leading to, or increasing, erosion. Erosion occurrence is more common in areas where are the dominant soil type is lateritic gravel more evident as rills or gullies that are common beyond Km 22.

Plate 19: Erosion on the left of the alignment in Endebess area

The project area receives moderate rainfall and which when combined with the terrain generates substantial soil erosion. The dominant soil type is prone to soil erosion, especially road sections crossing undulating landscape in Chepchoina.

Construction phase

The area experiences very high rainfall with heavy downpours during the wet season of March to June. Typically during construction, soil disturbance occasioned by site preparation mostly excavation, vegetation clearance and stockpiles could generate new soil erosion.
Soil erosion will manifest itself during both construction and operational phases of the project. However the impacts are expected to be higher during the construction phase when the road acts as a barrier to run-off occasioning concentrated water flow and enhancing scouring of the road embankment and side drains.

Since the road is already in existence, impacts, which are associated with the road acting as a barrier that concentrates flow, have already been seen and noted.

In the event of torrential rains, construction activities may cause soil erosion in the following ways:

- Heavy vehicles used during construction activities compact soils, resulting in the reduction of their infiltration capacities, thus initiating soil erosion and possible gully formation.
- The concentration of flows at both inlets and outlets of culverts may cause scouring. Increases in flow volume within a narrow channel and enhanced speed may enable the flow to scour and cause soil erosion. Side drains in areas with steep slopes have a similar effect.
- Clearing of vegetation especially *sporadic Eucaplyptus trees* along the roadside during construction will cause a reduction of the vegetation cover within the RoW. The soil is then exposed to soil erosion.

Soil erosion arising from road construction related activity could be both a short and long-term impact depending on whether measures are put in place to arrest it. The rate of soil erosion tends to increase with time. Therefore initially soil erosion will have a small magnitude effect, but once gully erosion has been initiated then the impact will have a progressively larger magnitude effect, following repeated episodes of torrential rains.

Operation phase

Optimized new drainage structures over the current and realigning approaches to the current drifts and improved capacities of the new drainage structures should generally improve on drainage and in combination with specific erosion protection works will reduce soil erosion from that currently

experienced. In fact soil erosion occasioned by overland flow could impact on the road more than the road would cause soil erosion as has been noted with the current road.

Mitigation measures

The success of mitigation measures for soil erosion depends upon three factors:

- *The design of the road's drainage*
- *Stabilisation of the soil along the roadside and in the road reserve*
- *The cooperation and participation of the local community*

- *Specific engineering solutions should be implemented to mitigate soil erosion. Soil may erode along the road alignment, particularly during the wet season (April through October) in the initial years after decommissioning.*

Some of the engineering measures include:

- *All earth cuttings need to be at a gentle angle, wherever possible and economic, in order to allow vegetation to grow. Steep side-slopes tend to result in seeds washing away rather than having a chance to become established.*
- *Soil holding structures should be constructed in very loose soils especially along steep slopes immediately around the river bridges of Kaibei, Sabueni and Mubere*
- *Culvert outfall should be lined for an appropriate distance, especially around Mowlem area*
- *Scour checks should be constructed alongside drains on steep slopes*

Stabiizing using vegetation cover

It is proposed that KeNHA partners with the Kenya Forest Service to establish ground cover preferably with perennial trees. This collaboration can focus on the four new bridges at rivers Sabweni, Kaibei, Mubere and Suam. The tree cover should be established up and downstream of the bridges. KFS will assist with selection of approporiate species and silviclutural management of the trees to improve survival and performance

8.3.2 Hydrology

Baseline

There are a number of rivers in the project region with River Nzoia catchment forming the dominant drainage system in the area. The river drains the county with its major tributaries Ewaso, Rongai, Koitobos and Ainomaget rivers. These rivers flow into Lake Victoria through River Nzoia while Suam River drains into Lake Turkana. Most rivers flow all year round causing some flooding in Namanjalala and Endebess due to vegetation cover depletion.

The alignment crosses 4 major rivers namely; Sabueni River, Kaibei River, Mubere River and Suam River at the border of Kenya and Uganda which is also the project end. All these rivers originate

from the highlands of Mount Elgon and flow from east to west direction crossing the project road from left hand side to the right hand side.

According to recognized run-off coefficients, run-off from gravel surface is the same as that of a paved road. This implies that the project will not lead to a significant change in run-off due to the new paved wearing course.

Construction phase impacts

Impact on hydrology will mainly be manifested in water quality and very little in quantity. The major rivers that intersect the road could be contaminated in two ways:

1. Through enhanced sedimentation through soil disturbance accompanying excavations, cut and fill and activities associated with bridge construction
2. Through contamination by accidental oil spills from construction machinery and traffic, cement and bitumen.

Operational Phase

The conventional structures used to drain water are culverts, side drains, miter drains and bridges. Most culverts concentrate flows at their inlets and outlets resulting in localized increased rates of flow, and consequently potential for scouring, especially at the outlets. Such soil erosion could endanger the road itself, and be a hazard to traffic. In addition, the water disposed from such concentrated flows could enhance erosion and gully formation.

As this is an existing road, it has been possible to see some of the effects of changes in hydrology as a result of the road's presence. Whereas there are many adequate drainage structures along the road, some drainage structures have been adjudged inadequate, or in poor condition, and will require re-designing and repositioning. The design of the upgraded road is largely expected to mitigate, rather than enhance impacts on drainage. On balance, this is a positive impact of the project. No new negative impacts on drainage are foreseen.

Mitigation measures

In the main this impact is largely positive since the new design will mitigate the current impacts associated with drainage.

The drainage structures have been designed based on 100 year flood return period for bridges and culverts and this should accommodate the expected flows through the 20 year design period of the road,

This being an agricultural area, directing drainage from mitre drains and culverts to farms will require prior consent of the owner of the land. Generally this may involve some form of compensation.

Importantly such outfalls should be directed to holding ditches but where the flow is substantial then the drainage should be lined for some distance and velocity control measures employed.

8.3.3 Air quality

Baseline

Air quality is defined by ambient air concentrations of specific pollutants determined to be of concern with respect to the health and welfare of the general public. The project roads is largely rural and currently of gravel standards hence fugitive dust generated by road traffic constitute the main air pollutant.

Construction phase

Construction activities associated with the project are expected to have only short-term adverse impacts on local air quality and are reversible. Such impacts would be primarily caused by increased emissions of carbon monoxide, hydrocarbons, and nitrous oxides from construction traffic. Considering that the road is unpaved, dust generation above baseline ambient levels are not expected to be significant.

The following receptors were identified:

0+000	African Gospel Church and Elgon View Hotel both on the left of the alignment
0+600	Kitale Museum on the left of the alignment
0+900	Boswa petrol station on the right of the alignment
2+600	Deep sea resort on the right of the alignment
3+000 to 3+600	Start and end of veterinary estate on the right side of the alignment
3+900	Faith Care school on the right of the alignment
4+400	Frana Academy on the left of the alignment
5+000	Matisi Market
5+200	Reisa Preparatory School on the left of the alignment
5+700	Raphael's Health Centre and Maternity on the left of the alignment
5+800	Matisi Primary School on the left of the alignment
5+850	Matisi Friends High School on the left of the alignment
5+900	Titan Academy on the left of the alignment.
6+000	Matisi Police Post on the left of the alignment
6+200	Kings and Queens High School.
6+700	Amani clinic
6+500	Seed of Hope Academy, Orphanage and Dispensary on the right of the alignment
7+900 to 8+900	Start and end of residential area both on the right and left of the alignment
11+400	Kenya Seed Company Staff Houses and seed driers section on the left of the alignment
19+600	Office of the Deputy County Commissioner Kwanza Sub-County on the right of the alignment
19+800	Baraka Hotel on the left of the alignment

19+900	Bright Star Hotel on the right of the alignment
20+200	Kenya Assemblies of God Endebess on the left and Endebess District Hospital on the right of the alignment
20+400	Endebess Police Station and Endebess Center Primary School both on the right
21+500	Township Education Centre on the left
22+200	Elgon Junior Academy on the left
22+700	Kapkures Primary School on the left
26+000	Mowlem Shopping Centre
29+100	Naifarm Primary School on the left of the alignment
29+400	St. Mary's Naifarm Secondary School on the left of the alignment
31+400	Assistant Chief's Office Twiga Sub-location, Chepchoina Location on the right side of the alignment
34+600 to 35+100	Start and end of residential area on both the left and right of the alignment
35+700	Chepchoina Centre
36+300	Chepchoina Dispensary on the right of the alignment
36+400	Chepchoina Centre School on the right of the alignment
36+200	Japata Secondary School on the right of the alignment
38+800	VCT, Anderson Medical Centre, Anderson High School, Mt Elgon Trust and MET Children's Home on the left of the alignment
39+200	Mount Elgon High School on the left of the alignment
39+900	Mount Elgon Rural Housing Project on the right of the alignment
41+200	Suam Forest Station camp on the left side
41+700	Start and end of residential area on both left and right sides of the alignment
45+200	Government of Kenya Immigration Offices at Kenya-Uganda border

Operation phase

Vehicle travel along unpaved road surfaces, especially along diversions and excavation of bare ground surfaces would create fugitive dust emissions. In addition to fugitive dust, project construction activities would generate tailpipe emissions from mobile heavy equipment and increased vehicular traffic. In a regional context, the daily equipment emissions associated with project construction, even during maximum-intensity work periods, would be relatively minor. Similarly, the road is not expected to lead to purchase of new vehicles that sould be significant in the sectoral context or at national scale. This implies no new long term effects on air quality is expected to occur. This notwithstanding the projected increase in road traffic along the road would result in increased daily emissions of carbon monoxide, hydrocarbons, and nitrous oxide. However adverse effects on regional air quality is not predicted to be significant even if the projected increase if traffic materializes.

Considering the prevailing conditions in the project area, dust pollution is potentially the most important source of pollution. Concentrated construction activities across the towns on the project road could lead to sustained generation of dust, as opposed to sporadic generation of dust by vehicular transport.

This sustained high level of dust could impact negatively on the people who spend considerable time within the area adjacent to the road, such as shopkeepers.

Whereas the public can withstand dust as a trade-off for better infrastructure, the workers may not have the luxury of such a trade off. Construction workers at the road construction sites, quarries and borrow pits will be exposed to high dust levels under hot and dry environmental conditions for many hours each day. This impact, if not well mitigated could have very serious health implications on the workers.

Mitigation measures

- *Use dust suppressants as far as possible, especially within the towns and within the environs of sensitive institutions*
- *All workers should wear dust masks at all times when at the sites of high dust generation*
- *Warn the neighbourhood of possible generation of dust beyond normal levels*
- *Construction machinery should be well maintained and low sulphur diesel should be used*

8.3.4 Vegetation resources

Baseline

At Suam, the road crosses part of Suam Forest Reserve which is dominated by indigenous trees. Currently the forest has limited access to people from outside the area due to the poor condition of the road. Whereas it crosses forest land, natural vegetation in this section has been largely degraded and replaced by exotic tree species, thus biodiversity is already compromised. Furthermore the project will mostly be restricted to the current road reserve which has good vegetation cover but poor species diversity. The few sections that will be realigned are mainly covered with agricultural crops and exotic trees. In some cases the local farmers have planted crops within the road reserve.

Construction phase

8.3.4.1 Impact on flora related to clearance and earthworks

The vegetation cover in the project area is substantial, though the dominant species are exotic species that are not of conservation concern. Construction of the road will be accompanied by clearance of vegetation along the roadside, clearance for construction of access roads and other civil works. Impact of the project on vegetation is thus very specific to the site of the activities and therefore localized to the road corridor and to limited off-site areas. There are tree boulevards in some sections of the road and loss of valuable vegetation could be as follows:

	Chainage	Description	Possible impact	
3	0+500	Approximately 50 trees on the right of the alignment	Eucalyptus, Jacaranda and *Croton megalocarpus* spp. Within the road reserve.	
7	2+700	Stretch of Eucalyptus trees on the right of the alignment	Possible loss of trees if construction extends beyond the road reserve.	
24	7+100 to 19+000	Start and end of eucalyptus, cypress, neem, whistling pines, croton megalorcapus and young grevillea trees both on the right and left of the alignment	Possibility of tree loss if construction extends beyond the road reserve	 

Additional vegetation clearance at quarries and borrow pits, and camping sites will also contribute to overall vegetation loss. However, the diversity of natural vegetation in the project area is low, suggesting that vegetation clearance will not cause loss of rare species, species of medicinal and of major commercial values. No endangered trees or other plant species that are endemic to the area would be affected. The impact of vegetation clearance for construction is therefore likely to be minor if tree lines along some sections are preserves as detailed in design.

Potential poaching of trees by the contractor's workforce for fuelwood could lead to further degradation of Suam forest.

Operation phase

The road ends at Suam where it crosses the edge of Suam forest. This forest is a protected conservation area which is dominated by indigenous species. Whereas the direct impacts of the road on the forest is minimal since the road will be within the existing road reserve, the road will certainly improve access to the forest. This could encourage over exploitation of the forest resources both legally and illegally, thereby accelerating degradation of the forest. The converse could also

happen where the road encourages importation of forest resources from Uganda and thereby conserving Suam and other forest resources in the region.

Mitigation measures

- *Keep construction activities to the road reserve and AVOID CUTTING THE TREES LINING THE ROAD that are found sporadically between Km 0+500 to 19 +000*
- *Vegetation should only be cleared where it will interfere with road construction and/or present a hazard to traffic. In such instances, the local community should be given a chance to harvest the vegetation if they so wish. Construction workers could also be allowed to use cleared materials for firewood.*
- *As far as practicable, materials should not be stockpiled on vegetated areas. In areas where soils are compacted during road construction (such as along temporary access roads) the soil should be loosened through ripping, after completion of the works, to enable infiltration of water and growth of plants*
- *The Kenya Forest Service should plan to improve surveillance and monitoring movements of forest resources within the area. Extra forest rangers could be hired if the situation demands extra protection.*
- *KeNHA could support the current efforts at establishing the indigenous tree buffer strip on either side of the road beyond the road reserve. This could be done as a partnership.*
- *Partner with KFS by providing complementary resources needed to improve the afforestation efforts currently on-going at Suam forest. KFS estimates that such support could in form of nursery establishment and outplanting of seedlings.*

8.3.5 Faunal resources

Baseline

The project road will serve Mt. Elgon which is a protected area and hosts a variety of animals of conservation value. However the bulk of the project road is through a landscape that has undergone considerable degradation over the years due to settlement and agriculture, thus there are very few species of conservation value. Although none of conservation value, different animal species are found in a variety of places such as on trees, rocks, rivers, swamps, caves, and other microhabitats situated in the region. They are comprised of mammals, birds, reptiles, insects, amphibians and molluscs.

Construction phase

Discarded hazardous waste can be harmful to wildlife as much as humans. This could potentially be an issue at the section crossing Suam forest. Similarly empty bitumen containers could be harmful especially to birds that could patch on them and get stuck. In the past, contractor's workers have been known to hunt wild animals for game meat and sometimes for sale. Other than the wild ungulates such as antelopes, other wildlife such as monkeys have been known to be hunted for their

meat. This could have an impact on the endangered species found in Mt. Elgon ecosystem that include the giant forest hog, oribi, rothschild girrafe, turacos and red-fronted parrots.

Mitigation measures

- *Empty containers and other waste should be managed carefully to avoid exposing wildlife to possible poisoning especially at the section crossing Suam forest*
- *The contractor should ensure that his employees do not poach wildlife for sale of for their consumption*

Operation Phase

This will largely relate to the long-term exposure of the Mt. Elgon conservation area. Impacts could be either positive or negative or even a bit of both. Firstly, it can be positive in the sense that the park will be more accessible to tourists, thus creating new economic opportunity in the area. The local population may be motivated to protect the wildlife in order to sustain the new economic opportunity. Furthermore the Kenya Wildlife Service will be better facilitated to improve surveillance within the park and its environs.

Secondly, it could be adverse on the wildlife since improved access could encourage commercial poaching since markets beyond the project area can be easily accessed.

Mitigation measures

- *Upon completion, the KWS should promote the park for tourism but at the same time improve surveillance. Should tourism improve then the park will realize improved revenue that can be ploughed back to conservation.*
- *KWS could enhance the positive impacts by promoting a Private Public Partnerships in the development of tourist facilities within the neighbourhood of Suam*
- *Workers should be sensitized on the importance on wildlife so as to avoid poaching or killing wildlife for bush meat*
- *A linkage between the contractor and the local Mt. Elgon Man and Biosphere Implementation committee should be established to monitor any impacts on fauna*
-

8.3.6 Noise and Ground Vibration

Noise and ground vibrations can be defined as unwanted sound. However, sound and vibration are measurable, whereas noise is subjective. The relationship between measurable sound and vibration and human irritation is the key to evaluating noise impact.

The challenge to evaluating noise impact lies in determining what amount and what kind of sound constitutes noise. The majority of people exposed to noise are not in danger of direct physical harm. There are several generally accepted conclusions about noise as an environmental impact:

- The effects of sound are cumulative; therefore, the duration of exposure should be included in any evaluation of noise.
- Noise can interfere with outdoor activities and other communication.
- Noise can disturb sleep, TV/radio listening, and relaxation.
- When community noise levels have reached sufficient intensity, community-wide objection to the noise would likely occur.

Individual responses to noise are difficult to predict. Some people are annoyed by perceptible noise events, while others show little concern over the most disruptive events. However, it is possible to predict the responses of large groups of people — i.e. communities. Consequently, community response has emerged as the prime index of noise measurement.

While noise emanates from many different sources, transportation noise is perhaps the most pervasive and difficult source to avoid in society today. Highway traffic noise is a major contributor to overall transportation noise and is generally of most concern within the project area.

Construction phase

Activities associated with road construction will cause a temporary increase in noise levels in the vicinity of the construction sites. This should be of short duration, however, and should not produce any long-term adverse effects within the region.

This impact can be of concern only at construction sites within the larger urban environments of Kitale, Endebess and Suam. In addition there are over 30 noise-sensitive institutions that are within 300m of the road that include schools, health facilities, colleges and places of worship.

Where explosives will be used, especially at quarries, there will be serious noise and vibrations in the vicinity of the site. Certain degrees of explosion can be destructive to structures particularly houses. Fortunately most of the potential material sites are located in land far removed from human settlements and activities. In any case impacts associated with explosions are sporadic and short term.

The most critical noise receptors are listed below:

00+200 LHS	Elgon View Hotel
00+400 LHS	Kitale Museum
2+600 LHS	Mt. Elgon Academy
2+900 LHS	The Heart of Worship Church
3+000	Veterinary Estate, Kenya Assemblies of God Kitale and Kanisa la Kristo
3+400	Wells of Restoration Church
3+500	Bethel Church
3+700	Oasis of Love
3+800	Redeemers Faith Ministry
3+900	Faith Care School

4+000	Lifeline of Churches Ministry and School
4+200	Frana Academy and Apostles of Christ Church
4+500	Kenya Assemblies of God Tumaini, CFF Church and Tumaini Baptist Church
4+700	Catholic Diocese of Kitale
5+000	Resa Preparatory
5+100	Raphael's Health Center and Maternity
5+200	Matisi Pentecostal Church
5+400	King Jesus Faith
5+500	Matisi Primary School
5+600	Matisi Friends High School and Titan Academy
5+700	Kenya Good News Outreach Church
70+700	Kenya Police Post Matisi
5+800	A girls high school
5+900	Jesus is the Lord Elim Church
6+000	Kings and Queens High School
6+500	Amani Clinic
6+800	Seed of Hope Academy, Orphanage and Dispensary
7+700	Residential area
11+200	Kenya Seed Company Staff Residence and Seed Driers Section
19+400	Office of the Deputy County Commissioner Kwanza Sub-County
20+000	Kenya Assemblies of God Endebess
20+200	Endebess District Hospital, Endebess Police Station and Salvation Army
20+500	Endebess Centre Primary School
21+000	AIC Endebess
21+500	Township Education Center
21+600	Catholic Diocese of Kitale St. Pius Mission Endebess
22+000	Elgon Junior Academy
22+500	Kapkures Primary School
25+400	Church (No name)
25+900	Kenya Assemblies of God Mowlem
26+000	Miracle Revival Church
26+800	Full Gospel Church
29+100	Naifarm Primary School
29+400	St. Mary's Nai Secondary School
31+400	Office of the Assistant Chief Twiga Sub-location, Chepchoina location
33+900	County Government Chepchoina Ward Office

34+400	Residential Area
35+100	Kings Outreach Church
35+200	Kenya Assemblies of God
35+700	Church (No name)
36+100	Chepchoina Dispensary
36+150	Chepchoina Centre School
36+200	Japata Secondary School
38+800	Anderson VCT and Medical Centre, Anderson High School, Mt. Elgon Trust and MET Children's Home
39+000	Mt. Elgon High School
41+000	Kenya Forest Camp
41+500	Residential area
45+200	Government of Kenya Immigration Offices at Kenya-Uganda border

Operational phase

The operation and maintenance phases of the project will be accompanied by significant increases in traffic, much of which will be composed of heavy and medium goods vehicles, which will in turn increase noise levels significantly along the road. Furthermore, noise associated with vehicular traffic would be largely unavoidable.

Mitigation measures

- *At commencement of construction works, map all noise sensitive receptors and prepare a construction plan that avoids excessive noise within proximity of the receptors as appropriate*
- *Avoid loud noise during school hours when working close to the institutions*
- *Warn residents within 300m of quarries of intention to blast and the exact blasting time. To the extent possible, heavy vehicles should not be used at night across inhaibited areas especially Endebess and Chepchoina.*
- *Ensure that construction equipment is operating optimally and with operational noise mufflers where possible.*

8.3.7 Visual Intrusion (landscape disfigurement)

Baseline

Quarries and borrow pits, limited cut slopes towards the last third to Suam, that are anticipated and material stockpiles when exposed to the public, often leads to visual intrusion. The landscape within the project area is dominated by vegetated agricultural fields, pockets of woodlots and tree

plantations over undulating terrain. The project area is not a major tourist attraction neither is it extraordinarily scenic. However it might be an important tourist corridor for accessing Mt. Elgon National Park in the future.

Construction phase

Visual impacts could occur due to denudation occasioned by site works and, more importantly, quarrying and borrowing activities, The impact magnitude of the latter will be dependent on the location of the material sites and their management. A quick appraisal of environmental suitability of the sites are presented in Annex 3 of this report.

If the construction contracts specify that material sites/borrow areas and quarries are to be landscaped after use to blend with the landscape as far as is reasonably possible, visual intrusion associated with these activities would be swamped by the expansive landscape, hence impact would be minor.

Mitigation measures

- *The contractor should develop detailed material sites environmental management plans that must include rehabilitation plans. These will need to be approved by the RE*
- *For all quarries, comprehensive ESIA will need to be prepared by the contractor for submission to NEMA and a copy to the RE*

Operation phase

Quite often, broken down machinery, structures and other facilities are left on the camp site at decommissioning. This could create visual intrusion. The impact will depend wholly on the decommissioning standards set out in the contract details.

Mitigation measures

- *Spoil materials including solid waste produced at camping sites for road construction crews should be properly disposed.*
- *Prepare management and rehabilitation plans for the borrow pits and this is to be forwarded to the RE for approval*

8.3.8 Waste management

Baseline

Other than at the major trading centres and towns, the road traverses agricultural landscape where dominant waste is organic and, therefore, biodegradable. At the more populated commercial centres and market places, solid waste management is a perennial problem. This is mainly plastic paper bags that are discarded without much care. This often clogs drainage channels and an eyesore.

Construction phase

There is a wide variety of waste generated during construction. This includes debris, domestic and human waste, timber, stones, rock, metals, paper, plastics, etc. The quantity of waste can be substantial and can be both a health hazard and be of visual intrusion. Furthermore, there is potential for contamination of soils and watercourses as a result of improper disposal of liquid and solid waste from construction activities and construction camps.

The large number of used containers invariably have residual chemicals that could be poisonous to humans and other life forms if used to ferry cooking (humans) and drinking water for both domestic and wild animals. Disposal of containers of used oil, lubricants, paint, and other toxic substances, etc. should therefore be carried out with extreme care, so that individuals do not use them as water containers. Spoil material and earth waste from excavations are also produced and require careful disposal.

Mitigation Measures

- *Construction and domestic waste should be stored only in the specially designated places and removed and disposed of regularly. Disposal and burial of waste should be agreed upon in the established manner before commencement of the works. Discharge of any non-treated drain waters and waste to the rivers or on the surrounding land should be forbidden.*
- *Ensure that waste materials are properly disposed of to suitable locations. Partly inert waste materials (for example concrete from bridge reconstruction) can possibly be used as fill materials.*
- *Periodic inspection of waste storage areas and facilities at the construction works sites/camps helps to ensure proper handling of waste materials.*
- *Contractors should encourage reuse and recycling wherever possible to minimize residual waste.*
- *A handling protocol, e.g., waste storage away from public view, and provision of retention areas to contain accidental spills of toxic, hazardous, and harmful construction materials, such as caustic and acidic substances, oil, waste oil, diesel, and bitumen, should be prepared and implemented by the contractors.*

Other measures

Prior to the commencement of the construction program, the contractor(s) will prepare a Project Waste Management Plan (PWMP). The PWMP will:-

- Propose a minimization, collection, storage, treatment, re-use and disposal route for each waste stream
- Identify potential third party re-users

- Propose Incinerator types if required
- Propose location of waste storage and duties of site personnel with regard to waste management
- Identify and describe possible locations of disposal sites or long-term storage sites.
- State the methods for properly managing (i.e. training, storing, containerizing, labelling, transporting, disposing) wastes.
- Describe the transition of control from the contractors to the Proponent, including arrangements for wastes associated with commissioning.

8.3.8.1 Waste Management Plan

It is expected that the special specifications will obligate the contractor to dispose of different categories of waste appropriately. For example, steel wasted lengths may easily be taken by the *Jua Kali* (informal) Industry.

In general, the contractor will be required to develop construction specific Waste Management Plans prior to the start of construction work. At the start of the construction contract, the contractor will undertake a waste minimization/treatment/disposal study, guided by the project waste management strategy. The study will identify and quantify the expected wastes and describe:-

- Proposals for reduction, treatment processing
- Third parties to whom waste will be transferred for re-use
- Liaisons with the local Councils to identify and document suitable council disposal sites ground, landfill and incineration facilities.
- Other locations of landfills or waste storage sites to be adopted if local Council facilities are inadequate.
- On site incineration facilities to be adopted if local Council facilities are inadequate.

The findings of the study will be used in the development of the construction waste management plans which must adhere to the EMCA - Waste Management Regulations of 2006. At a minimum, these plans will include:-

- A consolidated summary of the applicable regulations and restrictions governing the generation, handling, treatment and disposal of wastes generated during the construction/commissioning phases of the Project.
- Any permitting requirements for waste treatment or disposal.
- Detailed method statement for each element of the waste management handling, treatment and disposal process
- Any third party agreements for waste handling, transfer or disposal

After construction of the road, the waste handling/disposal facilities established by the contractor under the construction program will be closed. If a waste handling/disposal facility procured by the contractor is closed, the contractors will be required to ensure that it is appropriately de-commissioned (i.e. including capping of any disposal sites) and the surface will be re-instated according to the Project Reinstatement Strategy. If the facility is retained, it will be transferred to the proponent.

8.3.9 Minimum Considerations at Material Sources

8.3.10 Hardstone Quarries

Quarrying is one of the areas that can lead to substantial impacts on the environment. Provisional hard stone material sites have been identified (see Annex), but it is noted that other new sites may be identified by the contractor(s). Below are some negative impacts that are associated with the quarries and broad guidelines for managing them.

Potential negative impacts

- Vegetation clearance and loss at the site, and along created access roads.
- Blasting could have substantial impacts as follows:
- The workers are exposed to risks of scattering rocks, dust and deafening noise during blasting.
- As some quarries may be close to the main road, motorists, although few, could be affected by sudden nearby blasts, which could lead to accidents.
- Large quantities of dust and noise can be generated during blasting, which could affect the workers.
- Blasting can adversely affect wildlife by scaring them, which in turn can affect their behaviour, breeding patterns, and in some cases can even cause death.

Mitigation measures

- The contractor will be expected to formalize licensing.
- Topsoil material resulting from stripping or associated operations should be stockpiled in raised areas so as to avoid being washed away by any sudden storm.
- The environmental rehabilitation measures needed (after completion of certain works) should be enforceable through provisions in the contract agreement(s) for the construction works.
- Blasting should take place at pre-arranged designated times and the affected public, within approximately 1 km radius, duly informed. Appropriate warning signs on the road will also need to be erected.
- Keep workers a minimum 350 m away from the blast spot to avoid scattering stones. If possible, machinery and other facilities should also be kept at least 200 m from the blast site.

These distances will, however, depend upon the charge power. The workers should return to the working zone 10-15 minutes after the explosion.

- The storehouses of explosives should not be kept on the sites; instead they should be delivered to the site as necessary from special storehouses managed by the contractor.
- Only qualified personnel should be allowed to handle explosives.
- Fence off the entire quarry to prevent wildlife and even the public, especially curious herds' boys from accidentally falling over the cliff.
- Development should be oriented so that grading and other site preparation is kept to an absolute minimum. Natural features, landforms, and native vegetation, such as shrubs and occasional trees, should be preserved to the maximum extent feasible.
- Any adjacent water facilities, or structures such as water pans, should be protected.
- Due to scarcity of water and hot windy conditions in the project area, sprinkling of water as a way of reducing dust may not be a sustainable measure to mitigate the potential dust pollution, which will particularly affect the workers. Whereas it is highly recommend that dust suppressants be used, it may not be very effective, hence it is advisable that the workers be provided with dust masks while in the quarry area.
- An attendant should be stationed at the entrance gate of the access road at all times, when the quarry is open, to control entry to the site. The entrance gate should be locked when the quarry is not in operation.
- Quarrying operations should be conducted in a neat and orderly manner, free from junk, trash, or unnecessary debris. Where in public view, salvageable equipment stored in a non-operating condition should be suitably screened or stored in an enclosed structure.

Post-closure recommendations

- Piles or dumps of quarry waste should be stockpiled in such a manner as to facilitate phased reclamation over the quarrying period. Such waste should be segregated from topsoil, etc.
- Topsoil should be spread on hard rock surfaces to allow natural colonization by vegetation over time. It is not realistic, under the prevailing conditions, to broadcast seeds or plant trees.
- At closure, all dumps of quarry waste and overburden should be used to landscape the area to conform to the surrounding topography as much as possible.
- Reclamation surfaces, however, should be provided with available native soils and vegetative debris recovered in quarrying and these materials should be placed in crack systems where plants could potentially propagate. To increase the potential for successful reclamation and to augment topsoil from the site, additional topsoil may be required to be imported to the site.

8.3.11 Borrow pits

Most of the mitigation measures for the hard stone quarries are also applicable to borrow areas. In summary, on completion of operations in a borrow area, the contractor should reinstate the entire area so as to blend with the surrounding area as much as is reasonably possible, and to permit the re-establishment of vegetation.

8.3.12 Enhanced Urbanization

Upon completion the project is expected to accelerate growth of centres along the road. Basically, the project will lead to rapid urbanization rate within the area of influence and will be typified by land use change, increasing property values with subsequent change in the local demography.

Construction phase

Construction phase may lead to a slight dip in urbanization rate due to the disruptions that will accompany construction. This is temporary in nature.

Operation phase

In tandem with the increased importance of the trading centres and towns will be an increase in population within these centres. The increase in urban population will in turn exert increased demand on land and other utilities. As mentioned elsewhere in this report, the road will provide motivation for urban development along its length and rapid appreciation of property values.

Mitigation measures

- *Proactive planning by the County Physical Planners*

8.3.13 Public Health

Construction

Potential public health and safety issues will be both directly and indirectly associated with the activities of the project. The direct impacts include effects of dust, noise and fumes from machinery and construction traffic, as well as noise and fumes from the expected increase in traffic along the road.

Construction workers will be most pre-disposed to these direct impacts during the construction phase. As discussed in other sections, pollution, noise and vibration during both construction and operation could have comparatively higher impacts on health in urban centres and sensitive institutions than in the rural country. The indirect impacts of the project on health and safety are associated primarily with human behaviour, and this includes the potential for transmission of STIs including HIV-AIDS.

Mitigation measures

- *Road construction workers should be informed about diseases that are prevalent in the project area, and how they can minimize their exposure to, and the transmission of, such diseases*
- *Conduct a yearly audit of occupational health and safety within all premises of the contractors and at sites of works as required by law*
- *The contractor should establish a clinic within the main camp with a full time nurse since health facilities in the area far between. The clinic should be linked to the Ministry of Health in order that the clinic can support the local community who may want medical attention.*

8.3.14 HIV/Aids

HIV/AIDS is a serious health and development problem in the project area. The HIV/AIDS prevalence rate in Trans Nzoia County stands at 7.2 %.

The major drivers of HIV/AIDS in the counties include engaging in unprotected sex, ignorance on safe sex practices, unwillingness to use condoms, ignorance on HIV status, commercial sex workers unsafe sexual behavior, drug abuse (drinking of illicit brews), high levels of peer pressure and family breakdowns.
Accompanying HIV/AIDS is prevalence of other sexually transmitted diseases whose infection rate mirrors that of HIV/AIDS.

Construction phase

One of the major health concerns related to the project is its potential to significantly increase the spread of HIV/AIDS and other sexually transmitted infections (STIs) in the local population and among the workers. The mobilization of a large workforce over a long period is likely to increase sexual activities in the area and the presence of the workforce may even bring in a number of commercial sex workers. From the data provided, a large number of the population is under the age of 50 (see section on demography) and being an active age group, the impacts of new relationships are highly likely. HIV/AIDS poses a big threat to development of the area because of increasing dependency ratio with an increasing number of orphans and street children. These could reverse progressive gains made in poverty reduction. The youth (15-49 years) are the hardest hit and this is a threat to the labour force of the region.

Operation phase

This is rather difficult to predict given that the socio-economic dynamics will change substantially during the life of the project.

Mitigation measures

A programmatic approach is proposed as contained in the chapter on HIV-AIDS and the ESMP

- *Mount regular HIV-AIDS awareness campaigns. Condoms should be made available to construction crews.*
- *Contractors should provide workers with sufficient accommodation for married couples to stay together.*
- *The Contractors should consider hiring a permanent nurse to attend to emergencies and to mount awareness campaigns amongst the workers.*
- *Health service providers should be regularly consulted to determine any changes in disease patterns which may be associated with road construction.*
- *KeNHA should hold regular discussions with their counterparts on any health implications of on-going road construction.*

8.3.15 Road safety

Baseline

Considering the road has been unpaved with low traffic, increased traffic and speed could cause road safety concerns including accidents.

Construction phase

Construction traffic, poor traffic control and inadequate signage could lead to road safety issues. Accidents, emanating from speeding vehicles and construction machines (among the operators during construction), may increase. Accidents could likely occur in sharp corners at Kimase, Twiga, and Matisi. The proposed design will straighten out the very sharp corners. In order to minimize the accidents, these sites should be provided with road marks, regulatory and cautionary signs and speed limits to reduce the accidents. During construction the road environs could experience fugitive dust that could cloud vision of motorists and pedestrians alike.

Operation phase

Improved roadways complete with an additional two lanes between Kitale and Matisi, and improved geometrics will undoubtedly encourage more vehicular traffic and higher average speeds. There will be increased possibility for accidents between vehicles, and with non-motorized transport such as cyclists, pedestrians and both domestic and wild animals.

Although the improved road will be designed to make it safer to travel at higher speeds, the likelihood of collision between vehicles will be reduced, but there could still be collisions between vehicles and/with pedestrians and livestock.

Mitigation measures

- *Contractors to develop the health and safety policy and procedures and educate all workers on the policy and the procedure*
- *Access roads for haulage trucks, used during road construction, should not be located near schools, hospitals and residential areas.*
- *Install appropriate reflectorized signs at road diversions.*
- *Provide sufficient road signs*
- *Suppress fugitive dust by regular watering especially during the dry season*

8.3.16 Resettlement and Compensation

A separate Resettlement Action Plan Report has been prepared where compensation and relocation measures and mitigation actions on land and property acquisition are clearly spelt out.

8.3.17 Socio-cultural impacts

Baseline

The project area is moderately populated, with density of about 367 people per square kilometre as of 2013 and is mostly rural. The Luhya community is the predominant community although there are many other communities present in the urban centres and within business premises in the area.

Construction phase

The Contractor is not obligated to employ the local community and this could bring people of alien culture to the area. This could bring resentment amongst the community considering that there is a large population of young unemployed locals.

Operation

There is a tendency for infrastructure to attract immigrants to the area. Property values will increase due to high demand and this could empower a section of the community while disenfranchising others. The projected immigrants will originate from elsewhere in Kenya and could lead to enhanced social interaction and networking. In addition, there will be cultural diffusion and to some extent, erosion of some values and practices.

Mitigation measures

- *Proactive planning on the part of the local county government*
- *Inform the community about the possibilities for changes in the local demography but without stoking resentment towards immigrants*

8.4 Climate change and potential impacts on project and project adaptations

8.4.1 Temperature

According to the Kenya National Climate Change Response Strategy, climate change is already being experienced in Kenya. For example From the early 1960s, Kenya has experienced generally increasing temperature trends over vast areas. Over the inland areas, the trends in both minimum (night/early morning) and maximum (daytime) temperatures depict a general warming (increasing) trend with time. However, the increase in the minimum temperatures is steeper than in maximum temperatures. The result of the steeper increase in minimum temperature and a less steep increase maximum temperature is a reduction in the diurnal temperature range (difference between the maximum and minimum temperatures (Table 15).

Table 10: Minimum Temperature trend from 1960 – 2010

Region	Trend	Magnitude (0)
Western	Increase	0.8-2.9
Northern & North-Eastern	Increase	0.7-1.8
Central	Increase	0.8-2.0
South Eastern Districts	Increase	0.7-1.0
Coastal Strip	Decrease	0.3-1.0

Table 11: Maximum Temperature trend from 1960 – 2010

Region	Trend	Magnitude (0)
Western	Increase	0.5-2.1
Northern & North-Eastern	Increase	0.1-1.3
Central	Increase	0.1-0.7
South Eastern Districts	Increase	0.2-0.6
Coastal Strip	Increase	0.2-2.0

From the Table above, the region has experienced an increasing temperature trend for the past 50 years and this increase may continue into the future.

8.4.2 Rainfall

Neutral to slightly decreasing trends are manifested in the annual rainfall series over most areas of Kenya. This is mainly due to an associated general decline with time of rainfall in the main rainfall season of March-May (the 'Long Rains') over most areas.

There is a general positive trend (increase) in rainfall events of September to February period suggesting a tendency for the 'Short Rains' (October-December) season to be extending into what is

normally hot and dry period of January and February over most areas. This may be attributed to possibly more frequent occurrences of El-Niño events occasionally coupled with relatively warmer sea surface temperatures over the western Indian ocean (along the coast of east Africa) and relatively cooler than average sea surface temperatures (SSTs) to the east of the Indian Ocean. This sea surface temperature pattern is conducive for enhancing rainfall over the country. Even in the absence of El-Niño conditions, this pattern over the Indian Ocean results into heavy rainfall during the 'Short Rains' season as was the case in 1961-62 and the recent 2006-07 rainfall events.

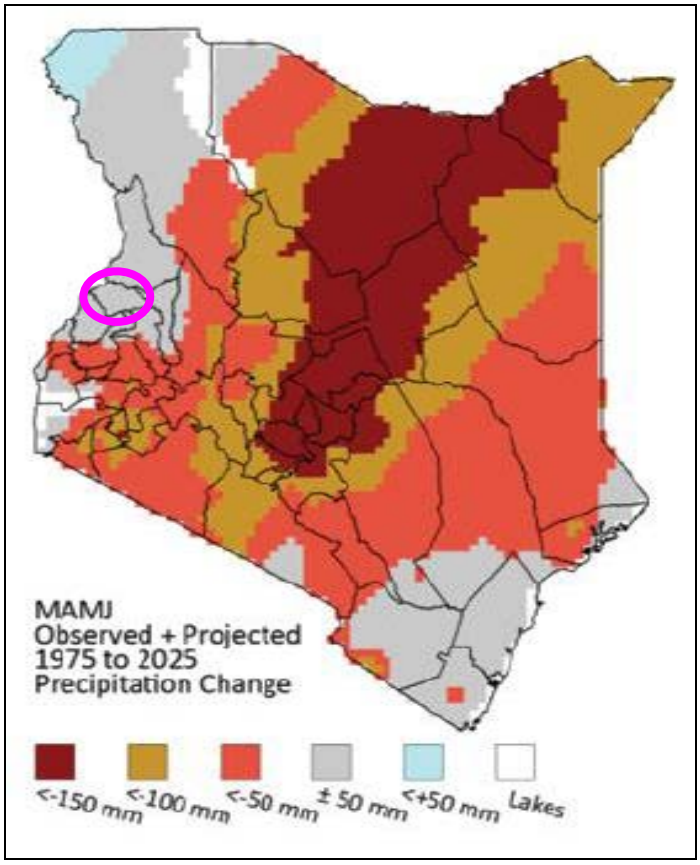

Figure 30: Predicted precipitation changes with climate change

The figure above provides predictions in changes that are expected in precipitation to year 2025. The predictions indicate a stable region that could experience a change in an annual climate change of only about 50mm in either direction. In this regard we do not expect a particularly significant impact of climate change as manifested in precipitation changes on the performance of the road.

Furthermore, and in general, annual highest rainfall events indicate the 24-hour intense rainfall amounts observed in the recent years are relatively lower than those in the early 1960s. Effectively, these values have been reducing (negative trend) with time. This however is not the case in coastal areas and northern Kenya where there is an indication of relatively more intense rainfall occurring more frequently.

Potential Impacts

As can be gleaned from the preceding sections, climate change could have low to insignificant impacts when the most critical factor, drainage is considered. However we conducted a screening procedure on all relevant climate related factors to assess climate related risks. The initial screening has been done by filling in a checklist. Risks considered are those resulting from temperature increase, precipitation change, wind speed change, sea level rise, solar radiation change, water availability, flooding, tropical storms, wildfire and landslide.

Table 12: Climate Risk Screening

Environmental Factors	Risk To Project
Temperature increase	Low
Wildfire	Low
Precipitation increase	Medium
Flood	Medium
Landslide	Low
Precipitation decrease	Low
Wind speed increase	Low
Sea level rise	-
Solar radiation change	Low

The project scores low on most accounts except flooding which was adjudged medium because changes in precipitation could still occur however subtle. In the event increases in precipitation occur then attendant increases in floods could undermine road drainage structures and foundations. In addition, short intensive rains which, however, are still not predicted for the region could result in flush floods with similar consequences on drainage structures. Overall therefore climate change impacts on the road is adjudged to be minimum and the little impact could be related to potential changes in precipitation and accompanying floods.

Mitigation measures

Kenya's climate change adaptation strategy proposes that physical Infrastructure including transportation and telecommunication Networks could be designed to ensure that the infrastructure is climate-proof over its lifespan, which includes carrying out geotechnical site investigations (GSIs) to determine appropriate sites for infrastructure development; factoring a maintenance component into all infrastructural development funds; and designing infrastructure that can withstand the prevailing climatic conditions, e.g. structures that can withstand strong winds, tides as well as high temperatures.

Adapting to climate change through design

Kenya's adaptation strategy missed the crucial element of drainage structures designs that can accommodate increases in flow volumes across rivers that are already associated with extreme weather events such as El Nino. As noted earlier the road crosses a number of rivers. To address this, hydrological study and analysis of the project area was conducted to predict peak discharges

for all watercourses that crossed the proposed road. The design floods at each crossing were estimated using Rational Method, TRRL Method and Soil Conservation Services (SCS) Method.

The flood frequencies adopted for the design of road drainage structures are as follows:

Type of structure	Design flood frequency	Check / Review (Years)
Earth ditches	5	10
Lined ditches	10	25
Pipe culverts	10	25
Box culverts	50	50
Bridges	100	100

The implication is that the design capacity of these structures would be able to cope with maximum levels that have occurred in the past and that are likely to occur within the 20 year life of the project.

9 POTENTIAL CUMULATIVE IMPACTS

Both AfDB Safeguard Policies and the Kenyan EIA Regulations emphasises the need for cumulative impacts to be considered at a project level. Cumulative impacts are those new impacts, or enhancements of existing impacts, that occur only because of the interaction of the construction and operation of the proposed upgrading of the Kitale-Endebess-Suam (C45) road project with "other" projects and plans, or from the interaction of different aspects of the proposed road project.

Impacts may occur from the compounding of an issue (e.g. pollution from different sources affecting the same receptor) or from changes to the baseline (e.g. future development may change the landscape character and thus the impact of the road in the future baseline). Where a particular impact affects different receptors, this is not a cumulative impact but a direct impact which is not considered any further in this Chapter. For example, the adverse impacts from silt laden runoff could have a detrimental impact on water quality, as well as contribute to a temporary increase in flood risk by contributing to blockages of small watercourses. In some circumstances standard assessment methods used in this ESIA take cumulative impacts into account. For example, the assessment of air quality and noise from the operation of the road (which are based on predicted traffic flows) considers the change in future traffic flows caused by other proposed developments that could induce or divert traffic onto the C45 road.

Likewise, the assessment of the impacts of the road on the economic viability of impacted farms considers cumulatively a number of separate issues in the one assessment. Further, silt pollution may be caused by a variety of reasons and from different locations of the site, which is considered cumulatively in the assessment.

9.1 Methodology

A qualitative assessment of the potential cumulative impacts has been undertaken. Good practice guidelines recommend that an EIA should assess the impacts of the development cumulatively with other developments only when there are likely to be significant impacts. When evaluating the potential for significant impacts there is often considerable uncertainty in the assessment.

There are specific impacts on over 50 receptors, mainly towns and market centres, schools and places of worship and health facilities that have been described elsewhere in this report. The descriptions of these impacts basically provide combined impacts on specific resources or receptors in regards to the execution of the project. A summary of the likely potential cumulative impacts has been provided in Table 15.

9.2 OTHER DEVELOPMENTS

In order to assess cumulative impacts as a result of proposed development in the vicinity of the proposed road, information regarding proposed developments is required. Based on the information the Consultants could gather, the only major project is the proposed inter-change of the Webuye-Kitale road project, approximately 2km from the project start of the Kitale-Endebess-Suam road. From our assessments, only developments within 5km of the proposed road could be considered, as beyond the arbitrary study area cumulative impacts are unlikely to occur.

9.3 Identification of Potential Cumulative Impacts

Table 15 provides a summary of the likely potential cumulative impacts that may result from the construction and operation of the proposed road, and in combination with other proposed developments that may come up during the construction phase of the project.

Table 13: Summary of Likely Potential Cumulative Impacts

Environmental Topic	Potential Cumulative Impacts	
	Construction Phase	**Operation Phase**
Air Quality	Cumulative impacts will only occur during the construction phase if the construction of other nearby projects coincides with that of the proposed road. If this is the case, even greater attention should be paid to the mitigation measures outlined in Chapter 8 and the ESMP to ensure the cumulative impact will remain of minor adverse significance.	It is anticipated that the proposed upgrading of the road will have a minor beneficial impact on local air quality. Despite a net adverse impact on a few properties close to the site, there will a far greater number of potential receptors that will benefit from reductions in dust. As indicated in the analysis, there is likelihood of people migrating into the area because of cheaper land but better access hence number of receptors may increase. The impacts of the proposed road on regional air quality and greenhouse gases are predicted to be negligible.
Ecology and Nature Conservation	Cumulative impacts will only occur during the construction phase if the construction of other nearby projects coincides with that of the proposed project. If this is the case, even greater attention should be paid to the mitigation measures outlined in Chapter 7 to ensure any cumulative impact from the construction works on ecology and nature conservation is avoided.	This will remain speculative depending on possible new projects during the operation phase.
Landscape and Visual	There will be some cumulative visual impacts for areas overlooking the construction sites Providing adequate mitigation is provided no significant adverse cumulative impacts are anticipated.	The cumulative impact of the proposed road, structures, and other infrastructure and link roads will be particularly significant in the context that it will contribute to the increasing urbanisation of that area, resulting in a gradual change of character. Significant areas of ground between Endebess and Suam could in future be zoned as areas suitable for future development. The new road and future infrastructure developments may contribute to a potential future cumulative urbanising impact, along with the future development of Mt. Kenya University in Namanjalala, changing the character of the area from rural to urban edge.
Land Use	Providing adequate mitigation is place no significant adverse cumulative impacts are anticipated.	The proposed road way will have a cumulative impact on agriculture in the area. The route and the economic growth it is planned to stimulate will ultimately affect the way the land is farmed and increase the overall impact. Land take will increase as new development takes place.

Noise and Vibration	In light of possible land use change there is the potential for cumulative noise impacts of the proposed development in conjunction with other new developments that may concurrently be executed in the vicinity arising from simultaneous demolition and construction works. However each development is expected to have separate EIA and EMP to mitigate the impacts. Practice for Control of Noise from Construction and given localised nature of noise impacts associated with the construction of each foreseeable development it is unlikely that cumulative impacts will occur.	The noise assessment has taken into account cumulative impacts as the traffic data considers all proposals especially diverted traffic onto the new road. Cumulatively it can be mentioned that in the future some areas could be affected depending on development controls that will be applied as land-use is likely to change. For example, residential apartments may come up close to the highway especially closer to Chepchoina.
Pedestrians, Cyclists, Equestrians, and Community Impacts	Providing adequate mitigation is in place, cumulative impacts are not considered to be significant during construction.	The design has considered NMT and footbridges. No adverse cumulative impacts are expected
Vehicle Travellers	No developments are located such that they would have a major impact on the operation of the current network during construction.	The traffic data indicates shorter travel time and more comfortable travel. Whereas individual accidents may increase, cumulatively it is projected that accident events per million vehicles will be reduced.
Road Drainage and the Water Environment	Providing adequate mitigation is in place no significant adverse cumulative impacts are anticipated.	The proposed dual carriage way will have a larger paved surface thus cumulatively there will be more run-off. The total loading of road runoff with vehicle derived pollutants could therefore increase. Although difficult to determine the significance, since there are no known treatment measures serving road runoff from the current road or any road in Kenya, the impact is likely to be adverse but not significant when the baseline is considered.
Geology and Soils	Providing adequate mitigation is place, no significant adverse cumulative impacts are anticipated.	The impact on geology and soils could only relate to sharing material sources, i.e. gravel and hardstones, with other projects and only if the same sources shall have not been properly closed and rehabilitated. Currently no significant adverse cumulative impacts are anticipated.

9.4 SIGNIFICANCE OF CUMULATIVE IMPACTS

Cumulative impacts will only occur during the construction phase if the construction of other nearby projects coincides with that of the proposed road project. If this is the case, even greater attention should be paid to the proposed mitigation measures to ensure the cumulative impact of the construction works on ecology and nature conservation is minimised.

The assessment has concluded that significant cumulative impacts can also occur on landscape and visual amenity. It is predicted that although some adverse visual impacts can arise during construction and assuming adequate mitigation is provided, these impacts will not be significant. During operation, cumulative impacts will be significant within farmlands and urban fringe between Kitale and Endebess resulting in a gradual change of character. Landscape changes may contribute to a potential future cumulative urbanising impact changing the character of the area from rural to urban edge. Due to expected future residential and commercial developments along the alignment, cumulative impacts relating to land use and noise and vibration are expected.

No significant cumulative impacts are expected on archaeology and cultural heritage, air quality, vehicle travellers, water quality and geology and soils. In some cases the implementation of good practice mitigation is required.

10 SUMMARY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental Management Plan (ESMP) is prepared to show how site specific concerns and mitigation measures are addressed through the detailed design, pre-construction, construction and post-construction / operation phase of the Project. The detailed ESMP is contained in a separate Annex to this report.

The ESMP has been developed with project knowledge and information available to date. Some of the Project's final details, such as proposed locations of construction camps, actual locations of borrow areas to be used by the Contractor, disposal areas for construction debris among other issues, are unknown at the present time. As project commencement and scheduling plans are developed and changed, components of the EMP might require amending. This is therefore a working document, which can be updated whenever new information is received or site conditions change.

10.1 Objectives of the ESMP

The Environmental and Social Management Plan (ESMP) describes the range of environmental issues associated with the Project and outlines corresponding management strategies that will be employed to mitigate potential adverse environmental impacts. The ESMP conveys the Project's environmental and social constraints.

The Project will comply with all local laws and regulations, which seek to ensure that the construction work does not adversely affect the environment and social community resources.

The Supervising Consultant may periodically revise the ESMP in consultation with the Contractor, and subject to the approval from the Ministry of Roads Kenya and the National Environment Management Authority. Revisions may be made to accommodate changes in work, weather and site conditions.

The ESMP should be made available to all Project Staff.

The main objectives of the ESMP are:

- To bring the project into compliance with applicable national environmental and social legal requirements;
- To outline the mitigating/enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts;
- To address capacity building requirements within the relevant Ministries if necessary.

10.2 Responsibilities

In order to ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project. The following entities will be involved on the implementation of this ESMP:

- KeNHA;
- Ministry of Transport and Infrastructure;
- National Environmental Management Authority;
- Resident Engineer.
- Environmental, Health and Safety officer
- Social Officer and Community Liaison;
- Contractor;
- Trans Nzoia County Authority

10.2.1 KeNHA

The project road is under the jurisdiction of KeNHA (the project proponent). Therefore, the responsibility for ensuring that mitigation measures specified in this ESMP and the contract documents are implemented will lie with them.

10.2.2 Ministry of Transport and Traffic Police

Road safety and accident prevention is the responsibility of the Ministry of Transport and the Traffic Police. It will be the responsibility of the two organs to ensure that road safety policies detailed below is implemented:

- Mandatory use of seat belts;
- compulsory driver training and testing;
- prohibition and punishment of driving while impaired by drugs or alcohol;
- traffic safety education for children; and
- Testing and inspection of all vehicles according to national vehicle safety standards.

The Ministry of Transport and Traffic Police should also ensure the following:

- Ensuring that post-accident emergency assistance and medical care are available to all accident victims;
- Developing an accurate accident data recording system;

- Conducting research and regularly monitoring the state of road safety;
- Determining the need for further road improvements (based on accident data); and
- Encouraging research and development of new, safety-oriented road technologies.

10.2.3 National Environmental Management Authority (NEMA)

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment and to ensure that all mitigation measures proposed are actually implemented.

10.2.4 The Resident Engineer and Environment / Social Officer

The Resident Engineer (RE) will be appointed by KeNHA or Supervising Consultant and will be required to oversee the construction programme and construction activities performed by the Contractor, in compliance with the present EMP. The RE should have an Environmental and social officer (ESO) in his team to co-ordinate all aspects of the environment during project implementation. This will include following the construction to monitor, review and verify the implementation of the project's EMP.

During construction, the ESO will be responsible for the following tasks:

- Updating environmental aspects (not covered in the ESIA / ESMP) during project implementation;
- Auditing environmental and safety aspects at the work sites;
- S/He shall participate in the definition of the no working-areas and the location of campsite, borrow pits, quarries and other areas;
- Recommending solutions for specific environmental and social issues;
- S/He shall facilitate the creation of Community Liaison Groups and shall monitor the compliance of the social clauses of the Contract, in terms of local labour force and HIV/AIDS campaign;
- Overseeing strategies for sensitising the local population on health and safety problems;
- Attending consultations held at key stages of the project with the community and interested parties;
- S/He will be required to liaise with the respective Environmental Authorities on the level of compliance with the ESMP achieved by the Contractor on a regular basis for the duration of the contract;
- Controlling and supervising the implementation of the ESMP;

- Preparing quarterly environmental and social progress or “audits” reports on the status of implementation of measures and management of work sites.

10.2.5 The Contractor

The Contractor will be appointed by the KeNHA and will be required to comply with the requirements of the ESIA/ ESMP and the Standard Specifications for Road Works in Kenya, which include specifications for Environmental Protection and Waste disposal, Borrow Pit and Quarry Acquisition and Exploitation, Landscaping and grassing and so on.

10.2.6 Local Authorities

The relevant departmental officers in the local authorities should be called upon where necessary during project implementation to provide the necessary permits and advisory services to the project implementers. Some of the areas for which the officers will be required include:

- Approving locations for establishing work camps;
- Involvement in relocation of project affected persons along the road;
- Liaising with the NGOs in the project area to assist in the sensitization campaigns for HIV/ AIDS and public health to the workforce and the local community;
- Issuing permits for tree felling, vegetation clearing, exploitation of quarries and borrow sites (whenever necessary);
- Identifying locations for disposal of construction debris;
- Issuing permits or relevant documentation for health and safety monitoring in accordance with local health and safety legislation and / or ILO standards.

10.3 Environmental & Social Management Plan

The set of instructions provided in this Chapter and summarized in Table 16 constitute the Environmental & Social Management Plan (ESMP).

The following issues require special attention:

- Material sources, especially the quarry sites and borrow bits;
- At the locations for livestock grazing and crossings, signage must be erected. Exact locations to be identified by the local administration in consultation with the locals.
- Designs must take into considerations the soil conditions especially the poorly drained soil areas;
- Informative signs shall be considered for all social amenities (educational institutions, hospitals, trading centres etc);
- The Contractor shall ensure that all pertinent permits, certificates and licenses have been obtained prior to any activities commencing on site and are strictly enforced / adhered to;

- The Contractor shall maintain a database of all pertinent permits and licenses required for the contract as a whole and for pertinent activities for the duration of the contract.

The Table below presents a tabulated environmental and social management plan. It includes the impacts, mitigation measures, responsible parties and the estimated costs.

Table 14: Environmental and Social Management Plan

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		Construction Phase				
1.	Construction material sourcing	1. Contractor to develop a site specific material site rehabilitation plan to be approved by the RE before excavating any materials. Such a plan must indicate the GPS coordinates of the site(s) 2. The Contractor will be responsible for ensuring that appropriate authorisation and licences to use the proposed borrows pits and quarries has been obtained before commencing activities; 3. Carry out inspection of each of the site's soil stability before excavation; 4. All borrow pits sites shall be clearly indicated on a plan and approved by the RE; 5. Borrow pits and quarries shall be located more than 20 meters from watercourses to minimise storm water runoff into watercourse; 6. The Contractor shall give 14 days' notice to nearby communities of his intention to begin excavation in the borrow pits or quarries; 7. Prepare health and safety plan before any work on the quarries is commenced; 8. Cordon off the quarry and borrow areas to keep livestock and children off; 9. The Contractor shall rehabilitate and decommission all borrow	• Rehabilitation of Quarry and borrow sites after completion of construction.	Contractor	Construction	Sh. 4,000,000 for rehabilitating material sites

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		pits and quarries 10. Stockpile top soil on site and use during rehabilitation of the borrow site and quarries; 11. Plant suitable saplings where it is deemed feasible; 12. In case of blasting: **I.** The Contractor will obtain a current and valid authorization from the Department of Mines and Geology prior to any blasting activity. ii. A qualified and registered blaster shall supervise all blasting and rock-splitting operations; iii. The contractor shall develop a safety policy on site. 13. Upon completion of works, the borrow areas should be graded and backfilled with top soil that formed the overburden. The sites should be re-vegetated preferably with local species of plants. 14. ALL QUARRIES SHOULD BE SUBJECTED TO AN ESIA STUDY BY THE CONTRACTOR				
2.	Air Pollution	1. Sensitize workers on air pollution. All construction machinery to be serviced in accordance with the owner's manual; 2. Workers shall be trained on dust minimization techniques; 3. The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilized as soon as practically possible;	• To reduce pollution of ambient air	Supervising Engineer and the Contractor.	Construction	Apply Best Practices. Sh. 2,500,000 for dust suppression at main centres

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		4. Water sprays shall be used on all earthworks areas and transport routes close to towns and settlements whenever it fails to rain for at least two days. The contractor should prepare a watering schedule to be approved by the RE 5. To minimize further generation of dust, vehicles delivering soil materials shall be covered to reduce spills and wind-blown dust; 6. Any complaints received by the Contractor regarding dust should be recorded and communicated to the RE; 7. Comply with all legal and statutory requirements as contained in EMCA air quality regulations. 8. Project-specific design improvements to limit motor vehicle air pollution impacts should be prepared and implemented. 9. Crusher plants to be installed with dust suppressants.				only. Sh. 750,000 for provision of dust masks.
3.	Noise pollution	1. The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours across Kitale, Endebess area and Suam. 2. Schools, hospitals and other noise sensitive areas which lie within 200m of the road shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity 3. Construction workers will be required to use PPE appropriately 4. Equipment should be maintained regularly to reduce noise resulting from friction;	• To avoid exposure of the community living around the project area and workers to noise nuisance	Contractor	Construction	Best Practices, no additional cost

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		5. No unnecessary hooting by project vehicles within 200 m of noise sensitive receptors. 6. Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE.				
4.	Vegetation loss	1. To avoid conflicts on trees within the Road reserve, a clear understanding of ownership should be reached with the immediate neighbours before any tree if felled. 2. Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed nor should any unauthorized planting of vegetation take place; 3. The clearance of the site for construction purposes shall be kept to a minimum. The use of existing un-vegetated or disturbed areas for the Contractor's Camp, stockpiling of materials etc., shall be encouraged; 4. Areas to be cleared should be agreed and demarcated before the start of the clearing operations; 5. Clearing and removal of vegetation, especially at borrow sites must be carried out in such a way that damage to adjacent areas is prevented or minimized; 6. Areas with dense indigenous vegetation are not to be disturbed unless required for construction purposes, nor shall new access routes be cut through such areas; 7. Trees should be trimmed rather than removed wherever possible;	• To protect vegetation	Contractor	Construction	As in Item 1

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		8. The use of fuel wood by construction workers should be discouraged. Workers should be encouraged to use clean energy sources. 9. The contractors to ensure suppliers are legally compliant and environmentally sensitive.				
5.	Impacts on soils and drainage including landslides	1. As far as possible earthworks should avoid the wet seasons that are always intense to prevent soil erosion and landslides; 2. Excavated materials and excess earth should be kept at appropriate sites approved by the Supervising Engineer; 3. Wherever possible, the earth dumping sites will be designed in such a manner as to facilitate natural water discharge; 4. The contractor should adhere to specified cut and fill gradients and planting embankments with shrubs and grass to reduce erosion and take care of stability problems of road embankments. Areas cleared for improving sight distance should be planted with grass to reduce erosion (where possible); 5. The Contractor shall protect areas susceptible to severe erosion such as across steep slopes by installing necessary temporary and permanent drainage works. 6. Areas affected by construction related activities and/or susceptible to erosion or landslides must be monitored regularly. 7. On areas where the risk of erosion is evident, stabilize the areas and prevent erosion. These may include, but not be	• To conserve soil and avoid stripping of top soil	Contractor	Construction	To be included in drainage structures cost Set aside Sh. 5,500,000 for off-road environmental measures

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		limited to: i. Confining construction activities; ii. Using cut off drains; iii. Using mechanical cover or packing structures such as geofabric to stabilize steep slopes or gabions, mattress and retaining walls; iv. Mulch or chip cover; v. Constructing anti-erosion berms; vi. The erosion prevention measures must be implemented to the satisfaction of the RE; vii. Where erosion does occur on any completed work/working areas, the Contractor shall reinstate such areas and areas damaged by the erosion at his own cost and to the satisfaction of the RE and ESO. 8. Cut areas susceptible to landslides should be protected immediately after the works, and works should not be prolonged at such sites unnecessarily				
6.	Water resources	1. The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006. 2. Ensure community complaints related to water abstraction activities are promptly mitigated	• To ensure the community's right to access water is not infringed continued	Contractor	Construction	No additional cost required

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
			supply of water			
7.	Contractors camp	1. The site for the Contractor's Camp shall be determined in collaboration with the RE taking into consideration the following: i. The security situation in the area (expressed authority must be given by the Officer Commanding Police Division) ii. Involve local community and administration in site selection. iii. Decommission the camps and Reinstate the land to its natural 2. The Contractor shall implement the following as required with the approval by the RE: iv. The contractor shall prepare a waste management plan. v. A suitable water drainage system to prevent soil erosion. vi. A suitable potable water supply; vii. Suitable ablution facilities. viii. Facilities for cooking; ix. Facilities for solid waste collection; x. Facilities for waste water management.	• To ensure proper siting of contractor's camp	Contractor	Construction	To be specified in the BoQ
8.	Sanitation	1. The Contractor shall comply with laws and by-laws relating to public health and sanitation;	• To ensure proper	Supervising Engineer and Contractor	Construction	To be specified in constructio

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		2. All temporary/ portable toilets or pit latrines shall be secured to the ground. 3. The type and exact location of the toilets/septic tanks shall be approved by the RE. 4. All toilets shall be maintained by the Contractor in a clean sanitary condition. 5. A wash basin with adequate clean water and soap shall be provided alongside each toilet. 6. Ensure that solid/liquid exhausts are disposed by licensed agents or through approval by the local Public Health Office.	sanitation			n contract
9.	Workshops	1. All maintenance of equipment and vehicles shall be performed in the workshop. 2. If it is necessary to do maintenance on site, but outside of the workshop area, the Contractor shall obtain the approval of the RE prior to commencing activities; 3. The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water. 4. The workshop shall be kept tidy at all times and shall have the following as a minimum: i. An impermeable floor either constructed of concrete or suitable plastic fabric ii. The floor shall be bunded and sloped towards an oil trap or sump. iii. Drip trays shall be used to collect the waste oil and	• To ensure proper maintenance of equipment and machinery and cleanliness in the workshop	Contractor	Construction	Best Engineering Practices

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		lubricants. iv. The drip trays shall be inspected and emptied daily; v. Drip trays shall be closely monitored during wet weather				
10.	Solid wastes	1. The contractor should develop a waste management plan; 2. All personnel shall be instructed to dispose of all waste in a proper manner; 3. Contractor shall provide litter collection facilities; 4. The final disposal of the site waste shall be done by approved waste disposal agents; 5. Wherever possible, materials used or generated by construction shall be recycled; 6. Provision for responsible management of any hazardous waste generated according to NEMA regulations on waste management. 7. Dispose of surplus material ("spoil") only at designated sites and by approved methods. 8. The spoil designated area need to be more than 20 meters from watercourses. 9. The development and rehabilitation of spoil areas shall include the following activities; i. Stripping and stockpiling of topsoil; ii. Contouring of spoil site to approximate natural topography	• To maintain sound waste management practice.	Supervising Engineer and the Contractor.	Construction	Sh. 2,500,000 for waste disposal site and its management. The operational costs to be contained in BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		and drainage and/or reduce erosion impacts on the site; iii. Placement of excavated subsoil and then topsoil over spoil material; iv. Contouring and re-vegetation; v. The Contractor shall ensure that the placement of spoil is done in such a manner to minimise the spread of materials and the impact on surrounding vegetation and that no materials 'creep' into 'no-go' areas.				
11.	Liquid wastes	1. No grey water runoff or uncontrolled discharges from the site/working areas; 2. Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. 3. The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas. 4. Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered; 5. Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted; 6. The Contractor shall notify the RE of any pollution incidents on site.	• To maintain properly dispose wastewater	Supervising Engineer and the Contractor.	Construction	As contained in Item No. 11
12.	Fuels, Oils,	1. Hazardous materials shall be stored above flood level and at	• To ensure	Supervising	Construction	Best

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
	Hazardous Substances and other Liquid Pollutants	least 20 metres from any watercourse; 2. Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations; 3. Chemicals and fuel shall be stored in storage tanks within a secure compound. All chemicals and fuels shall be stored in accordance with their Material Safety Data Sheet (MSDS); 4. Storage areas or secondary containment shall be constructed of waterproof reinforced concrete or approved equivalent, which is not adversely affected by contact with chemicals captured within them; 5. Pipe-work carrying product from the tank to facilities outside the containment shall be provided with secondary containment; 6. Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment; 7. Fence of the tank compound with locks or other adequate security controls at the site; 8. Appropriate training for the handling and use of fuels and hazardous material is to be provided by the Contractor as necessary. This includes providing spill response and contingency plans; 9. Extreme care will be taken when transferring chemicals and fuels from storage vessels to equipment and machinery on an impervious sealed area which is kerbed and graded to prevent run-off. Chemical and fuel transfer areas shall drain away from	proper handling of fuels and hazardous substances	Engineer and the Contractor.		Engineering practices

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		the perimeter bund to a containment pit. 10. All chemicals stored within the bunded areas shall be clearly labelled detailing the nature and quantity of chemicals within individual containers; 11. Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal; 12. Storm water shall be diverted away from the fuel handling and storage areas. An oil water interceptor shall be provided to treat any rainwater from fuel storage and handling areas.				
13.	Asphalt, Bitumen and Paving	1. The plant should be situated on flat ground; 2. Topsoil shall be removed prior to site establishment and stockpiled for later rehabilitation of the site; 3. Bitumen drums / products shall be stored in an area approved by the RE. This area shall be indicated on the construction camp layout plan. The storage area shall have a smooth impermeable (concrete or thick plastic covered in gravel) floor. The floor shall be bunded and sloped towards a sump to contain any spillages of substances; 4. The area shall be covered to prevent rainwater from contacting the areas containing fuels, oils, bitumen etc and potentially generating contaminated runoff; 5. The plant shall be secured from trespassers and animals through the provision of fencing and a lockable gate to the satisfaction of the RE;	• To ensure proper siting and operation of asphalt, bitumen and paving	Supervising Engineer and the Contractor.	Construction	No additional cost

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		6. Well-trained staff shall be responsible for plant workings. 7. Within the bitumen plant site, areas shall be demarcated/marked for plant materials, wastewater and contaminated water; 8. An area should be clearly marked for vehicle access; 9. Drums/tanks shall be safely and securely stored; 10. Materials requiring disposal shall be disposed off by a licensed waste disposal agent				
14.	Cement / Concrete Batching	1. Concrete batching plant shall be located more than 20 m from the nearest stream/river channel; 2. Topsoil shall be removed from the batching plant site and stockpiled; 3. Concrete shall not be mixed directly on the ground; 4. The concrete batching works shall be kept neat and clean at all times; 5. Contaminated storm water and wastewater runoff from the batching area and aggregate stockpiles shall not be permitted to enter streams but shall be led to a pit where the water can soak away; 6. Unused cement bags are to be stored so as not to be effected by rain or runoff events; 7. Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via	• To ensure proper siting and operation of cement/concrete batching	Supervising Engineer and the Contractor.	Construction	No additional cost

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		wind blown dust); 8. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment; 9. Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching; 10. Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site; 11. All visible remains of excess concrete shall be physically removed on completion and disposed at an approved disposal site. Washing the remains into the ground is not acceptable; 12. All excess aggregate and sand shall also be removed; 13. After closure of the batching plant or any area where concrete was mixed all waste concrete/cement sludge shall be removed together with contaminated soil. The surface shall then be ripped to a depth of 150mm and the topsoil replaced evenly over the site and re-grassed.				
15.	Diversion and access roads	1. The Contractor should adhere to the road reserve as much as possible in locating the diversion if required. If diversion routes go beyond the road reserve, necessary permission should be sought; 2. Where possible the diversion must be limited to already connecting routes in the area; 3. The Contractor shall comply with all applicable laws and by-	• Use of existing roads and proper use of diversion and access roads	Supervising Engineer and the Contractor.	Construction	Cost of watering as contained in item 2

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		laws in Kenya with regard to road safety and transport; 4. Access to the construction site and works area shall utilize existing roads and tracks where possible; 5. Upgrading of the access roads shall be undertaken within the existing confines of the road, unless otherwise agreed with the RE; 6. All diversion and temporary access routes shall be rehabilitated at the end of the contract to the satisfaction of the RE; 7. Damage to the existing access roads and services as a result of construction activities shall be repaired to the satisfaction of the RE. The cost of the repairs shall be borne by the Contractor; 8. To avoid dusts and air pollution, the Contractor must sprinkle water in the diversion route, as necessary, this must be supervised by RE.				
16.	Disruption of Access to Property	1. Disruption of access to property must be kept to a minimum at all times. Where such disruption is unavoidable, the Contractor shall advise the affected parties and the RE at least seven working days in advance of such disruption.	• Minimise disruption of access to property	Supervising Engineer and the Contractor.	Construction	Standard procedures to be followed
17.	Relocation of public utilities	1. Undertake inventory of existing utilities in the project area before beginning construction; 2. Relocation of services is provided for in the BOQs 3. Notice should be given to the utility users prior to any interruption in supply;	• Minimum disruption of access to public utilities	Supervising Engineer, Contractor, Kenya Power	Construction	To be contained in RAP and BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		4. Liaise with relevant parties				
18.	Delays in transportation	1. To avoid delays to road users, the contractor will be required to plan itineraries for site traffic on a daily basis. Traffic management and control is mandatory throughout the project; 2. Temporary road signs that are visible both during the day and at night indicating road works and restrictions will be required; 3. The contractor should also set aside parking bays for heavy goods vehicles and public transport vehicles; 4. Areas where construction is taking place should have clearly marked speed reduction signage.	• Traffic management plan	Supervising Engineer, and Contractor	Construction	Standard procedures to be followed
19.	Emergence of unplanned settlements	1. To forestall the growth of unplanned settlements around the construction camps and other work sites, KeNHA and local administration will need to undertake routine and strict surveillance around the work sites; 2. To mitigate against the potential increase of persons who may be affected by the project, presently and in future, the KeNHA should inform the district administration to stop further developments within the right of way. They should also undertake regular surveillance along the project road to ensure that new developments are not erected within the right of way.	• To curb against unplanned settlements	County Administration	Construction	No cost at construction stage
20.	Discrimination on employment opportunities	1. To avoid conflicts with the local people on employment is it proposed and important that the Contractor employs the locals in liaison with local leaders and administration in unskilled and semi-skilled duties; 2. To promote the livelihood of vulnerable groups such as the	• Employment of local communities	Contractor and local administration	Construction	Prudent hiring practices

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		women-headed households, the Contractor should make deliberate efforts to include and retain women in construction 3. Make deliberate efforts to include at least 33% of women to be included as employees within the road construction project 4. Contractor to put in place a code of conduct to prevent sexual harassment / exploitation of women employees				
21.	Occupational Health and Safety	1. The Contractor shall comply with all standard and legally required health and safety regulations as promulgated by Factories and Other Places of Work Act and also the ILO Guidelines on Safety and Public Health in the construction activities; 2. The Contractor shall provide a standard first aid kit at the site office; 3. There should be a Safety Officer on site who has first aid training and knowledge of safety procedures; 4. Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads; 5. No unauthorized firearms are permitted on site; 6. The Contractor shall provide the appropriate Personal Protective Equipment for staff; 7. The contractor must have insurance cover for the workmen.	• To reduce chances of accidents	Supervising Engineer and Contractor.	Construction	PPEs to be included in the BoQ
22.	Public Health	1. The Contractor shall be responsible for the protection of the public and public property from any dangers associated with construction activities, and for the safe and easy passage of	• To reduce transmission	Supervising Engineer, Contractor,	Construction	HIV/AIDS awareness costs

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		pedestrians and traffic in areas affected by the construction activities; 2. All works which may pose a hazard to humans and domestic animals are to be protected, fenced, demarcated or cordoned off as instructed by the RE. If appropriate, symbolic warning signs must be erected; 3. The HIV/AIDS prevention campaigns should be conducted at the camps as well as in the trading / market centres. The contractor shall take an active role in civic and public health education to his employees. The campaign shall include the training of facilitators within the workers, information posters in more frequented areas in the campsite and public areas, availability of promotional material (T-shirts and caps), availability of condoms (free), and theatre groups. The contractor will co-ordinate with the Provincial and District HIV/AIDS control councils, health officers and the NGOs undertaking education and sensitization programmes; 4. The contractor will provide condoms at appropriate places in the work camps. The campaigns will be continuously done by the relevant Government organization even during operation phase of the road; 5. The implementing agency for HIV/AIDS campaign shall monitor activities regularly to assess effectiveness and impact. This should include an initial, interim and final assessment of basic knowledge, attitude and practices taking account of existing data sources and recognizing the limitations due to the short timeframe to show behavior change. The assessment will	of diseases; • To create awareness of the HIV/AIDS.	NGOS, Provincial and District HIV/AIDS control councils, and health officers		normally contained in the BOQ No. 25

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		be supported by qualitative information from focus group discussions. 6. The contractor should follow the recommendations of the Kenya National Aids Strategic Plan in communicating prevention measures				
23.	Disruption of Community	1. Are adequately addressed in the Resettlement Action Plan	• To minimize disruptions	KENHA	Pre-construction	
24.	Site Security	1. Security arrangements must be included in the Bills of Quantities to avoid any delays which might be caused due to insecurity; 2. The Supervising Engineer and Contractor in liaison with the security organs must create awareness to the security situation on the ground all the times; 3. Appropriate fencing, security gates, shelter and security guards are to be provided at the Construction Site to ensure the security of all plant, equipment and materials, as well as to secure the safety of site staff; 4. The Contractor must ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; 5. Site staff that are found to be involved in incidences of theft or pose other security risks to the local community are to be dismissed and reported to the authorities.	• To improve site security and avoid cases of theft	Supervising Engineer and Contractor.	Construction	
25.	Fire	1. The Contractor shall take all reasonable and precautionary	• Fire	Supervising	Construction	Fire

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
	Prevention and Control	steps to ensure that fires are not started as a consequence of his activities on site; 2. The Contractor shall ensure that there is basic fire-fighting equipment available on site; 3. Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires; 4. 'Hot' work activities shall be restricted to a site approved by the RE; 5. Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include: i. Workshop; ii. Fuel storage areas; iii. Any areas where vegetation or other material is such as to make liable the rapid spread of an initial flame; 6. The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This shall include, but not be limited to: i. Regular fire prevention talks and drills; ii. Posting of regular reminders to staff; iii. Any fires that occur shall be reported to the RE immediately and then to the relevant authorities; iv. In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and	prevention and control	Engineer and Contractor.		management equipment to be included in the BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		take all necessary action to prevent the spread of the fire and bring the fire under control; v. Costs incurred through fire damage will be the responsibility of the Contractor, should the Contractor's staff be proven responsible for such a fire.				
26.		**Operation Phase**				
27.	Erosion and water quality	1. Maintenance engineers from KeNHA shall inspect all drainage structures and outfalls; 2. All the damaged culverts, wing walls and aprons shall be repaired and additional measures for velocity reduction and erosion protection shall be implemented.	• To ensure drainage systems are in good condition	KeNHA	Operation	Included in design
28.	Road Accidents	1. Proper design of road safety features is a very effective way to prevent accidents. The Resident Engineer and the Contractor involved with the implementation of the design of the road should: i. Examine road design standards, safety equipment specifications and training to ensure that design details take account of safety concerns and that specific safety features are correctly designed and installed; ii. Traffic management plans, including details of signs, markings, and intersection layouts, channelization of flows, access restrictions, footpaths, bus stops, and provisions for non-motorized vehicles;	• To avoid road accidents	Kenya Road Safety Authority, KeNHA and Traffic police	Construction and operation	Included in design, Kenya Road safety Authority to include in usual budget

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		iii. Painting of edge lines in order to separate shoulders; iv. Establishment of non-motorised vehicle waiting area; v. Improvement of visibility; vi. Provision of speed limit signs; vii. Construction of bumps to reduce speeds; viii. Improvement of crossing sites paintings of zebra crossings; ix. Regulations, educations and safety trainings. 2. Active police enforcement of speeds; 3. Road safety and accident prevention campaigns are recommended at the end of construction. To monitor the effectiveness of the road safety information and education campaigns, the following measures are recommended: 4. KeNHA shall monitor traffic accidents through records kept at the local police stations along the project road; 5. KeNHA and the relevant Livestock Office shall record accidents with livestock; 6. A report will be required after two years of monitoring and the results used to recommend further mitigation measures, if necessary.				
29.	HIV/AIDS	1. Sensitisation and awareness campaigns should be the responsibility of the National Aids Control Councils in Kenya together with their district co-ordinators. 2. Prevention measures to include access to free condoms to all	• To reduce prevalence rates	Contractor and National Aids Control Councils	Operation	Contained in BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		workers within the project				
30.	Urbanization	3. Proactive planning by all the Counties traversed by the project road	• To forestall unplanned urban development	County Governments	Operation	-

10.4 ENVIRONMENTAL RISK MANAGEMENT, OCCUPATIONAL HEALTH AND SAFETY

The issues raised in this chapter are meant to have the project implemented with none or minimal safety and health concerns to the workers involved in the construction and the public. The project must also meet the statutory health and safety obligations as outlined below.

10.4.1 Approval of Plans

Before commencing construction, after the design stage, the proponent needs to make an application to the Director of Occupational Safety and Health Services for approval of plans.

The Occupational Safety and Health, Act 2007 section 125 (1)states; *'No building shall be erected or converted for use as a workplace and no structural alteration and no extension shall be made to any existing workplace except in accordance with plans showing details of the proposed construction, conversion, alteration or extension, approved by the Director.*

(2) Upon receipt of a written application supported by such particulars as may be prescribed for the approval of any plan described in subsection (1), the Director shall

a) *If he is satisfied that the plans provide for suitable premises for use of a workplace of the type proposed, issue a certificate of approval for such plans; or*
b) *If he is not satisfied, refuse to issue a certificate of approval and shall state in writing to the applicant the reasons for such refusal'.*

10.4.2 Occupational Safety and Health during construction Works

10.4.2.1 Hoarding of site works

On award of contract, the proponent shall hand over the site to the contractor. Where necessary the contractor should seclude working area to help avoid exposing non interested parties to the various hazards in the works area.

10.4.2.2 Registration of Construction Site

The contractor appointed to carry out this works shall carry out his operations in accordance to the requirements of OSHA and particularly the 'Building Operations and Works of Engineering Construction) Rules, 1984'.
Rule no: 6 (1) Notification of commencement or taking over of operations or works.

'A main contractor shall, within seven days of commencing or undertaking building operations or works of engineering construction, notify the Chief inspector in writing of:

a. *The contractor's name and postal address;*
b. *The address or location of the site of the operations or works;*
c. *The date of commencement*
d. *The expected date of completion;*
e. *Whether mechanical power is used or not;*
f. *The number of persons expected to be employed'.*

Rule no: 7 (1) on the appointment of a safety supervisor states;
'Every contractor who employs more than twenty persons shall, for every site on which he is the contractor appoint one or more persons experienced in the operations or works carried out at the site and suitably qualified for the purposes to:

(a) *Advise the contractor as to the observance of the safety, health and welfare requirements under the Act and under these Rules; and*

(b) Supervise and ensure the observance of those requirements and promote the safe conduct of work generally at the sites'.

10.4.2.3 Excavations

Precautions shall be made to prevent persons falling into excavated areas during construction.
Rule no: 8 (1) of building operations and works of engineering construction rules, 1984 deals with prevention of danger in excavations, etc
'The walls and roofs of any excavation, shaft, earthwork or tunnel, deeper than 1.2 metres shall be reinforced with timber of suitable quality or with other suitable material to prevent, so far as is reasonably practicable danger or injury resulting from a fall or dislodgement of earth, rock or other matter from the walls or roof, to any person employed or making the inspection or examination under rule 9'.

Rule No: 13 Fencing of excavations further states that;
'A Contractor shall ensure that any excavation, shaft, pit or opening in the ground more than two metres in depth shall be securely covered, fenced or otherwise provided with a suitable barrier when access by workmen, plant and equipment or material to it or from it is not necessary'.

10.4.2.4 Dust and Fumes

During construction dust will be generated. Precautions must be taken to prevent inhalation of dusts and fumes by the workers. This may cause health effects on those exposed. The adjacent existing laboratories will be in operation and therefore exposure to dust will be detrimental to those working in the laboratories.

Rule number 20 of the Building and works of engineering construction rules, 1984 states that;
'In any building operation or works of engineering construction where dust or fumes likely to be injurious to the health of persons employed are given off, all reasonably practicable measures be taken to prevent the inhalation of the dust or fumes by the persons employed by ensuring adequate ventilation or providing suitable respirators at the place where the operation or work is carried on'.

10.4.2.5 Lighting

During construction effective steps shall be taken to provide lighting for the works to be carried out safely .The Occupational safety and Health Act, 2007 section 50 (1) states;
'An occupier shall ensure that effective provision is made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of his workplace in which persons are working or passing'.

Rule No 47 of Building and Works of Engineering Construction, Rules, 1984 on lighting of workplaces states that;
'There shall be adequate and suitable lighting in:

a) every working place and approach thereto;
b) every work place where here is lowering and raising operations with the use of lifting appliances are in progress; and
c) All openings dangerous to persons employed'.

10.4.2.6 Lifting

During construction there will be a lot of lifting of weights. Lifting shall be mechanized in many instances and where it must be done manually the training on safe lifting methods has to be done. Rule No 53 of the Building and works of engineering construction rules, 1984 on lifting of excessive weights states that;

' A person shall not be employed to lift, carry or move a load so heavy as to be likely to cause injury to him'.

10.4.2.7 Working platforms

During construction processes working platforms will be erected. Scaffolding structures are used to support these platforms. Scaffoldings must be strong and stable to be able to support the kind of weights expected.

Rule Number 57 of the Building and Works of engineering construction rules, 1984 on Construction and material states that;
'*(1) Every scaffold and every part thereof shall be of good construction, of suitable and sound material and of adequate strength for the purposes for which it is used'.*

10.4.2.8 Sanitary conveniences

The contractor is obliged to provide sanitary conveniences for his employees, visitors and other stakeholders. The Occupational safety and health, act 2007 section 52 (1) states that;
'Sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and, where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex'.

10.4.2.9 Fire and Fire prevention

All construction works shall be carried while strictly following the 'The Factories and Other Places of Work (Fire Risk Reduction) Rules of 2007 (Legal Notice no. 59 of 2007). OSHA, 2007, however has requirements that have to be met in overall fire obligations.

Section 78**.** (1) *'All stocks of highly inflammable substances shall be kept either in a fire-resisting store or in a safe place outside any occupied building:*

- *Provided that no such store shall be so situated as to endanger the means of escape from the workplace or from any part thereof in the event of a fire occurring in the store'.*

Section 81 (1) *'In every workplace or workroom there shall be:*

(a) Provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, means for extinguishing fire, which shall be adequate and suitable having regard to the circumstances of each case; and

(b) Present, persons trained in the correct use of such means of extinguishing fire during all working hours.

(2) Every workplace shall be provided with adequate means of escape, in case of fire, for the persons employed therein, having regard to the circumstances of each case.

3) All the means of escape referred to in subsection (2) shall be properly maintained and kept free from obstruction'.

10.4.2.10 Supply of drinking water

The contractor's employees and those visiting site shall require to have a supply of drinking water for their use whilst the works are going on. Section 91 of OSHA, 2007 states;

'(1) Every occupier shall provide and maintain an adequate supply of wholesome drinking water at suitable points conveniently accessible to all persons employed'.

10.4.2.11 Hygiene

Hygiene is paramount both for the contractor, his workforce and for the proponent who is responsible for the road works work under strict conditions. Section 92 of OSHA, 2007 on washing facilities states that;

'(1) Every occupier shall provide and maintain for the use of persons employed, adequate and suitable facilities for washing, which shall be conveniently accessible and shall be kept in a clean and orderly condition'.

10.4.2.12 First Aid

In case of injuries on site the contractor shall require first aid dispensation before seeking for further medical attention. The provision has to be in accordance to first aid rules, 1974. OSHA section 95 states that;

'*Every occupier shall be provide and maintain so as to be readily accessible, a first-aid box or cupboard of the prescribed standard'.*

10.4.2.13 Protective clothing and appliances

All hazards on site shall either be eliminated, processes substituted to safer methods, safe procedures and controls utilized. In cases where this is not possible or safety needs to be enhanced then provision of personal protective equipment is very important so as to provide protection. Section 101 of OSHA states that;

(1) Every employer shall provide and maintain for the use of employees in any workplace where employees are employed in any process involving exposure to wet or to any injurious or offensive substance, adequate, effective and suitable protective clothing and appliances, including, where necessary, suitable gloves, footwear, goggles and head coverings'.

10.4.2.14 Safety and Health committees

The requirements of the Legal notice number 31 on Safety and Health committee rules must be met by the contractor during his activities on site. Section 9 of OSHA, 2007 states that;

'(1) Every occupier shall establish a safety and health committee at the workplace in accordance with regulations prescribed by the Minister if:

(a) There are twenty or more persons employed at the workplace; or

(b) The Director directs the establishment of such a committee at any other workplace'.

10.5 Traffic Safety

Upgrading of the Kitale – Endebess – Suam road may result into increased accidents particularly to the pedestrians and motorcyclists due to the following reasons:

- Increase in traffic speed due to improved road
- Luck of public awareness about road safety

General increase in traffic volume

The Table below provides safety recommendations that have been factored in design

General Safety Recommendations

General Accident Situation	Designed Countermeasure
Pedestrian/vehicle conflicts	• pedestrian / vehicle segregation (sidewalks or wide shoulders) • raised pedestrian crossings • speed control • Footbridge
Vehicular Loss of control	• road markings • delineation • speed controls • guardrails
Darkness	• reflective signs • reflective road markings • delineation
Poor visibility	• improve sightlines • realignment • conspicuity
Oncoming vehicle glare	• Ample median • Provision for tree planting within the median
Poor driving behaviour/ lane discipline	• road markings • enforcement/Awareness • median barriers
Collision with roadside obstacles	• better delineation • guardrails • frangible posts
Skidding	• restoring surface texture
Turning movements	• turn prohibition • channelisation / right turn lane • acceleration / deceleration lanes
Light / heavy vehicle conflicts	• bus bays / lay bys • Manageable gradients
Parked vehicles	• parking controls • parking provision
Roadside Stalls	• Service roads/ Wide shoulders

A general safety scheme for towns and major centers has been set up in design, consisting of:

- Town sign with end of town sign on opposite side facing the town near or shortly before start of built-up town section.
- Rumble strips across the carriageway and shoulders at the same location as the town sign. These rumble strips will alert the motorist of the speed limit sign ahead.
- Speed limit sign, 50 km/h, about 50 m after the town sign and at end of the 50 km/h sign facing the town in the opposite road side. End of prohibition sign for the 50Km/h speed is provided at the end of the town.
- Speed hump sign about 100-150m ahead of speed humps/raised pedestrian crossings and with a sub-sign specifying number of humps, if more than one speed hump is provided in the town.
- Raised pedestrian crossing (a flat speed hump) at the town Centre where many pedestrians need to cross the project road. These are also provided with a pedestrian crossing sign.
- Bus bay in each road side with the left side bus bay staggered forward (if practical) and a speed hump or raised pedestrian crossing in between the right and left side bus bay. Hereby bus passengers will be inclined to pass the road behind the bus which is safer than crossing ahead of the bus due to better visibility, especially if the bus actually move on before the passenger is crossing the road.
- Wide asphalt concrete paved shoulders, 2.00m wide for the outer shoulder in both sides of the road even in the built-up part of the towns and villages.
- Junctions, all junctions in relation to type of side road and volume and composition of traffic on the side road has been designed with ancillary lanes to enhance some safety.
- Provision of Localized street lighting for the major towns

11 CONCLUSIONS AND RECOMMENDATIONS

Overall the socio-economic impacts will be positive as it is for the larger societal good. The road will enhance agricultural productity in the agriculture rich catchment, through faster and cheaper transportation of farm produce and farm inputs. Ultimately the cost of agricultural production will be reduced potentially resulting in lower cost of food and other commercial crops from the area. More importantly the road will open up more trade with Uganda, thus creating export opportunity for agricultural products into Uganda and import opportunities for products from Uganda. In addition the road will foster East African integration with enhanced movement of people and goods across the border. The other tangible benefit is the projected appreciation of land values especially between Endebess and Suam due to better access.

Impacts on the bio-physical environment are medium to low and most of them can be avoided or mitigated. Material sites especially quarries and borrow pits could alter the general landscape and also lead to land degradation. This is a major impact considering that very large quantities of materials will be needed for construction. Improved road to all weather standards will improve access to Suam forest with a possibility of encouraging poaching of trees and the temptation to annex parts of the forest for agricultural production. This temptation could be further motivated by the ease of access to markets for agricultural products that shall have been afforded by the new road. The Kenya Forest Service should consider enhancing surveillance across the forest once unusual activities begin to be noted.

Cumulative impacts have been included in all the assessments of the environmental parameters. The findings are that cumulative impacts are related to potential secondary effects on Suam forest and the impacts associated with material sourcing. However, this does not exclude future cumulative impacts that may include those accruing from construction of the Ugandan side of the road and additional use of material sources. During operation, impacts will be significant within farmlands and urban fringe between Kitale and Chepchoina resulting in a gradual change of character. Landscape changes may contribute to a potential future urbanising impact changing the character of the area from rural to urban edge. Due to expected future residential and commercial developments along the Kitale and kapchorua section, cumulative impacts relating to land use change and increased number of noise and vibration receptors are expected. Wildlife within Mt. Elgon National Park could be affected, either positively or negatively as an indirect impact through enhanced poaching or through improved tourism hence motivation to protect tourism attractions especially wildlife.

The assessment has concluded that significant impacts can also occur on landscape and visual amenity occasioned by opening up of quarries and borrow pits and earthworks. It is predicted that although some adverse visual impacts can arise during construction and assuming adequate mitigation is provided, these impacts will not be significant. Proactive planning on the part of the county government could significantly mitigate these impacts. In general and taking into consideration all factors, it is concluded that the road project would have substantial positive impacts on livelihoods and

the economy while long term potential adverse impacts mainly relate to the opening up of Suam forest to degradation. Construction related impacts are all transient and can be easily mitigated.

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Annex 1

MINUTES OF PUBLIC CONSULTATIONS

Annex 1: Minutes of CPP/stakeholder meetings

CONSULTATITVE PUBLIC PARTICIPATION MEETING MINUTES.

HELD AT ENDEBESS COUNTY COMMISSIONERS OFFICE ON 13TH APRIL 2015

ATTENDED BY: Refer to the attendance lists.

PREAMBLE: The meeting was called to order at 1231hrs by the area chief who requested one of the attendees to open the meeting with a word of prayer.

He then welcomed the consultants to the meeting and apologized for the late attendance by the locals. He requested the locals to be cooperative and be attentive while the consultants are explaining the theme and purpose of the meeting.

MINUTE 1: INTRODUCTIONS.

The sociologist introduced himself and his team. He then welcomed the engineer to explain the design of the road.

MINUTE 2: ENGINEERING PRESENTATION.

The engineer explained that the road starts from Kitale through Matisi –Endebess all the way to Suam. He clarified that from Kitale the road will be dual carriage way and then as you pass Matisi the dual will be ended and the stretch from there be done a single lane but wide enough according to the standards of KeNHA roads of that class. Footpaths and other necessary requirements like bumps as well as service lanes will be done where necessary. He said the project is funded by the Africa Development Bank.

MINUTE 3: SOCIOLOGISTS PRESENTATION:

The sociologist informed the attendees that every project comes with its own impacts both positive and negative and this one was no exception. He said some of them will be social impacts as well as environmental impacts.

ANTICIPATED IMPACTS.

NEGATIVE IMPACTS.

Felling down of trees during construction.

Trees will be cut down to give way to the road and this will affect the environment. In our report to NEMA we will however recommend that the contractor plants trees by the road side to replace those which may be cut down. He also enquired from the locals if they have any cultural area like a shrine or any other along the stretch which they said they are far away from the road.

Soil erosion

He informed the attendees that they should be keen to know where storm waters are directed to by the contractor so that their shambas won't be affected. He urged them in case the waters are directed to their land without compensation to report to the authorities for action to be taken against the contractor.

Dust pollution

The road construction will bring dust pollution which may bring about airborne diseases to the locals hence affecting them. We will also recommend that the contractor be watering the road on a daily basis so as to reduce the dust pollution during construction.

POSITIVE IMPACTS

Cheap and fast transport.

1. This will come because the roads will be in a good condition and passable hence reduced transport costs.

2. Employment opportunities. It is a constitutional requirement that 60% of casual employment should be given to the locals . He however requested the locals not to hike the costs of labour since this may force the contractor to source for the employees elsewhere. He also requested the locals to make sure that the people to get jobs are of good conduct.

3. Market for their products will be more.

4. Cost of land i.e land value will appreciate.

5. Business will also boom.

SOCIAL IMPACTS

NEGATIVE

- Outbreak of diseases. Those coming to construct may come with diseases which may be passed to the locals through immoral relations. E.g TB , HIV/AIDS.

- Breakage of families. This may be brought about by money in circulation.

- Inrease in accidents. This may be brought about by speeding vehicles and will be carbed by providing zebra crossings and other speeding carbing methods.

MIN 4:VALUERS PRESENTATION

The valuer explained that a government has a project to benefit the public,the government has power to acquire land in private hands for public benefits. She explained that there are rules

Guiding on how to acquire such land and the processes followed to ensure the project benefits many. According to the Kenya construction section 40 states that the land and the process should be followed. Land of 2012 has :

- Compulsory acquisition act. This states those to be affected should be compensated adequately.

- Acqusition and resettlement bill . This is aiming at enduring the act due process is followed to acquisition.

- A and P to LDPS. This caters for those people whose property is acquired fully and that are categorized as LDPS and they should be paid promptly.

Who is to be compensated?

The land owner is paid for his land but if there are other developments in the same shamba they are paid to those who own it.

What is to be compensated?

Land.

Structures.

Trees.

Crops.

The sociologist explained that RAP will be starting very soon and requested the attendees to be cooperative to hose coming to carry out the exercise. He further explained that this will assist will assist

a William Siriyako

How can I get the tender of supplying the concrete to the contractors?

b Stella muricho

What will happen to te shambas whose owners have no title deed?

c Councillor Kirikoi

Why has the project delayed? Commented that the that the locals be given first priority in the jobs.. A lso requested the locals to form a committeeto oversee on compensation and jobs.

d Solomon Kisogoch

Which age group be employed , will thb ladies be considered in the employment

e Kenneth Shimoto

The road was done in colonial period. Requested the road to be done in a standard quality.

f Job Korot

What Is the qualification for those to be employed and ho will be the compensation.

g Steven Kisogoch

Will people be employed according to locations or it will be done once in Kitale.

Those working on the road , will they be given health insurance cover to cater for accidents.

ANSWERS

WILLIAM TENDER

For now the Engineer has identified the material sites where the material will be sourced. if the materials are quality the owner negotiate with the contractor about the price of materials . He requested the locals to follow upon the proceedings of the project so as to benefit. He requested the locals to be organized so as to get jobs and benefit fully.

Age group to be employed

There will be no child labour because the government is clear on the child labour. Those over 18 and have IDs will be the first to be considered and gender wouldn't be discriminated. Everybody has an equal opportunity to be employed . All others who would not get direct employment should start business of providing food to the employees.

About location employments

Each location will be given equal opportunity and representation in jobs distribution .

About insurance cover. The contractor should have insurance to cover the employees who be injured on duty.

About project delayance. The engineer said the time for the implementation of the project has come and it will be implemented now.

About substandard road quality. The engineer assured the road will be done to the required standards and the road will be of standard quality.

About those lacking title deed The valuer said if there is no tittle deed the local authority in conjuction with the lands tribunal will assist in identifying owners of the land.

MIN 7:CONCLUSION

The chief welcomed the area MCA to conclude on the meeting and give his inputs. One of then locals who don't have papers to be considered. Who is the contractor . The sociologist said the 60% is of then casuals and not everybody including the engineers Those willing to get jobs should start training early so as to be equipped.

The MCA . The MCA assured the locals the government is ready to implement the project and this is no exception.H e also promised to assist in ensuring that the people in his area are compensxated. The chief thanked the consultant for the meeting and everything . The meeting was closed with a word of prayer from the area assistant chied who also gave a vote of thanks.

CONSULTATIVE PUBLIC PARTICIPATION MEETING

HELD AT MOWLEM MARKET ON 13TH APRIL 2015

ATTENDED BY : REFER TO THE ATTENDANCE LIST

PREAMBLE

The meeting was called to order 1515hrs by the area chief who requested one of the attendees to open the meeting with a word of prayer.

MIN 1: INTRODUCTIONS

The chief welcomed the Sociologist who introduced himself and his team from Egis Int'l, concerning the Kitale-Endebess-Suam road project.

The consultants introduced themselves. The Sociologist explained that Egis Company is consulting on behalf of KENHA for the supervision of Kitale Endebess Suam road.

He explained this meeting was to inform the locals about the activities being carried on concerning the construction of the road as required by NEMA. Other stages are over and we are doing the final touches on the construction of the road whereby one of them is informing the locals.

MIN.II: ENVIRONMENTAL PRESENTATION.

The road will maintain its current alignment and it will take 7m of tarmac with the shoulders. The only land to be acquired will be where corners are by trying to align it. He explained that after the meeting we will be starting to carry out the RAP exercise to also get estimate valuations on who is affected. He requested for cooperation during the exercise so as to get a fair valuation.

MIN.III: IMPACTS

POSITIVE

- Fast transportation and clean matatus.
- Job opportunities – it is a requirement that 60% of casual employment should be given to the locals. He advised those willing to take part to start preparing early e.g. driving etc.
- He also encouraged those who won't get direct employment opportunities to start some benefiting activities like cooking food for the employees.
- Trees though cut down will be replaced after the project.
- Soil erosion also will be curbed by construction of gabions along the road. They requested the locals to be cooperative and engage themselves with the contractors so as to avoid storm waters being directed to their farm.

Negative

- Theft
- Outbreak of diseases

- Oil spillage to the rivers
- The locals were urged to report any cultural attachment area like shrines along the stretch.
- Different cultural and social ways of life will be introduced.
- Outbreak of diseases e.g. HIV/AIDS which may affect life's negatively. He urged them to exercise self control in relating with the contractors.
- Breakage of families due to a lot of money in circulation. He encouraged them to exercise self control and observe good morals.

He also requested the locals to give in their inputs and comments and recommendations to be incorporated in the design.

MIN.4 VALUATIONS PRESENTATION

The valuers explained that there are guidelines guiding this exercise. The constitution Section 40 states that the Government should only acquire private land for public good. There is also the 2012 land act part 8 which states that even if the land is being acquired for public good there is the process that government should follow to ensure everybody benefits

MIN. 5: WHO IS TO BE COMPENSATED?

- Land owners

  Structure owners

  Tree owners

  NB/. The structures and trees owners will be paid even if the land doesn't belong to them.
- Where there is a disputed land the money is kept at the public trustee until the owners clear their cases.

What is to be compensated

- Land
- All structures
- Trees – trees will be compensated depending on their sizes
- Crops
- Values will be established later after the RAP.

MIN.6 : questions and recommendations

- Alfred Barasa

  I have two lands touching the road. Can I get the Map or explain showing the extent of the road.
- William Lelei

  We have been promised the road several times by several people, please let the road be done.

- Employ our youths and also give opportunities to all the people

- Abubaka

  When will the project start?

- Mzee Gichuki

  Let the project be done.

- Toili

  Many of the lands don't have titles will we be compensated.

- Josphat Gichuhi

  The road had road signs which gave us security when using it. Every where a road sign is needed let it be done to ensure safety for the users.

- Ans.

  Ans. to Lelei.

  The road has funds and so the project will be implemented.

- About Jobs

  The sociologist requested those willing to work there should cooperate and be available so as to benefit.

About the implementation

The Eng. assured the attendances that the project will be implemented. Now we are taking their inputs after which the contract may start by next to year by April.

About road signs

All safety measures will be assured including road signs, etc.

About titles

- Those who don't have the titles, the administration available e.g. chiefs, assistants and elders will help in establishing the owners of the road.

- Land tribunal will also approve the owners of the land to be compensated. She also explained that the inquiry meeting will also be done to tell the people what to be compensated and how much.

- Trees and crops will be compensated to the owner regardless of where it is.

Questions

- Wekesa

  How will we be sure that our people will get jobs.

- Filex Murokoto

  Gender should be considered while distributing jobs

- Ngeiwa Chemasa

  Requested the cotton soil from the road to be used to fill up the Molem dam

- Chelabit

  Can't the road size be reduced at the markets to ensure no house is demolished.

- Serengo

  What will be the criteria of establishing the values of the structures.

- Nicholas Kibet Simoto

  Requested for the cornes at Molem to done away with.

- Chief

  The crime rate at Molem is high as a CSR if we are provided with a police house to enhance and improve security, also chiefs office.

- Mukasa

  CSR

  Which types of jobs will be available? The chief requested for security to be beafed up around this area.

Answers

About jobs guarantee

- It's about those who will be prepared adequately. The only way for them to benefit is to be organized and speak in one voice.

About gender

There won't be any discrimination based on gender but it will be given on basis of ability to work.

About CSR

- There is a provision for that but it will be announced later
- Hospital etc

About the Mowlem corner

The corner will be straightened

About reducing the road

- This is not possible according to Sheria.

About security

- We may give you a security light to light up the market.

About the new road

The road will maintain the current alignment.

About how to establish the value. There are about four methods used to establish value of the properties. She explained that several methods will be used to establish the values of the properties in the area.

NB. the owners will be compensated to a time of amount that will enable them to construct another house.

Those depending on the structure say tenants will be given a compensation known as a loss of livelihood.

If you find (food/Maize) on the shambas will you pay my food. About structures on the road reserve. The owners of the structures will be given adequate notice but will not be compensated.

MIN. 6. CONCLUSION

The chief thanked the attendance for their attendance and requested them to be cautious in future while dealing with contractors and exercise self control.

STAKEHOLDERS CONSULTATIVE MEETING

HELD AT KITALE CLUB ON 14TH APRIL 2014 ATTENDED BY: REFFER TO THE ATTENDANCE LIST.

PREMEABLE

The meeting was called to order at 1055hrs by the Egis Consultants who opened the meeting with a word of prayer and welcomed the stakeholders to a cup of tea as we waited for the Governor and the other stakeholders who had not arrived. After the tea the DCC welcomed the stakeholders to the workshop.

MIN.1: INTRODUCTIONS

The DCC told the stakeholders that the purpose of the meeting was to inform them of the project from Kitale to Suam road project.

He welcomed the consultants to take over and preside over the meeting.

The consultants welcomed all those present to introduce themselves. The Governor arrived and was given an opportunity to greet the stakeholders as the workshop started. The governor briefed the stakeholders about the various projects happening in the area.

The governor gave his views as follows:-

(a) The Webuye road interchange will have an averpass.

(b) The dual road should come from Maili Nne to Kitale.

(c) The dual should be all the way through Kitale town until the Olobolo junction.

(d) Near the show ground there should be included a lorries parking to ease traffic during construction.

(e) At the junction to former DC office and the new one the two round-about's should be merged to be one to ease traffic.

(f) As we enter town we must have pedestrians and Bodaboda lanes along the road as you enter and leave town.

(g) Laini Moja road should be joined to the main road.

(h) At chanuka we should have a dual road.

(i) At the town street lights should be put up.

(j) The hawkers along Kitale to Chanuka should be compensated.

(k) After compensating the hawkers we should put up a modern stalls for them to continue their business.

(l) Trees along the road should be considered after construction – re afforestration.

(m) A by pass should be considered.

(n) At the stadium (dual) there is a land with a bus park can it be accommodated.

(o) At Matisi if it is possible to put up stalls along the road if it is not possible we will discuss and see if you can have a stall.

(p) At Entebes and of dual the road there Must be very wide to ease vehicles movement from both sides.

(q) Provide a lorry park Entebes.

(r) An access road to the DC's office in Entebess.

(s) Can we harmonize the two roads leading to shame at Entebess and put up road signs.

(t) The road past Entebess should be aligned

(u) At the small markets street lights should be put up.

(v) At Sham include a lorry parking and a lane for the lorries heading to the borders (Malaba)

(w) Quaries should be hired from the locals

(x) Health centres should be given for e.g. the construction sites should be left behind at the and of the project to be used for hospitals.

(y) Tom Mboya health centre should be incorporated in the design so as to treat the workers in construction there.

(z) The consulting Engineer assured the governor that most of the things he requested are already in the designed.

MIN.2: THE DESIGN PRESENTATION

The Engineer explained that the Egis International was contracted last year 2013 to design the road from junction to Kanguria tranversing through Kitale town to Swam.

He briefed on the economic activities in the Trans-Nzoia county. He explained the road has four sections.

- Kitale town 2km with many activities e.g. Bodabodas, tracks.
- Matisi to Endebess town which is a rich agricultural area and the reserve is narrow.
- Endebess to Swam
- Then the project end the border between Kenya and Uganda
- Project time line
- Inception report was done
- Feasibility and preliminary design report has been presented to the clients
- Draft detail report will be presented for tendering early last year.
- Final report
- We explained that the financing is by the ADB.
- The project will follow the existing reserve except where special attention will be especial the sharp corners.
- The design avoids after citing peoples houses and other structures except where we can't avoid.
- Road reserve width, 40m according to law and this has been assured in the design.

- The project start is at kitale DC's office the end is at Swam border at the swam bridge.
- At the start the proposed elements by the on going Lesuru-kitale marich pass project.
- At the Kitale the road is dual and economically the project is viable through town section coz of traffic volume.
- Composition of the traffic
- Increasing rate
- There are 3 round abouts in Kitale:-
    i. Oil Libya round about
    ii. Sudi way round about
    iii. End of dual round about
- There are also areas as well as bus terminus with better facilities through the town.
- Pedestrian foot paths also have been introduced in the town.
- The Engineer shown the entire road corridor to the stake holders using the power point.
- He explained that he will be including the speed plus culming methods avery place where necessary.

General safety recommendations

Accidents

- Pedestrian and vehicle conflicts – There will be side walks.
- Service lanes

Ehcilcear loss control road markings

- Speed controls
- Guard rails

Darkness

- Reflective signs
- Reflective road marks

Poor visibility

- Improve sign lines
- Realignment
- Conspicuity

Oncoming vehicle glare

- Free planting along the road

Poor driving

- Road markings
- Awareness of enforcement
- Medium barriers

Collision with roadside obstacles guard rails etc.

Skidding

- Restoring surface texture

Light/heavy vehicle conflicts

- Bus bays / lay bays
- Climbing lanes and

Parked vehicles

- Parking centres etc.
- The cost of the project is 5.7 billion i.e. for the 128M for every Kilometre.

MIN.3 : ENVIRONMENTAL ISSUES

The environmentalist presented the environmental issues the project. She said this is a requirement as per the EMCA 1999 laws to undergo a Ein study on every road project.

Due to transboundary nature approach will adopt Kenyan policy framework and those of the E.A community.

Focus of ESTA

Project area of influence in respect to direct impact and offsite impacts.

Environmental impacts anticipated during the project

- Direct impacts, material sites, water resources, soil erosion, air, quality from fumes by machines, noise and vibrations from machines loss of some trees during construction and implications on the road safety.
- Indirect impacts e.g. land use charge over time, potential growth of Suan as a border town. Rise of property prices, socio-cultural changes due to increase number of people in the region because of the road.
- She said data has been collected to see any Environmental issues, holding of public Baraza's and stakeholders consultative meetings to get the views of those affected.

MIN.4: socio-economic issues

The sociologist explained we have used the Kenyan NEMA laws as well as the ADB's policies.

He explained that we have project background

Dentographic trends

Economy of the area

Social and cultural welfare land use and resources

Gender and HIV/AIDS

Project impacts etc.

The initial findings in the area are the location of the project is in the Trans-Nzoia county transversing all the locations along the stretch.

- There is also the urban area – Kitale town.
- Peri-urban-Kitale to Matisi with medium population
- Rural – matisi to Suan with intensive crop growing livestock keeping and agro-forestry.
- Public utilities also like water supply lines, powerlines etc. will also be affected.
- The also explained also the access to infrastructures among other key issues in the area among other issues of concern in the area as reflected in the county development plans.
- He explained on the healthy status, economic activities and literacy levels along the stretch.
- He also said in the project there are two stakeholders' presentations and also the public consultative baraza's later another stakeholder meeting will be called to notify the stakeholders on what will be implemented and what will not be.
- Public baraza's are already under way with 2 already having been done among the 7 meetings which will be held along the road.
- He also told them to give in their inputs to be incorporated in the design of the project.

MIN. 5: RAP

The valuer explained on the methodology to be used in the value saying she will be using the ADIB POLICE as well as the government policy.

- The ADB Policy states those affected should be left in a better situation than how they were before the project.
- RAP is developed to cover involuntary displacement and resettlement of the people by a government project.
- This is to ensure the disruption of PAPS is Minimised – This covers the socio-Economic issues in the project.
- When it comes to relocation and any loss of property and assets involuntary access disruption.
- Loss of income sources/livelihood is also considered.
- The project is based on the constitution of Kenya Section 40 that talks of protection of private property where by the right process has to be followed.
- Land Acts part VIII:

  They are:-

- The eviction and resettlement procedures Bill 2013 – Resettlement process
- Prevention, protection and assistance to IDP'S and affected communities act 2013. This states that the affected people shall be compensated and those whose laid has been acquired fully and come IDP's they should be categorized as IDP and should be compensated in advance promptly and fully to continue with their lives as before.

Data collection methodology

- For land we get the size of the land affected:- Note the owner and other issues.
- Structures – materials used in construction and measurements
- Trees – count, categorize as mature, medium and younger for valuation purposes
- Crops – we estimated the acreage.

On the compensation if the person owning the land is not the owner of the crops, structures or trees, the payment is done to its respective owner without considering where the structure or tree is placed.

MIN.6: QUESTIONS, COMMENTS AND RECOMMENDATIONS

ACC – About the design, how much time will the tendering take?

- Can the project be done in phases to reduce the time lines.
- About the Mowlem dam the dam should be filled or be given protection like fencing.

Ans.

Tendering process take 3-6 months procurement and duration like each almost one year and so we will know later.

- About the phases the contractor is the one to decide depending on the cost
- About dams

  This is a law that all the borrow pits should be filled up.

Ans.2

Between Matisi and Madalala the dual should be extended to Matisi corner.

- Will the only people to become resettled be the house owners or even the informal resettlement schemes and how much.

Ans.

The dueling has to meet some certain aspects for it to be dueled so past and where the dual ends we will do a wide road and at Matisi we will do some service lanes to reduce the traffic.

About who to be compensated:-

- We only compensate those in private land but not those in the road reserve since it’s a public land.
- Those on the road reserve will only be given a notice.
- On where does the 40m width start and end.
- A class A1 road has to be 60m why do we have 40m, instead. The markings should be done clearly on time.

Ans.

ADB policies about compensation along the road reserve are clear and those along the road reserve can only be assisted to relocated to another place but not compensated.

- The road is class C starting from the junction, the size 60m or 40m depends on what has been gazette this varies from one area to another depending on the compensated land.
- KENHA nowadays has a department dealing with the road reserve issues for protecting the road reserves in every region of the country, so on the department will start demolishing any encroached structures.
- About the projects we will mark the 40m edges.

Qtn

The bend at DC's office Entebess there should be a roundabout there to intermarry with the other road coming in there.

- Will you provide service lanes at entebbes also.
- Will the contractor sub contract some given opportunities for the locals so as to benefit from the project.

Ans.

The design is considering many aspects and when a roundabout is put up there must be traffic lights to help. Traffic is also considered in putting up a roundabout.

- Service lanes in Entebess is not possible because of the DC office can't be put down.
- About subcontracting this is possible but upto 30% is allowed. But the locals should not overcharge their services since the contractor is a businessman and should save something.
- The locals will be given job opportunities but since it's a national project, all the people in the nation should be given an opportunity also to participate.

Qtn.

Awareness campaign – How will the people be sensitized on how to use the road?

- Are the diversions
- How many positions are there for women.

Answer

- Diversions are done to control traffic
- All jobs are open for every gender without any discrimination.

Qtn.

Drainage – will it be catered for in this time – Yes.

Qtn.

Tony – suggested:

- We have a culvert to the hospital during construction provide access to the hospital.
- Social facilities within 600m along the roads be provided with access.

- At the orphanage of the physical and mental disability people , will the road be disability friendly in accessing the opposite side of the road? Anderson medical centre.
- Can we do a stage at the school of the disability?

Ans.

- Access to facility will be provided
- Social facilities like bus parks will be identified and be done
- Disability friendly - the road will be considered for that.

Qtn

Any healthy facility near the road put up a culvert to access it.

Ans.

That will be done.

- Consider every market centre if you can't put up a stall put up a necessary facility to assist those working there.

Ans.

- All facilities will be provided access.
- We will provide a lumpsome to take care of social facilities – we have been proposing to do a facility but if we lack land we can't pay for land for that so its upon the locals to provide the land for that.
- We can provide a slip road to access the markets in the area for people to buy goods as they pass.

Qtn. Nekesa

Can beautification be done along the road and if there is a slot possible give it to me to put up a monument.

Ans.

- There are 3 round abouts and you can beautifiy them
- We will also provide the grass planting in the round abouts.

Qtn.

The round abouts at the museum can be replaced with a fly over.

Street lights be put up in town.

Ans.

A flyover at the museum was not justified since we have no land for it there but we will look at it again.

There is street lights all through the town and in small town we put up some in every centre.

We will advice the county government to put up the lights there in future.

Qtn.

- Dust from the road should be considered and be controlled.
- Consider the peri urban status that goes to ADC machinery section instead of taking it to Matisi- provide a service lane in that area.

Ans.

- We will take care of the dust by watering the roads during construction.
- Peri urban Matisi – the dual goes past Matisi and where need be we are putting up a service lane.

Qtn.

- Dust and crops – dust affects crops productivity and so ahould be curbed.
- Deviations – This and be provided in this road to ease traffic during construction.

Qtns.

- The area from Matiri we have natural forestation with wild animals, mitigation measures should be put up in place like road signs to alert drivers of the animals.
- Fumes, liter, solid waste management should be put in place for this new road.
- Bumps increases wear and tear to our cars, give us friendly bumps instead of those which will slow us to O before picking up.
- Shoulders on the road should not be used for bicycles but suggest an alternative for the bikes
- KENHA Should take note of illegal bumps on the roads which are of illegal bumps on the roads which are causing harms to the motorists.

Ans.

KENHA is standardizing the bumps.

Environmental issues will be taken care of.

Qtn.

- Redempta Wekesa

  HIV/AIDS – we have a component on behavior change and have meeting to advice locals
- Have a provision for people to come for counseling once things happen e.g. have monthly meetings with the public.

Ans.

- In the public meetings we are informing the people that this are happening.
- We will recommend a centre to be put up in place to address that.

MIN.7 CONCLUSION

The presiding engineer welcomed the project supervising engineer who thanked the consultants and stakeholders for their time.

P.S. Engineer- the requested for animal crossing point data from the KWS.

Bumps will be put up which are motorists friendly on the road.

At Kibora market we are putting ups bumps and requested the administration to enforce the implementation of what is put up in place.

- NMT facilities will be done where necessary as the financiers policies outline.
- Let us ensure the suggestions we give won't increase the budget to a tune that the bank can't finance leading us to lose the funding of the project.
- Let the forest department give us room to do an expansion at Suan centre since there is no room for expansion there.

MIN. 8: AOB

The stakeholders were welcomed for lunch and the meeting was adjourned with a word of prayer from one of the attendees.

The DO introduced his company including the chief, AP inspector, she expressed joy for people's meeting. She explained that in all protect, public should be involved.

There is a protection earmarked for construction and that is why they have been called. The road will facilitate easy movement. It is an awareness creation for us.

PUBLIC CONSULTATIVE MEETING HELD AT KITALE PARK MAIN HALL

Attended by – refer to the attendance list. The DO welcomed the sociologist to introduce his team and explained the purpose of the meeting.

He further explained that we are Egis international and we are consulting on behalf of the KENHA concerning the survey and design of the kitale-Entebess – suan road.

The consultants introduced themselves one by one.

The sociologist explained that before the project starts there are various activities which take place which include – survey, design, identification of BPS and material sites.

- After this the public are notified of the project in details then later we carry out the RAP. For now we are carrying out the ESIA which will be followed by the RAP which will be carried out by next month.

MIN.2: ENGINEERING PRESENTATION

The engineer requested the attendees to give in their inputs and suggestions which may incorporated in the design.

He said the road is class C45 starting at the show ground junction where we will be doing a dual carriage way from the junction.

He said that currently the town is very congested and so we will be doing a very wide dual to ease the congestion. Foot paths will also be put in place to cater for pedestrians.

- We will also put up either footbridges, zebra crossings, road signs, street lighting and guard rails which will also enhance security.

- The Engineer said the space is not sufficient for now and so we may affect some few structures which will be explained later.

MIN. 3: ENVIRONMENTAL PRESENTATION

The environmentalist said we are following the EMCA 1999 LAWS to consider and take care of the environment.

Some of the effects to be highlighted in the GA report will be:

- How to control dust pollution

- To ensure the minimum number of trees are fallen and those cut should be replanted.

- Also in the report we will see how to control noise pollution and vibrations and we will advice the works to be done during the day.

- Waste management will also be controlled.

- Soil erosion control methods like planting of grass ans stones pitching and scotching to control soil pollution.

- She also said where there are wild animals crossing we will put up road signs and speed calming methods to ensure the safety of the animals.

After all this report will be presented to NEMA to see if the required measures are taken to prevent the locals.

MIN.4: sociologist presentation

The sociologist explained that Kitale has a very high population and so we must give them foothparts. Also many of the Kitale residents are commercial people and along the road, 40M is occupied by many hawkers among other users- and so we will mention that and see if there can be a provision to provide market stalls for the business people- this will be necesited by the county government since its responsibility.

MIN.5: ANTICIPATED IMPACTS

- The project is expected to come with some impacts.

POSITIVE IMPACTS

- Fast movement of the vehicles

- Accidents will reduce due to enough road space.

- Money circulation will cause businesses to boom and life styles will change positively.

- Employment opportunities to the locals since 60% of casual employment should be given to the locals by law.

He advised the locals to be organized and present themselves to the contractor to get the jobs.

He advised them to form a communities which will link them with the contractor and adviced them once they get the jobs to be responsible while on job.

Negative impacts

- Outbreak of health related disease which may affect others, e.g. TB, HIV/AIDS etc. he advised them to exercise self control while relating with each other. Though there will be centres to take care and prevent HIV/AIDS like ARV's, roadside clinics etc.

- Breaking of many homes due to the money in circulation. He advised those present to live as they used to be and not to live differently because of money.

- Also he advised the girls to exercise self control to ensure they don't get unwanted pregnancies and be left with extra responsibilities.

- Established groups and organizations breakages since may will be relocated to elsewhere.

- Insecurity issues may also arise and he advised the community policing and others like Nyumba Kumi to be Keen.

- Increase of population in Social amenities like schools, hospitals etc due to many who will come.
- Also disturbance of business during construction.

MIN.6: RAP

In RAP we will use the ADB policies and lands acts and we adopt policies which ensures people are compensated.

Who is to be compensated

1. Land owners – whose land will be acquired to expand the road
2. All structures will be compensated
3. Trees – All trees cut down will be compensated provided they are not on the road reserve.
4. Crops – all crops will be compensated

NB/. If the contractors destroy your property during construction they should be held responsible.

Those on the road reserve will not be compensated but will be given adequate notice to vacate.

After the total value the PAPS will be added another 15% of total value known as disturbance allowance.

The compensation will be at market value.

After we are through the NL board will send their valuers to come and verify and present offers to the affected then later they be compensated and then construction will start.

We will also take a sample of the hawkers along the road reserve to get an overview to see how many activities are there but those on their own land will be done 100%.

NB. The sociologist cautioned that we have not come to tell people to relocate but when that time causes they will be notified by a notice in the newspapers of wide circulation and radus and banners and also the county government ill be notified.

- He warned those who want cooperate that we will only give our estimates whereby the owner will be the loser.
- Those with disputes will not be compensated until their dispute is over so he advised them to solve their issues before that time.

MIN.7: QUESTIONS, COMMENTS AND RECOMMENDAITONS

QTN **Min 7. Questions ,Comments & recommendations**

QN1 .Henry Opale- I wanted to know the time frame, what is the exact time.

- Will we be resettled first before the start or later after construction.

QN2.Colleta Lumonya

- Your said you will count on Kibandas what will happen to those selling wares on the ground.
- Will we be assured that there won't be any corruption in employment opportunities.

QN3. Gerald Otunga

I have a Kibanda where I sell but I am mobile business person, if you find me absent will you wait for me to come with the other stock.

- If I have a shelter by the roadside, how will I be considered.

QN4.Steven Amakoha

- Do you have rules to govern diversions.
- Y don't you join the dual with the interchange on your way to webuye so it be continued.
- Let hawkers by the road side not be requested to pay the government but we will relocate peacefully without being charged.

QN5.Jose

- If you come to assess a house where I have rented will you take care of the landlord or the tenant.
- Can you help us to get the licenses from the government.

Response

- According to law you should be compensated promptly and then you should also relocate prompltey.If you are givena offer and you refuse then bring a offer higher than the expeted, the process may take some time which will make delayance in compensation .

Colletas and

Even if you share a table 2 people we will count each person independently- let people be honestly during that time.

He requested those organized to provide a list of their members along the road.

About corruption.

H e advised those wanting to be employed to decide on which way they can be employed without corruption.

About mobile business people.

Those along the road reserve we will only take a sample but those on private land we will handle them 100% .

About where to be relocated .

- We have advised the county govenermtn to relocate the hawkers where there are business e.g. relocate them at the same place where matatu terminus are.
- KENHA won't request for compensation .

- Renting and landlord.
- The owner of the house will be compensated fro his property but the tenants will only be given relocation costs and a also livelihood cost for 3months.

- When will contractor come (time) we are doing design to produce tender documents and the exercise will end by August.Procurment will be doen by KENHA .The process may go upto June next year when the contractor may come on the ground.

About diversion.

In the town we wont provide a diversion since their a existing road and we will do one and then the other.

Past town we will do a reasonable diversion say 10km.

About extending the dual to interchange webuye-

The government is the only one who can decide on that.

QN 1 Which will be the category of jobs available (casuals)?

Ans

- Casuals are the skilled staff.
- Drivers are semi skilled and they will be considered provided that they pass the interview.
- There is also prevalence to gender- youth - then elderly.
- Casuals pay we can't force but they will follow the labour laws.
- He advised those getting jobs not to hike the labour cost so as not to lose out.

QNS

ON Julius Chirchir

Once you are given opportunity to work and resetlle a person what will be the duration of project implementation, so that we come back to the road .

QN Lenard Wafula

Between now and the construction time what will you be doing that time.

QN Joseph Andero

Many of those affected are hawkers what will we be doing between now and next year.

QN Josphat karuri

Our landlord has an allotment letter from the government , will his tenants be considered.

QN Can those constructing along the road continue or stop.

Drainage from show ground is blocked and the storm waters will pass on the road.

Qn Drainage should be upgraded and the waterway should be done in a good and permanent way.

QN Benjamin Wafula comments

When relocating us give us a notice and lease with Transnzoia municipal council not to be collecting money illegally.

QN Chief Municipal

Requested if it is possible for the hawkers to be provided with modern stalls near the road so as to continue with their business.

Let those affected to be the first to be given first priority in jobs.

He advised the locals to exercise self control and invest wisely.

ANSWER

- The Eng. Said the construction will take 2 years but at the town it will only be few month and we pass.
- Drainage will be done in a modern and good way , that will take care of the storm waters.
- We will give a budget to the constructor to construct modern stalls but its upon the local administration to provide land for the same.
- After this exercise (RAP) we will call PAPS meeting for more information. The sociologist requested the attendees to ensure they fill in the attendance list.
- RAP activities will start in Kitale as we proceed to the other locations.
- Those who pay the county government we wont get in the issues of if to keep on paying or not .

MIN 8 CONLCUSION

The sociologist requested for maximum cooperation during the exercise and thanked all for their time and attendance .

The DO thanked the attendees and gave the inspector permission to address security issues and then the meeting was adjourned with a word of prayer from one of the attendees.

PUBLIC CONSULTATIVE MEETING HELD AT TUWANI BARABARA MPYA WORSHIPORS ASSEMBLY CHURCH ON 15 TH APRIL 2015

Attended by ;Refer to the attendance lists.

Preamble the meeting was called to order at 1517 hrs by thru area chief and requested one of the attendees to open the meeting with a word of prayer.

MIN 1 INTRODUCTIONS

The attendees introduced to themselves and then the chief welcomed the acc to welcome the consultants to also introduce themselves.

The Acc informed the attendees that of the meeting was to notify the locals concerning the construction of the road form Kitale to Suam.

She requested the attendees to be free and ask questions and also give in their comments concerning the project.

She welcomed the team lead- the sociologist to introduce his team. he informed them that we are from big consulting engineers who are contracted by KENHA to do the dualling from Kitale to Suam .

The sociologist welcomed the engineers to present design of the road.

MIN 2 : Engineers presentation .

The engineer said we have a contract to design the road from Kitale show ground through Bidii to Suam from town .It will be dual .At Bidii road will be widened , there will be footpaths, sidewalks and also service lanes will be put up in Bidii.

Access culverts will be also provided to each homestead and drainage will be taken care of in all the stretch.

He requested the attendees to give in their inputs to the design

MIN3 Environmental presentation

The environmental list said she will produce a report to be presented to NENYA Comprising of :_

-DUST POLLUTION

This will be taken care of to ensure locals are protected.

-Cutting down of trees.

Trees which may be cut down will be replanted.

Noise and vibrations pollution

This may be brought about by the constructing machines and also from the theories where we source for material.,

- Dust bins
- Soil erosion

This will be protected by ensuring there are grassed grown by the road side or do road cementing to protect soil erosion.

A wild animal's erosion

This will be taken care by providing road signs and also speed calming methods to protect the animals.

MIN 4 SOCIAL PRESENTATION

The sociologist said the road will benefit the residents in many ways and so they are expected to protect the road side signs and should not put up illegal bumps. They urged that to be the custodian of the road and ensure they protect the road as their own.

He explained that in this area people have not encroached a lot along the road reserve.

He also noted that the areas inhabitants are business people and he urged them to notify the others of what will be discussed today.

The sociologist classified that the road alignment will not change but will follow the existing road reserve.

He explained that those operating along the road side will not be able to use it any more.

ANTICIPATED IMPACTS

Positive

- Ease of transport .This will be enhanced by the new lean and spacious road which will reduce the coast of transport.
- Enhance safety ,Since the use of bodabodas will reduce.
- Increase of land value .
- This will be brought about by the change of road. Etc.

Negative

- The funds doing the road will be refunded by us as Kenya as since it s a loan.
- Influx of population in social amenities e.g. schools, hospitals etc.
- Out break of diseases due to many people around and the dust population e.g. TB.
- Insecurity .This also may be an issue and so be advised the locals to enforce the community policing.
- Different social ways of life to be brought about those constructing .
- Breakage of families due to lots of money in circulation during construction.

HIV/AIDS

There will be programs to create awareness on HIV/AIDS and also ways to prevent it ,but he advised the locals to excursive good morals and self control so as to benefit from the project instead of perishing with it.

Resettling of some people and also sign posts which may change their ways of life also since the vehicles will be traveling at a higher speed business may be affected .

MIN RAP

- When compensating those affected we follow the government polices as well as the ADB polices who are funding the project.
- These on the road reserve will not be compensated but will not be given notice to relocate but those to be affected on their private land will be fully compensated.

What will be compensated .

- Houses - structures
- LAN
- Trees-depending on their sizes
- After carrying out the data collecting we will go back to calculate the esteem valuation s of the property.

He requested those presented to be cooperative so as to get a fair values .

After conclusion of the exercise the NLG will come back to verify on what we will have e indicated.

MIN 6 CUT OFF DATE.

After the RAP exercise the people will be given a date to stop further development until compensation since anything extra will not be compensated.

MIN7 Questions comments & recommendations

QN1 Kizito Robert Ogoli

Those operating along the road reserve are only depending on the road, when the project starts can those affected be given first priority during jobs in construction.

- We have groups organized for youth and women can they be considered to be tendered for grass planting by the road side and sub contracts like management of the environment.

- You have put up huge bumps can you please put up smaller bumps top ensure safety fro motorists.

QN Disability friendly road should be done.

Qn Kiplimo

If compensation will come from the treasury can we know when to be compensated. When will you do the road extend markings.

Q Will the youths be given employment opportunities to reduce insecurity.

Q Paul Mungai hawkers by the road wide will we be given a notice toward construction.

Qn :There are structures by the road side which will be removed ,how will we be getting our daily bread after that.

Q Chief (Madam)

Will they girls be given job opportunities in construction .

Will the mothers be given opportunity to sell food to those constructing

QN Wamwingi

Dumping a place for dumping.

Will there be a notice to remove those things by the roadside.

If my structure is affected partially will it remove it still.

ANS

Kizito

- During construction PAPS are given first priority in jobs we have not come to tell people to leave but to inform them .When time come they will be notified so as to relocate.
- If your lies is marked by KENHA the owner should ensure to remove it instead of waiting for the tractor to remove it.

About local environmental groups .

Those may be considered to plant the grass and other activities but they should show their capability of doing.

- Physically challenged and disabled.
- When to be compensated. The law states that those affected should be compensated promptly but there are others who may not be paid on time-e.g. Those who don't cooperate in giving their signatures or refusing the values.

Hussein-17 you are on the road reserve you will only be given an office to relocate without considering how many people you have employed but if you and a landlord on a private and your tenants considered.

- About notice-it will be given.
- Road side structures –where to relocate the people is a responsibility of the county government but not KENHA.
- About Jobs

It is required by law that 60% casual employment is given to the locals, the urged them to be organized and have representatives to represent them .Those who get the employment should be of good conduct so as to maintain a good working relationships with the contractor.

Those who wont get the direct employment should establish business to help them e.g. food supply to those working. He also urged those who want to get jobs like driving to start training early so as to be considered when that time comes .First priority is to gender, youth etc.

About signboards-

A signboards are found in your land relocation cost will be catered for but not those on the road reserve.

About Bumps

We will put up a rumble strip bumps which are friendly to the motorists and so we will do motor friendly bumps.

About disabled

We will put up a race pedestrian .Bumps to calm the speed of vehicles

About CBOS planting grass

Cooperate with the contractor and you will get the sub contract for the job.

Qn Chief requested the project not to collide with their cultural belief and religious .If the deviation pass through shrines and graves – how will you handle that incase it appears.

QN Kennedy Nyambogo

The width of the road is wide fairly after completion of the road will you put it street light in during the night.

QN Chief Biddii

If your land is acquired fully will there be provision to relocate them to a place of their choice.

Will you consider how to council the youth on behavior change and about HIV/AIDS.

QN Many houses are built using bricks will give us the soil to use for making bricks.

Will you employ those near the sign posts to protect them.

ANS

About graves and shrines

- We have been informed there are no shrines along road, since we are not realigning the road we may not affect many .About graves the relocation costs are catered fro.
- Full land acquisition -during RAP we will ask where you want to be relocated to or what you want to be compensated with.
- About awareness creation.
- This will be there but its your responsibility to protect yourself from such diseases.
- Employing those near sign boards-They will not be paid but its your responsibility to protect all road furniture's for your own safety.
- About streetlights
- Streets lights will be put up in place –flood must will be provided in this area.
- About soil dumping
- We will give you the chance to show the contractor where to dump the soil .

MIN 8 ;CONLUSION

The sociologist thanked those present for the time and informed them we will be starting RAP after one week and so he requested for cooperated among the locals during the exercise.

The areas chief thanked them for their presence .The chief requested one of those present t to close with a word of prayers and meeting was adjourned.

PUBLIC CONSULTATIVE MEETING HEDL AT MATISI MARKET ON 16TH APRIL 2015 ATTENDED BY : REFFER TO THE ATTEDANCE LISTS.

Preamble

The meeting was called to order at 155hrs the area assistant chief who introduced the fellow Administration officials. She requested one of the attendees to open the meeting with a word of prayer .She later introduced the Nyumba Kumi officials as well as the village elders.

MIN 1 INTRODUCTIONS

The assistant chief welcomed the area chief to introduce the consultants. She welcomed the team leader to introduce his team and also give us the them of the meeting. The sociologist explained that we came from Egis and we are doing the design for the Kitale Suam road. He said consulting and informing the public concerning the project.

The Ace arrived and was welcomed by the area chief to say hi to the attendees and .the Acc greeted the attendees and said its a requirement by law fro people to be informed concerning any project happening in their area.

She welcomed the area inspector to introduce her and great the attendees.

The sociologist took over and introduced his team.

MIN 2.The project design .The sociologist said there are different stages undertaken when preparing the construction of the road including ,the survey, design, identifying the Bps and material sites as well as informing the locals where the project is being done. H e requested the attendees to be cooperative and give in their inputs.

The road starts from Kitale show ground being dual but as you enter matisi the road will be done wide so as to access mandate the traffic roadside walks will also be done as well as access culverts in every homestead.

At the market the speed will be reduced to 50 km/he by speed claming methods such as motorist friendly bumps.

MIN 3 .ENVIROMENTAL ASPECTS

The environmentalists said it is required that as we do the road the environment is not adversely affected by

Dust pollutions –There will be guidelines on how to control this like watering the ground every now and then.

Trees cutting down. When trees are cut down they will be replaced during and after construction.

Noise and vibrations pollution.

This may be caused by blasting in the quarries as well as the transportation of material etc.

Waste management .The contractor will have to ensure waste is controlled.

Drainage –This will be done presently since it's included in the design.

Wild animals –we will put up sign posts indicating where there are animal and also other speed calming methods to ensure safety of the animals.

She requested the attendees to give in their recommendation to be included in the report for their welfare.

MIN 4 : Social presentation

The sociologist explained that there will be put up a most flood light to ensure security at night.

He urged them to tell us what they may want to be done in their area.

He also said the locals should take part in jobs and other ways whereby they will assist in also protecting the road and the road furniture's to ensure their safety.

He explained that the area has population of residents tenants and business people e.g. maize sellers and also land owners .

He told the attendees that many of the residents have encroached on the road and may be affected.

Anticipated impacts.Postive

Fast movement.

Recuiton of accidents

Increase of land rates and value.

Availability of market for their rental houses.

Job opportunities since its a requirement that 60% of casual should be sourced locally.

H e encourage d those who may not get direct employment opportunities to start business e.g. selling food to those employed .Also those who may want to get professional opportunities to start training early in advance so as to be ready when that time comes.

The road may be done by next year

Negative impacts

Increase of population

Increase of population

Cultural interactions which may not be same as theirs.

Family's breakages due to lots of money in circulation's e urged them to live as they used to before the road and not break their families due to money.

Health related issues caused by alert egg TB etc as well as the deadly HIV/AIDS which may be caused by irresponsible. sexual relations.

Business disturbance during ,construction which may affect their business.

Relocation of structures and also land because of expanding the road.

MIN 5 RAP

The sociologist explained that at the end of this month the exercise will kick off and we will establish those encroaches and those of their land to collect data or estimate valuations .

He requested the locals to be cooperative and once the cut off date is given should not change the status of anything.

What is to be affected.

Hawkers.

Raw material-soil for sale by the road side.

Relocation of electricity lines and water lines.

We will be using the ADB policies sop as to ensure everything is okay.

The sociologist said we have e not come to tell people to go buy they should wait.

Until a notice is given for them to move's e urged them to live as the were until they are given them the notice.

What to be compensated

Land-This is only the land that is owned privately but not those who have encroached.

Structures-All structures on private land will be compensated once affected.

Trees –This will be compensated once affected.

Tress –This will be compensated depending on their size.

Crops

NB

After total valuation the PAPS will be added another 15% disturbance fee for being disturbed by the road.

He requested for cooperation during the exercise so as to get a fair valuation of their properties

NB

Compensation should be done promptly before being relocated .

MIN 6 Questions, comments and recommendations.

QN 1 Fred Wafula

W e a re promised jobs but we never get them, how will you ensure we get the jobs this time

QN 2 Tom Ekirapa

How will you be compensating

QN Daniel Simiyu

Those operating by the road side how will they be assisted.

Qn4 Mary Nahungu.

Will we be shown some where to do tree nurseries.

Q5 Patrick Nyongesa

At matisi we donor have a market we use the road we given an alternative place for us to continue with our business.

QN6 Wmalwa Daudi

What criteria will you use to employ us.

QN7 Lotay Amkada

Request how will you help us in side the estates in terms of reducing mud.

QN8 Simon Wanyaja

We depend on the road for business since we don't have a market is there a plan to give business people a place to trade in.

The most light should be put in the market to reduce insecurity.

QN 9 Joshua Korir

How will the storm waters be controlled so as not to affect the residents.

Q10 Maina Ngunjiri (VSCW)

Will you buy a place to put up a market in the area in your CSR department.

QN 11 Joel Bwalya

Will the person where dumping by the contractor is done be compensated.

ANSWERS

About getting employment

The sociologist said we will put it in the report that the people locals be employed.

He told the locals to be united and have representatives to ensure they have linkages with the contractors to get the jobs .Once the vacancies are announced he also urged them to give in the well behaved people to protect the image of the area.

About compensation

The locals will give recommendations on how they want to be compensated either in cash or what has been affected replacement .

Those on the reserve (market).

Those on the road will not be compensated. Those affected will be given 1st opportunity in the jobs available .Also second chance will be given to ladies then youth.,

About providing the market it s a responsibility of the county government and not of KENHA.

Tree nurseries

The County government provide a place for that ,but where urged to seek the opportunity of planting the trees by the road side.

About storm waters.

If there is a diversion of water we will pay for it, the locals should ensure water is not directed intheir property.

About most light

This is will be provided

Dumping soil intheri area.

The person should report to the authorities and if he does something to your house,the should pay for it.

About those having tree nurseries .

Those who have that we can buy their trees and give them the opportunity to plant them.

QN John ISa

The road will be very wide for people to cross the population here is high we request for a foot bridge to help us cross.

ANS

We have not provided a foot bridge but we will consider that let the locals help

us for identifying where to put up speed calming methods like signs ,bumps and zebra crossings.

MIN 7 CONCLSUION

The sociologist requested for cooperation when we return for RAP and also thanked them for their time and attending the meeting.

The area chief thanked all for their time and requested them to take what has been done seriously and exercise self control.

AOB

A vote of thanks was given by one of the attendees and the pastor closed the meeting with a word of prayer.

CONSULTATIVE PUBLIC MEETING HEDL AT ASST. CHIEFS OFFICE KIMASE MARKET ATTENDED BY : AS per the attendance LIST

Preamble ./The meeting was called to order at 1430 hrs by the area asst chief who requested one of the attendees to open the meeting with a word of prayer.

The asst chief said the local should consult only the administration officers and the consultants only but should not welcome brokers.

MIN 1 .introduction

The asst chief introduced his team and welcomed the consultant s to introduce themselves and start the meeting.

The environmental list introduced herself who are designing the road.,

Min 2 .The engineers design presentations .

The Eng. Said that the road starts at Kitale through endless to Suam.

He said the road will be taking 40m but something like corner cause us to acquire some more land .Those whose land will be acquired will be compensated. the road will be farm asked all the way from Kitale and it will be wide accommodating foot paths cycling paths etc.

At the corners just before the market we will selling I this causing acquisition of some land. He requested the locals to give in their inputs too be incorporated to the design .

MIN 3 .Environmental presentation some of the things we will take care of are:-

Dust pollution by watering the soil during construction

Cutting down of trees, this will be controlled by replacing the trees during construction

Waste management during construction will be taken care of.

Noise and vibration pollution caused by machines and blasting of storms in the quarries .We will advice this activities to be carried out during the night.

Drainage and soil erosion-

We will advice them to plant grasses and do stone .. to ensure no soil erosion.

Wild animals crossing –we will put up seed cal mining methods like the bumps and signposts etc.

She requested the locals to give in their views to be include in the report to be presented for NEMA.

MIN 4 .Social presentation

The sociologist explained that the local have a responsibility to take care of the road and protect the road furniture.

Anticipated impacts

Positive

Cheap transport cost.

Value of land will increase .

Money in circulation will increase of the locals.

Employment opportunities and business opportunities during construction first priority will be given- PAPS ,then women ,youth and the men. He advised them to present themselves during that time to get the jobs. They should also start training for professional jobs early and be unite d and organized.

Negative

Insecurity due to many people coming and be advised people increase their community policing to secure their area

Breakage of families due to money in circulation. He advised them not to leave their families because of money since its goanna end. He also requested the mothers to advice their daughters to exercise self control to ensure they don't get unexpected responsibilities due to irresponsible behaviors.

Cultural mixtures which may affect their ways of life since many people will come with mixed cultures.

Healthy related problems like TB,HIV.AIDS which may be infected by the locals .The advised the locals to self control.

Physical changes which may affect what they have been used to see.

Relocation of homestead

MIN 5 RAP

This is done following Kenya and ADP policies.

What to be compensated .

Land

Structures -every structure

Trees according to size

Crops -in acreage

We will start the exercise next month and so he requested for maximum cooperation during that time so as to get a fair values. He requested that the locals be honestly when giving out data to the envirnmetors and don't lie about ownership.

After getting the estimates we will take them to the…….. whereby NLC will come to verify what has been counted .

After carrying out the RAP we will give a cut off date whereby no other item added will be compensated.

After verification the offer letters will be brought then later construction starts.

We will late r call a PAPS meeting to explain what will follow next.

Those with pending case will not be compensated until the case is through.

MIN 6 QUESTIONS & COMMENTS

QN 1 Charles Wamalwa

Land values differ will you consider that.

QN 2 How can we get the jobs

Qn3 Timothy Ongeri

Many of the lands have no title ,what will you use to verify the ownership.

QN 4 What will be compensated if my land is affected by along stretch.

QN5 My land has a case, when you relocate me and you don't compensate a disputed land where will it be that time before the end of the case

QN 6 Will you compensate for graves.

ANS

Land values differences.

We will consider everything in valuing.

About employment

Cooperate and be in unity to get jobs.

About title deals

Even If you don't have a title deed we will use local administration to establish ownership of the land.

About long stretch .

Everything will be compensated.

Disputed land.,

The project will not wait for your case to be over and so.

It's up to you to finish your disputes.

About graves along the road.

We don't compensate for graves but we cover its relocation costs.

Qns

QN We have cooperative societies

ANS

Land how will it be compensated we will use that structure to identify the owners.

QN will you compensate in cash or replacement

During our survey we will ask how you want to be compensated your choice alternative will be applied.

QN Please provide us with speed calming methods in this market.

All the market are provided with speed claming methods like bumps, zebra crossing and road signs

QN How will we identify those genuine people concerning with the road.

We will be the same people coming to collect the road data together with administration. IF my land has materials and you source for materials and will you take the materials and leave my shamba or you will buy it completely .

Visit the contractors office and see if we will buy you material but after finishing with the materials we will leave the shamba for you

QN John Kisaka

Don't bring new people to work here on we are here be in unity and those who will get the jobs excise good morals so as to main the jobs

This 60% is of casual employees only and its upto my to be organized well to benefit.

QN Nyongesa Kikwai

If you take my land to be the contractors yard, will I be compensated.

You will make agreements with them

QN Time frame of payment.

You should be paid promptly and be given a notice to relocate.

QN If I have private school will you relocate me with the pupils or what?

Public institutions will be done a fresh but private institutions the donor will be paid the costs.

MIN 7 CONCLUSIONS

The area chief thanked those who attended the meeting.

The chief advices the locals to observe good morals when the project starts.

He advised the local to be good ambassadors and inform the others of what they have been informed .He also advised those compensated to invest wisely so as to benefit.

MIN 8 AOB

The locals where thanked and the meeting was closed with a word of prayer from one of the locals.

CONSULTATIVE PUBLIC MEETING HELD AT SANGO CENTRE ON 17TH APRIL .

ATTENDED BY: Refer to the attendance list.

Preamble: the meeting was called to order at 1105hrs by the area chief who called one of the attendees to open the meeting with a word of prayer.

MIN Introduction

The chief said the area is under a land owned by two cooperative societies.

He welcomed a representative of the societies to welcome the consultants to the meeting.

He welcomed the consultants to the meeting and called upon them to introduce themselves. The environmentalist explained that we will be doing the road from Kitale to Saum .She explained that there are different people from different department who are taking part in different departments of the road.

MIN 1 Environmental Presentation

The environmentalist explained some of the impacts concerning environment which may come up with the construction

Dust pollution of the road be watered

Waste management -the contractor should manage waste effectively

Tress cut down should be replanted.

Noise pollution and vibration work should be done during the day.

Soil erosion and drainage –This will be controlled by grass planting gabbions and stone pitching etc.

Wild animals-there will be put speed calming methods to protect the animals.

EMCA 1999laws requires the public to be informed of the project so as to get their views and include them in the report presented to NEMA.

MIN2 The design

The sociologist introduced himself and the company Egic. He said we are working on behalf of KENHA until to design this road C45 and from Kitale show grounds round about .Until Matisi we will have a dual carriage way together with service lanes .From matisi the dual will end and will do a wide road with side walk and pedestrian lanes. The road will take 40m and this area we may acquire more land which may affect their structures. the project is funded by ADB and we are waiting only to compel the legal process then construction will start next year.

MIN 3 social presentations.

We have consulted the leaders of the area and now we are informing the public on the impact we will require way leave and since many people there are agriculturist and business people there will be many people .

Anticipated Impacts

Positive

- Cheap and fast transport
- Increase of land value.
- Establishment of new markets
- Jobs creations 60% of casuals
- Will be given to the local population .They should be organized to get jobs.
- Business opportunities will be many during construction.

Negative

Breakage of families due to money in circulation.

HIV/AIDS infections.

Accidents –Though we will put up speed calming method

Relocations from the roadside which will affect many people.

MIN 4; RAP

The exercise will start next week to seek the estimates to compensate those who are in their land and those who have encroached will only be given a notice to vacate.

He told them we have not come to tell people to go but they should wait for notices.

What to be compensated.

- Land
- Structures
- Tress
- Crops

After total value of your property

You will be added 15% disturbance allowance.

After that NLC officers will come verification then later they be compensated .he requested fro cooperation during RAP ,construction and also after completion of the project they should protect the roadside furniture.

MIN 5: Questions and comments/Recommendations.

QN 1 Moses Nyonges Simiyu

Will you compensate fro graves?

Qn 2 Janet Baraza

What will be the qualifications fro jobs.

QN 3 Will you change the alignment of the road.

QN 4 Martin Kunyasa

Who will be affected will the road be expanded from the current alignment.

Reduce the road to 15 mm instead of 20m.

Qn How will you consider the plots.

What will happen to structures along the road.

ANS

- Who is affected
- We will show you when we come with machines
- We wont change the extend of the road that was surveyed .
- About plots identifying owners we will use local administration to establish the owners.

QN

How will we curb corruption during jobs distribution

How will women be involved in construction.

I don't have allotment or title.

ANS

Women jobs

First priority will be to PAPS, then ladies and youth.

We will need to see the documentation of ownership but we will use the local administration to establish ownership.

QN

Distributed land

Land that is disputed will wait until the case is cleared.

QNS

Janet Barasa

How will the bumps be?

We will use motor friendly bumps in this road and also a road sign to warn the motorist.

QN Martin Ongesa

What will happen to those who constructed when they didn't know they were on the reserve.

The road was surveyed along time ago, and we will maintain that alignment.

MIN 6 ;CONCLUSION

The chief thanked all for their time and closed the meeting with a word of prayer.

Kitale - Endebess - Suam Road Project

Consultations with Mr. Bernard Orinda, Kenya Forest Service Zonal Manager, Trans Nzoia

Date 13th November 2015

Tree boulevard

The forester appreciated that the design will avoid, to the extent possible, the tree lines between Kitale and Endebess. The official informed that most of the trees are actually within the ADC farms and therefore privately owned. These trees are very old, mostly over 50 years and some have started falling while majority of those still standing have developed heart-rot and will die in the coming years. On this the KFS has approached the ADC to partner with them to proactively plant replacement trees as the current trees die off. If this proposal is agreeable with the ADC then the KFS will assist ADC in selecting appropriate species and assist with silvicultural management. The forester said species selection is critical so as to have an ideal mix of indigenous and exotic species. Since indigenous species are not vulnerable to heart-rot or other diseases, the tree line will be maintained much longer. On the other hand the exotic trees will provide the aesthetic values and maintenance of character.

Suam Forest

The forester acknowledged that the road runs through forest land but at the edge of the forest. This part of the forest is however set aside for plantation forest. Since the last plantations were cleared tree planting has not been done which has left the areas covered in shrub and herbs with occasional standing trees of no merchantable value.

His assessment is that the road improvement project will have no direct effect on the forest, but cited possible operation positive impact as being a sink for GHGs whose local emission will increase with increase in traffic volumes. To this end, KeNHA could enhance their partnership with KFS to enhance this positive function by supporting the on-going afforestation efforts.

The forester informed that KFS has embarked on strip planting of indigenous species along both sides of the road to act as a buffer. This initiative has commenced on the LHS of the road and will continue on the RHS. Because of this, the forester noted that there is no need for a fence on either side of the road. Furthermore beyond the buffer will be plantations mainly of pine trees on both sides of the road.

Stabilizing vulnerable sites along the road

Sites for new bridges were identified as areas that may require joint effort as they will require protection from land degradation such as soil erosion and landslides. He cited three bridges between Endebess and Suam. He proposes partnership with KeNHA in identification of suitable ground cover vegetation especially trees and other plant types such as bamboo and in planting and maintenance. In addition to sites where heavy excavations have created new slopes, tree planting could extend beyond the specific sites to the neighbouring land. This may involve adjacent land owners.

Mt. Elgon as a Biosphere Reserve

He confirmed that the Mt. Elgon area is a biosphere reserve. He said the Mount Elgon Forest Reserve forms an important buffer zone to protect the reserve. In addition there is a 10 km strip of intensively used land in the foothills of the mountain range making up the transition area. The ecosystem Management Committee, however, has not been very effective in steering the implementation of the overall management plan. Part of the committees work is to mobilize awareness amongst the community and implementation of alternative income-generating activities such as hospitality facilities, agroforestry as a form of economic activity amongst others. He sees this road as a potential catalyst towards the

realization of the biosphere reserve management in that it can facilitate development of alternative sources of income, hence a positive impact.

Partnering with KeNHA

The forester mentioned that it is possible to partner with KFS zonal office in actioning the aforementioned measures as follows:

- Support nursery establishment to raise seedlings for planting along the road and at identified upstream and downstream vulnerable areas
- Support afforestation within Suam forest to enhance carbon sequestration
- Support tree planting at selected drainages especially at (and near) the bridges and where planting is required within the road reserve.
- That these activities could be undertaken during the construction period and not after.

KITALE – ENDEBESS – SUAM ROAD IMPROVEMENT PROJECT

Consultations with Mr. John Ongoto, Head of Natural Sciences, Kenya National Commission for UNESCO, Nairobi Kenya, interview on 20th November 2015

Mr. Ongoto appreciated that the Project has consulted the commission for their comments on the proposed project.

He had the following comments:

1. That UNESCO is in the process of establishing the Mt. Elgon Man and Biosphere Reserve into a trans-boundary reserve striding both Kenya and Uganda. This will call for transboundary cooperation in the management of the reserve.
2. Appreciated that the project is an important infrastructure development however sustainability is crucial given the international importance of the reserve
3. He indicated that the Commission has established a Man and Biosphere (MAB) committee which is composed of a wide range of governmental and non-governmental organizations key ones being Kenya Wildlife Service, Kenya Forest Service, Ministry of Environment, NEMA, and UNEP. Several NGOs are also represented
4. The MAB committee meets once every month to deliberate on MAB issues
5. He recommended that the ESIA produced for the project should be sent to the commission alongside a letter seeking their comments on the ESIA findings. That this letter should be addressed to: The Secretary General, Kenya National Commission for UNESCO, P. O. Box 72107 – 00200 Nairobi

Annex 2:

LIST OF PARTICIPANTS

Annex 2: Key Persons Consulted

Date	Name	Mobile Phone No.	Organisation/Designation
6.03.2015	Benard Owuri	0726 428373	Kwanza Sub County Agriculture Office(Monitoring & Evaluation Officer)
6.03.2015	Patrick Khaemba		Trans Nzoia County Governor
6.03.2015	Sifuna Wakofula	0723 412161	Trans Nzoia County Secretary
6.03.2015	Wycliffe Kiiya	0721 403802	County Executive Committee Member For Energy ,Public Works, Transport & Infrastructure
6.03.2015	Engineer Philip Wasike	0735 963641	Chief Officer For Energy ,Public Works, Transport & Infrastructure
6.03.2015	Mrs.Beatrice Bikeyo	0723 785411	D.O Central Division
7.03.2015	Abner O. Momanyi	0722 875768	Elgon Lodge Manager
7.03.2015	Mr.Wekesa	0786 641608	Delta Crescent Sanctuary Farm Manager
9.03.2015	Edward W.Osanya	O724 105644	County Director Of Agriculture
9.03.2015	Kenneth K.Kagai	0722 433699	Deputy County Director Of Agriculture-Crops
9.03.2015	Benard Bett	0720 174551	Trans West Livestock Production Officer
9.03.2015	Mr.Njeru		County Director Of Fisheries
9.03.2015	Peter Njuguna		Kwanza Sub County Education Officer
9.03.2015	Mr.Shadrack Singalavah	0729 808505	Chief Endebess
9.03.2015	Mrs.Rukia	0724 953 465	Sub-Chief Chepchoina Location
10.03.2015	Lusweti Edward	0728 561360	County Director Of Youth Polytechnics And Ecds
10.03.2015	Bob Anderson	0734 333095	Managing Director-Mt. Elgon Orchards Limited
10.03.2015	Mr.Kigen	0722 611030	Assistant Sub-County Commissioner-Kwanza
10.03.2015	Mr.Geofrey Kaibei	0727 823431	Chief Kaibei Location-Kwanza Sub-County
12.03.2015	Gladys Agala	0723 639765	Gender ,Youth, Sports And Culture Department-Sports Officer
12.03.2015	Dr.Philip Mbithi	0724 622965	County Public Health Officer
12.03.2015	Mr.Kapatet	0728 346550	Transnzoia West District Education Office-Administration

Annex 3:

MATERIAL SITES ENVIRONMENTAL APPRAISAL

ANNEX 3 ENVIRONMENTAL APPRAISAL OF MATERIAL SITES

Material site	UTM Coordinates (36N)		Material to be extracted	Flora& Fauna	Current land uses & utility facilities	Other features	Comments
BA 01	719672	119695	Gravel	Maize plantation	Residential and crop farming	Km 6.5 RHS offset of 5.3 km from the alignment	Suitable due to its proximity to the alignment. No ecologically sensitive areas around. Recommended
BA 02	717488	114008	Gravel	Maize plantation	Residential and crop farming	Km 8.5 LHS offset of 1.7 km from the alignment	Suitable due to its proximity to the alignment. No ecologically sensitive areas around. Recommended
BA 03	715796	115450	Gravel	Maize plantation	Swamp, fish ponds, crop farming	Km 9.5 LHS offset of 800m from the alignment	Near wetland and community investments. Caution is recommended
BA 04	710156	126336	Gravel	Maize plantation	ADC farms and squatter settlement	Km 13.25 RHS offset of 11.3km from the alignment	Suitable due to its proximity to the alignment. No ecologically sensitive areas around. Recommended
BA 05	704154	122998	Gravel	Shrub land,	Abandoned borrow pit	Km 24 LHS offset of 1.3 km from the alignment	Murram has been extracted previously and thus will not be out of character.

							Convenient since it's near the alignment.
BA 06	705834	124046	Gravel	Grassland, Shrub land	Residential area	Km 25+600 offset of 1.9 km from the alignment	Suitable due to its proximity to the alignment. No ecologically sensitive areas around. Recommended
BA 07	705587	129667	Gravel	Grassland, shrub land	Residential area	Km 32+300 RHS offset of 2.25 km offset from the alignment	Suitable due to its proximity to the alignment. No ecologically sensitive areas around. Recommended
BA 08	699577	133281	Gravel	Grass, *mixed herbs*	Abandoned borrow pit	Km 37+500 LHS offset of 620m from the proposed alignment	Murram has been extracted previously and thus will not be out of character. Convenient since it's near the alignment
BA 09	692949	133819	Gravel	Eucalyptus, *Grevillea robusta*	Near suam forest	Km 42+200 LHS offset of 2 km from the alignment	Near a protected area. Ecologically sensitive, therefore caution is recommended
HA 01	737307	94427	Hard core	No flora and fauna	Quarrying	Moi's bridge, along the Eldoret-Kitale road	Quarrying activities are ongoing and thus will not be out of character. Recommended

HA 02	704140	125397	Hard core	Grass land	Abandoned Quarry	Km 26 of alignment in Mowlem area	Quarrying activities have been practiced and thus will not be out of character. It is filled with turbid water. During public consultations residents proposed it should be drained.
SA 01	710450	149868	Sand	Grasses, reeds	River Kanyarkwat	Many kilometers from the alignment	Adjacent to water resource used by community. Ecologically sensitive, therefore caution is recommended
SA 02	726896	154409	Sand	Grasses, reeds	Near Kapenguria	Many kilometers from the alignment	Adjacent to water resource used by community. Ecologically sensitive, therefore caution is recommended

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Annex 4:

BILL OF QUANTITIES

KITALE - ENDEBESS - SUAM PRELIMINARY COST ESTIMATE

BILL NO.	DESCRIPTION	AMOUNT (KSHS)	% LOCAL	% FOREIGN
1	PRELIMINARY AND SUPERVISORY SERVICES	588,121,276.89	465,079,265.22	123,042,011.67
4	SITE CLEARANCE AND TOP SOIL STRIPPING	74,942,227.83	31,949,686.49	42,992,541.34
5	EARTHWORKS	756,970,246.22	188,224,096.99	568,746,134.87
7	EXCAVATION AND FILLING FOR STRUCTURES	29,515,582.26	12,736,414.57	16,779,167.06
8	CULVERTS AND DRAINAGE WORKS	402,244,677.93	167,817,467.37	234,427,086.32
9	PASSAGE OF TRAFFIC	76,176,458.70	16,311,235.36	59,865,223.33
12	NATURAL MATERIAL BASE AND SUBBASE	89,010,997.99	23,468,725.31	65,542,272.68
13	GRADED CRUSH STONE BASE	66,589,693.43	17,557,102.59	49,032,590.84
14	CEMENT AND LIME TREATED MATERIALS	436,032,048.60	163,877,011.19	272,155,037.41
15	BITUMINOUS SURFACE TREATMENT AND SURFACE DRESSING	557,591,849.20	201,385,871.56	356,205,977.64
16	BITUMINOUS MIXES	869,745,072.36	317,860,144.20	551,884,928.16
17	CONCRETE WORKS	322,003,902.68	119,910,074.63	25,972,114.44
20	ROAD FURNITURE	168,538,419.57	72,534,426.51	96,003,993.07
21	BRIDGE WORKS	2,666,460.40	2,208,419.60	458,040.81
22	DAY WORKS	59,550,656.90	17,980,354.70	41,519,027.75
24	ROAD SIDE AMMENITIES AND ACCESS ROADS	215,000,000.00	120,000,000.00	0.00
25	HIV/AIDS AWARENESS CAMPAIGN	7,800,000.00	7,800,000.00	0.00
26	ROAD SIDE AMMENITIES, STREET LIGHTING AND ENVIRONMENTAL MITIGATION MEASURES	5,160,000.00	5,160,000.00	0.00
A	**SUB TOTAL**	**4,727,659,570.97**	1,951,860,296.30	2,504,626,147.39
B	**PROVISIONAL/ PC SUMS IN BILL ITEMS**	**382,700,000.00**	382,700,000.00	
C	**SUB-TOTAL (A) LESS PROVISIONAL/ PC SUMS (A) - (B) = (C)**	**4,344,959,570.97**	1,569,160,296.30	2,504,626,147.39
D	**ADD 10% OF SUB-TOTAL (C) ABOVE FOR VARIATION OF PRICE (FINANCIAL CONTINGENCIES)**	**434,495,957.10**	156,916,029.63	250,462,614.74
E	**ALLOW 10% OF SUB-TOTAL (C) ABOVE FOR PHYSICAL CONTINGENCIES**	**434,495,957.10**	156,916,029.63	250,462,614.74
F	**TOTAL**	**5,596,651,485.16**	2,265,692,355.56	3,005,551,376.87

Annex 5:

EIA EXPERT'S NEMA LICENSE

FORM 7 (r.15(2))

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/1645

Application Reference No: NEMA/EIA/EL/2903

M/S **Tom Omenda**
(individual or firm) of address

P.O. BOX 28976-00200 Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **0011**

in accordance with the provision of the Environmental Management and Coordination Act, 1999.

Issued Date: **3/19/2015**

Expiry Date: **12/31/2015**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P. T. O.