



MINISTRY OF ROADS & TRANSPORT,
STATE DEPARTMENT OF ROADS

**CONSULTANCY SERVICES FOR ENVIRONMENTAL AND SOCIAL
IMPACT ASSESSMENT AND DETAILED ENGINEERING DESIGN
OF NORTH HERR – JN DARATHE AP (A4) ROAD**

CONTRACT NO. KeNHA/RD/HPD/3395/2021



Environmental and Social Impact Assessment Report
June 2024



In Association With

DISCLOSURE PAGE

This Environmental and Social Impact Assessment Study Report is hereby disclosed for public review as follows: -

Proponent: The Kenya National Highway Authority-KENHA

Assignment: Environmental and Social Impact Assessment for the proposed upgrading to Bitumen Standard of North Horr Jn – Daratthe AP Camp (A4) Road Project

Lead Firm: Repcon Associates - NEMA Registration No. 0002

Lead Expert: Michael M. Wairagu - NEMA Registration No. 0177



Signed:

2nd June 2024

Michael M. Wairagu (Lead Expert)

Proponent: The Kenya National Highway Authority-KENHA

Contact address:	Headquarters: Barabara Plaza, Block A & C, Jomo Kenyatta International Airport (JKIA), Off Airport South Road, along Mazao Road. P.O. Box 49712-00100 Nairobi. Phone: 0204954000/0700423606 Email: dg@kenha.co.ke, integrity@kenha.co.ke,
-------------------------	--

Signed.....

Date.....

Director General -KENHA

EXECUTIVE SUMMARY

THE REPORT

The Government of Kenya, through its implementing agency, the Kenya National Highways Authority (KeNHA) has earmarked funds through the Development Vote towards undertaking Feasibility Study, preliminary and detailed engineering design of North Horr – Jn Darathe Ap Camp (A4) Road. Development objectives of the immediate project are to improve the movement of goods and people along North Horr- Jn Darathe Ap Camp Part of the Gilgil - Nyahururu - Maralal- South Horr- North Horr – Ileret road corridor and to enhance connectivity between Kenya and Ethiopia. The project seeks to address development constraints caused by poor infrastructure in the Northern region of Kenya, which is one of the most impoverished and isolated regions of the country. This project is also a key link to the LAPSSET Project and opening up of the Northern corridor. Improving the road will no doubt stimulate the development, integrate, and contribute to improving security and bringing about sharing the prosperity of the country with this region.

Under this Contract, KENHA has commissioned Ms Norken-Kenya Ltd (The Consultant) to render all technical support services, which may be deemed relevant to the above project and as specified in the Terms of Reference issued by Implementing Agency. As part of the contract, and in line with existing national legislation and international practice, the Consultant is expected to undertake Environmental Impact Assessment (EIA) for the said Project.

This ESIA Study Report highlights findings on Environmental and Social Impact Assessment conducted on the 108 Kilometre long North Horr Jn- Darathe AP camp Road Project scheduled for implementation by the Government of Kenya through the Kenya National Highway Authority at a cost of KSh.10.035 billion Kenya Shillings. The Road starts off in the sandy plains of North Horr Town which are an extension of the Chalbi Desert and proceeds in a North Westerly direction through the El Beso settlement and stops at the Darathe AP Camp located on the eastern periphery of Sibiloi National Park which, among others, hosts the Sibiloi Museum of Natural History, the only one of its kind in Kenya. All traverse is within the North Horr Location of North Horr sub-County and Constituency within Marsabit County.

The Report has been prepared under contract by Lead Experts from Repcon Associates, an Environmental Firm of Experts duly registered and licensed by NEMA (NEMA Registration No. 0002) and other Government of Kenya (GoK) agencies.

PROJECT DESCRIPTION

The project road is situated in Marsabit (County No. 10) where it traverses the North Horr Location/Ward located within North Horr Constituency of North Horr Sub-County all of which are administered from the North Horr Town. The Road starts off at North Horr Town, about 196 km north west of Marsabit town at the junction of Maralal-Baragoi-Loyangalani- North Horr road (A4 formerly C77) and Marsabit – North Horr road B75. The entire road is currently earthen starting at North Horr Town and proceeds in a generally northwesterly direction through El Beso Market Centre. At Km 79+00, the road changes direction and heads westwards to cross minor rift valleys of which the main one is the Chalbi Ndogo and proceeds westwards to end at the Darathe AP Camp at the edge of Sibiloi National Park located on the north-eastern shores of Lake Turkana, approximately 108 km away from North Horr Town.

Currently, the road is of gravel standard maintained by KeNHA, generally in good condition and has been designed for upgrading to Class A. The adopted road cross-section is a Type II, with 7.0 m carriageway and 2.0m shoulders on both sides. A sum total of Ksh 10,034,742,654.18 is anticipated to be spent on the road as broken down in Table below.

Estimated cost of the Works

Summary Bill of Quantities		
Preliminary Design: North Horr - Jn Darathe Ap Camp (A4) Road		
Item	Description	Amount (Kshs.)
1	Preliminary and General Items	672,677,203.42
4	Site Clearance and Topsoil Stripping	158,480,000.00
5	Earthworks	1,694,576,680.00
7	Excavation & Filling for Structures: Box Culverts & Bridges	136,548,932.50
8	Culvert and Drainage Works	297,487,034.00
9	Passage of Traffic	67,954,300.00
12	Natural Material for Sub-base and Base	2,294,400.00
13	Graded Crushed Stone Base and Sub-base	880,502,100.00
15	Bituminous Surface Treatments and Surface Dressing	671,271,000.00
16	Bituminous Mix Bases, Binder Courses and Wearing Courses	1,330,665,000.00
17	Concrete Works	766,064,638.00
20	Road Furniture	121,948,918.38
21	Miscellaneous Bridge Works	5,534,435.00
22	Day works	47,967,534.00
24	Environmental Mitigation Measures	20,185,000.00
25	HIV/AIDS Awareness and Education	12,875,000.00
26	Road Safety and Awareness Campaign	8,280,000.00
27	Occupational Safety and Health Administration	25,200,000.00
	Sub-total 1	6,920,512,175.30
	Add 10% of Sub-total 1 for Physical Contingencies to be expended in whole or in part or deleted as directed by the Engineer.	692,051,217.53
	Add 15% of Sub-total 1 for Variation of Prices in accordance with Clause 70 of the Conditions of Contract.	1,038,076,826.29
	Sub-total 2	8,650,640,219.12
	Add 16% of Sub-total 2 for Value Added Tax (VAT)	1,384,102,435.06
Total carried forward to form of Bid		10,034,742,654.18

PREVAILING BASELINE

General Physiography and Altitude

The Road starts at an elevation of 380 m asl at North Horr project road starts at an altitude of about 361 m amsl at North Horr and follows a gentle climb to 479 m asl at El Beso following which it climbs consistently to hit 765m asl at KM 95 and then drops to 600m asl at Darathe AP camp. While the geomorphology between North Horr and El Beso generally comprises low lying piedmont sandy plains to same rapidly changes to become rugged and hill rocky terrain. Between Km 65 and 85, the rocky terrain is broken by two sand filled minor Rift Valleys one is which is called the small Chalbi.

Climatic Conditions

Temperature: Given the low altitude location, the North Horr area remains generally hot throughout the year with mean temperatures averaging 29.4°C with a range from 23.9°C and 34.9°C. Temperatures remain generally high throughout the year with March recording a slightly elevated Temperature 30.3°C.

Seasonal rainfall occurrence and distribution: Rainfall occurrence in the Marsabit area is influenced by the semi-annual passage of the inter-tropical convergence zone and the monsoons – the *North Easterly Monsoon (NEM)* from December to March and the *South Easterly Monsoon* from May to October. Most of the rainfall occurs when moisture laden monsoon winds are forced to rise over relief barriers whereby they drop the moisture load leading to orographic rainfall so common on mountainous areas. However, given the low elevation and general lack of relief barriers in the North Horr-Darathe transect, rainfall is mainly convection and thus quite low. Long-term mean annual rainfall is 141.4mm and although delivered in two maxima, there is really no wet season in the area given that May, the wettest month receives a paltry 45.1 mm on average.

Climatic potential of rainfall: The climatic value of rainfall has been analyzed based on computation of the climatic index as determined by the ratio of rainfall (r) to potential evapo-transpiration (Eo) based on the method of Sombroek et. al, 1982.¹ With a mean annual rainfall of 141.4mm and an equivalent potential evapotranspiration of 2939 mm, the North Horr area has a climatic index (r/Eo ratio) of 4.74% which translates to a Climatic Zone VII which is very arid. Monthly rainfall is way below the evaporative demand created by high levels of sunshine in which case, a moisture deficit prevails during the entire year. Moisture scarcity therefore, poses the most severe limitation to ecological productivity in the area. Rainfed crop farming is therefore strictly impossible leaving mobile pastoralism as the only viable climate supported means to livelihood.

The road traverses two Range Units:

Range Unit 5 receives a median annual rainfall of 250 to 400 mm with a risk of drought occurrence in 2 to 4 years out of 10. On account of domination by a rocky lithology and saline sodic clays soils, vegetation in the Unit is poor of which 50% is barren land with dwarf shrub/annual grassland and 30% is entirely barren land. Forage availability over the remaining 20% of the unit comprised of narrow vegetation bands of dwarf shrubs and annual grasses along drainage lines and in shallow depressions only (10% is bushed grassland; 5% is deciduous shrubland, and 5% riparian is woodland) is limited to the rainy seasons and the immediate post-rain periods. Forage quality, particularly in the herb layer, deteriorates very quickly after the rains and becomes unsuitable as ruminant feed. Small areas of bushed grassland and riparian woodlands can be used as dry season grazing reserve for a limited number of camels and goats. Approx. 10% have severe permanent restrictions to access by livestock (lava boulders) and 35 % have severe temporary restrictions due to flooding.

The range unit 6 (North Horr) comprises of approximately 2250 km² and is mainly traversed between North Horr and El Beso. On account of majority of this Unit being covered by rocky lithology, 50% of the area is barren with narrow vegetation bands of dwarf shrubs and annual grasses along drainage lines and in shallow depressions only. Forage availability over the remaining 50% of the unit comprised of bush land to grass land on saline soils at 30% and riparian woodland and deciduous shrub land following at 10% each, is limited to the rainy seasons and the immediate post-rain periods. Forage quality, particularly in the herb layer, deteriorates very quickly after the rains and becomes unsuitable as ruminant feed. Small areas of riparian woodlands can be used as dry season grazing reserve for a limited number of camels and goats. A risk of drought occurs in 4 years out of 10. Approximately 10% have severe temporary restrictions to access by livestock due to flooding.

¹

Hydrology and Water Resources

Surface Drainage System: Officially, the North Horr area is classified under Drainage Basin No. 5; the Ewaso Ngiro. However, there is no single drainage outlet that connects the North Horr Area to the Ewaso Ngiro System and the area comprises of several internal drainage sub-systems all ending in the local depression areas of which, the main one is the Chalbi Desert. There are no permanent surface water bodies and main drainage comprises of laggas that experience short-lived flows in the wet season and end up in the local depressions which become seasonally flooded thus possibly occasioning recharge for local perched water tables.

Local sources of water supply: The North Horr JN-Darathe Road Project boasts of two oases at both the starting and end points of the road and these comprise the main sources of water for both domestic use and livestock water ring. With an estimated daily yield of 210 cubic metres, this source at North Horr is hardly enough to meet the local needs and it is supplemented by piped supply and a borehole. The springs are fed by underground flow from aquifers recharged by sand filled depressions that concessionary flood during exceptionally wet years.

Other natural resources

Sibiloi National Park and the Koobi Fora beds: The North Horr JN –Darathe Road Project is designed to end at Darathe on the eastern periphery of the Sibiloi National Park, but the current earth road continues to Ileret and Ethiopia through the Park. Sibiloi National Park commands an area of 1570 square kilometres and was created vide Legal Notice No. 160 of 1973. Otherwise called “**The Cradle of Mankind**”, Sibiloi is located on the wild and rugged shores of Lake Turkana and is home to important archaeological sites including Koobi Fora where the fossil remains have contributed more to the understanding of human evolution than any other site in the continent. According to the National Museum of Kenya, the area is characterized by semi-desert habitat and open plains flanked by volcanic formations including Mount Sibiloi, where the remains of a petrified forest can be seen. Sibiloi serves as a stopover for migrant waterfowl and is a major breeding ground for the Nile crocodile. Terrestrial wildlife includes zebras, Grant gazelles, lions, leopards, striped hyenas, Beisa Oryx, greater kudu, cheetahs and northern topi among others. A total of over 350 species of aquatic and terrestrial bird have been recorded in Lake Turkana. Sibiloi is surrounded by the Turkana, the Gabra and the Dassanach who are communities with very rich and unpolluted traditional cultures. Other key features of this resource that will be opened to the public vide the North Horr Jn –Darathe Road include: -

Skull 1470- Homo habilis: Known as the ‘Cradle of Mankind’ Sibiloi National Park was created to protect the sites of the many remarkable hominid fossils found, revealed by its searing winds. The park yielded its most striking treasure in 1972 when a 2-million-year-old fossilized skull was discovered by eminent paleontologist Dr Richard Leaky and his team. The almost complete skull (labeled ‘1470’ by the National Museum of Kenya) confirmed the existence of a sophisticated evolutionary hominid named *Homo habilis*, the direct ancestor of *Homo sapiens*. Evidence of *Homo erectus* was also unearthed along with some 160 additional finds relating to the early hominids.

The Koobi Fora Museum: At Koobi Fora which is to the north of Allia Bay, extensive paleontological finds have been made, starting in 1969, with the discovery of *Paranthropus boisei*. The discovery of *Homo habilis* thereafter is evidence of the existence of a relatively intelligent hominid two million years ago and reflect the change in climate from moist forest grassland when the now petrified forest were growing to the present hot desert. The human and pre-human fossils include the remains of five species, *Australopithecus anamensis*, *Homo habilis/rudolfensis*, *Paranthropus boisei*, *Homo erectus* and *Homo sapiens* all found within one locality. Koobi Fora deposits, rich in mammalian, molluscan and other fossil remains, has contributed more to the understanding of human evolution than any

other site in the continent. Sibiloi national park is also home to an elephant fossil dating 1.7 million years back and is one of the most magnificent archeological findings.

The Giant Tortoise: It is a 1.6-million-year-old fossil of an extinct tortoise. This is the shell and limb bones of a giant tortoise which is lying upside down and may have died by falling from a river bank on its back.

The Jade Sea: Lake Turkana is an isolated chloro-carbonate alkaline giant; Prolific Birdlife covering 6,400 sq Km. Its mercurial blue-green color has earned it the title 'The Jade Sea'.

The Crocodile Kingdom: Survivors of an epoch long before mankind, Lake Turkana's estimated 12,000 crocodiles have not changed in 130 million years. Despite their monstrous size and formidable appearance, they are generally inoffensive creatures living in perfect harmony with their environment and feeding on the lake's prolific fish.

Petrified forests: The largest areas of petrified wood lying around Sibiloi are the remains of a once-great cedar forest, which covered the Lake's shores 7 million years ago.

Prolific birdlife: Sibiloi's avian highlights include: Somali ostrich, Kori and Heuglin's bustard, northern carmine and Somali bee-eater, chestnut-bellied sand grouse and fox kestrel. The Park is also famous for the European migrants that sweep across its skies between March-May.

The Volcanic Basalt Rock Outcrops: One of the least appreciated natural resource endowments of the North Horr Area and indeed the northern portion of Marsabit is the monotonous lithology of Basalt Rocks of volcanic origin that outcrop the ground surface (Plate 4.6) and second to aridity, the rock outcrop is a major contributing factor to barrenness that grossly undermines land productivity.

The People and population distribution

From consultations on the ground, the entire traverse from North Horr to Daratthe is occupied by the Gabbra Community. Beyond Daratthe towards Illeret, the Dasenatch is the predominant group who occupies the entire Illeret location. Within North Horr Town, other communities, mainly Borana and Meru are common mostly engaged in trade. As per 2019 Population Census, North Horr location has a total population of 5,177 people. With an area of 7,722.8ha, the traverse area has a population density of 0.7 persons per square kilometer/t6. The population is mainly resident within North Horr Town and other small settlements of the traverse such as El beso ha while others reside in pastoralist settlements located near water sources.

Land use and economic activity: Both land-use and economic activity are ordained by the harsh ecology imposed by hyper-aridity. And though mobile pastoralism is the only land-use activity possible, it is limited by obstacles posed by hostile terrain and saline soils which limit forage activity to narrow beds located along riparian belts of season laggas. Thus, according to the Range Management Handbook of 1991, the bulk of the traverse area is classified as being of low range productivity where only 31% is available for seasonal use. Even so, the 31% available has very limited carrying capacity (Table) on account of the low productivity. An hectare of rangeland can only support 1 cow for 65 days, 8 sheep for 85 days, 8 goats for 115 days while 6.1ha is required to support one mature camel for 139 days immediately after the long rains following which, they have to migrate in search of forage and water.

The Human Development Index (HDI): One of the main objectives under the Kenya's economic blueprint, Vision 2030, is to provide a high quality of life for all Kenyans. A major goal of Kenya Vision 2030 is to raise Kenya's HDI from its current level of 0.520 to 0.750 by the year 2015.

Achieving this goal requires sustained economic growth, strengthened competitiveness, and continued investments in human capital. In Marsabit County, the HDI stands at 0.438. This is below the national average of 0.520 and also below that for neighbouring Isiolo County, which stands at 0.451. However, Marsabit's HDI is above those of Mandera and Wajir, which both stand at 0.421. Recognizing that HDI in the county has to be improved to reflect improved welfare of the people, the county government has put in place several initiatives especially on health, education and income generation. The HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a county and not economic growth alone, since two counties/regions with the same level of GNP per capita can end up with different human development outcomes.

Gender Inequality Index (GII): Marsabit County has a GII of 0.693 compared to the national average of 0.622. Of the neighbouring counties, only Wajir ranks behind Marsabit at 0.732 while Isiolo has a GII of 0.640 and Mandera 0.686. Although Marsabit County GII is low, it is noted that the same trend is witnessed in all the counties in Kenya. Despite the fact that women represent 51 per cent of the Kenyan population, their representation in post-primary education, wage employment, enterprise ownership, and decision making is limited. They are adversely affected by such factors as traditional and social practices, as well as poverty and domestic violence, among other challenges. Improving women's profiles in all sectors and reducing gender disparities will not only benefit women but also men, children, the poor, and the rich. This will also enhance women's empowerment and contribute to sustainable economic growth and reduce poverty and social injustices.

Emerging Concerns and Trends

Low economic productivity and vulnerability to poverty: On account of the harsh ecology imposed by both aridity and rocky stratum, mobile pastoralism is the only means to livelihood currently supportable by the local ecology. However, going by analysis in Table 4.1 below, this harsh ecology imposes huge limitations to the productivity of this livelihood system. Thus, the carrying capacity (Table 4.2) limits the entire North Horr Location of 7,723ha to a paltry per capita livestock holding of 1.38 TLU² for the 5177 people resident and only for between 65 to 139 days for diverse stock in the 1st rains.

Pastoral income levels and livestock holdings are below both the Income Poverty Line (1 US dollar per day) and the Asset Poverty Threshold of 4.5 TLU. Essentially, households within the Project Road traverse are both asset and income poor. This agrees with recent findings in Marsabit County which documented majority of households surveyed to be structurally poor with the proportion rising from 66.8% in 2009 to 69.3% in 2013 primarily through loss of assets thus supporting the general observation that, within the pastoral belt of Kenya poverty is on the increase.

Alongside other ASALs, the North Horr road transect has some of the lowest development indicators and the highest incidence of poverty in Kenya; poverty levels of more than 60 per cent for the general population are not unusual and can be as high as 90 per cent. Livelihoods are undermined by unfavorable market conditions, inadequate infrastructure, limited access to services such as animal health, and a poorly developed financial sector. Ongoing and proposed projects to open up the area up to Darathe and link the same to the Great North Road through Marsabit will be strategic in underpinning economic production.

Vulnerability to drought, famines and escalating poverty: Drought is the single most important natural hazard in Kenya. It shatters livelihoods and causes hunger, nutrition-related disease, and even death. Between 1975 and 2011 there were at least ten serious droughts, three of them in the last seven years (2005-6, 2008-9 and 2010-11). The number of people affected by repeated drought emergencies appears to be rising. According to the inter-agency Kenya Food Security Steering Group (KFSSG) an

estimated 4.5 million people were affected in 2011, 3.8 million in arid and semi-arid lands (ASALs) and 700,000 in non-ASAL areas. The extent to which the rise in these numbers is attributable to the deepening vulnerability of drought-affected populations, or to the growing severity of drought conditions, is a subject of debate. Droughts are a national concern and affect the whole of Kenya, either directly or indirectly. As well as their direct impacts on the economy, they affect the linkages between different sub-economies, ecologies and communities. For example, there may be structural problems of overproduction in one area which could compensate for under-production in another if infrastructure were improved.

Distressing trends in wildlife numbers: Following observations that wildlife is no longer frequent within the traverse of the North Horr JN –Darathe Road, an attempt was made to explain this scenario mainly through review of available reports and documents (The National Wildlife Conservation Status Report 2015-2017; The Wildlife Migratory and Dispersal Areas –Gordon Ojwang et. al, 2017). It soon emerged that recent studies have confirmed drastic declines in both wildlife populations and dispersal ranges including those specific to the North Horr JN-Darathe Road traverse area. Two cases namely that of the Gravy's Zebra and Giraffe best illustrate this scenario. While both species used to frequent the traverse area as an important area, dispersal area of core area, the same is not the case in the year 2000s where none of the species was cited in the area.

The Factor of Climate Change

The Concern and Trends: Climate Change is currently appreciated as critical threat to national economies and human survival itself with the most at risk population being the poor populations. Kenya experiences various climate and weather extremes including prolonged droughts; frost in some of the productive agricultural areas; hailstorms; extreme flooding leading to fluctuating lake levels; and drying of rivers and wetlands. These extremes can lead to large economic losses and adversely impact food security. A review of historical climate trends shows that the East African region is highly vulnerable to the impacts of climate change. The region has suffered prolonged droughts in 1983/84, 1991/92, 1995/96, 2004/2005 and the La Nina-related drought of 1999/2001, with major impacts on the economy and food security. The severe occurrence of drought experienced in the region in 2009-11 had extreme effects on approximately 12.4 million people and resulted to degradation of dryland ecosystems. Similarly, the El Niño-related floods of 1997/98 had devastating effects on road infrastructure, human settlements, agricultural production and health impacts related to cholera and highland malaria among 21 others.

Impact of Climate Change on Food Security: Kenya's Global Hunger Index Score is 23.7 which places it in the lower end of the 'serious' category. The risk of food insecurity, and under-nutrition, is highly likely to increase due to higher temperatures, land and water scarcity, flooding, drought and displacement, which combined will negatively impact agriculture. Since 2015, there has been an increase in the percentage of the population who lack the adequate consumption of calories, which has coincided with the 2016–2017 drought that affected the Horn of Africa and caused significant drops in agricultural production and subsequent spikes in food prices.

Increased propensity to ethnic strives: Cross-border and cross-county conflict can be exacerbated by climate change. As temperatures rise and rainfall patterns change, some areas become less conducive for livestock, particularly cattle, leading to a reduction in herd numbers. Those counties with favourable conditions, such as Laikipia, could enter into resource use conflicts as pastoralists from other counties move their animals to water and better pasture conditions. Cross border conflicts could increase with other countries, such as Ethiopia and Tanzania, as pastoralists compete for food, water and grazing lands. There is evidence of migration linked to climate change in Kenya, mainly because vulnerable groups are reliant on resource-based livelihoods.

The Synopsis

The baseline characterization provided in sections above served to map the scenario pre-existing the proposed upgrading of the 108 Km long North Horr JN-Darathe Road project as a background against which impact prediction will be undertaken. Going forward, major concerns have emerged as follows:

-

- a) Incidence of high levels of poverty occasioned by low economic production imposed by both aridity and barrenness of the soil
- b) Huge paucity of surface and groundwater resources
- c) Lack of viable alternative means to livelihood
- d) High vulnerability to droughts and escalation of poverty
- e) Occurrence of sensitive natural resources mainly the Sibiloi National Park and the Koobi Fora beds.
- f) The factor of insecurity
- g) The disappearing Wildlife

APPROACH TO THE ESIA STUDY

Scope of the study

The Terms of Reference provided by the client have identified the scope and objective of the EIA study. The TOR specifies that, in execution of the EIA study, the Consultant shall conduct analyses which shall detail the positive and negative effects of the project on the environment and prepare an environmental mitigation plan to minimize any undesirable effects resulting during and following rehabilitation works on the road. The TOR further identifies 15 key issues (concerns) to be investigated as part of the EIA study and this informed the Study Design.

Policy, Legal institutional Framework in the ESIA Study

This ESIA Study is anchored on the national policy-legal standards reigning in Kenya and those of Strategic Partners namely the World Bank, JICA and AfDB.

The Kenyan Standards for Environmental Protection: By guaranteeing the right to a clean and healthy environment for all citizens, Section 42 of the Constitution provides the broad policy framework for environmental protection in the country while Section 69 (1)-f requires the State to *Establish systems of environmental impact assessment, environmental audit and monitoring of the environment* thus providing a framework for mitigation of development related environmental degradation. Essentially, the New Constitution has embraced and provided further anchorage to the spirit and letter of Cap 387 whose requirements for environmental protection and management have largely informed Sections 69 through to 71 of the Document. In Section 72 however, the new constitution allows for enactment of laws towards enforcement of any new provisions of the Supreme Law.

The Legal Notice 31 of 2019 amendment of Second Schedule of Cap 387 specifies projects that require to be subjected to EIA studies and in line with this schedule, the proposed construction of the project Road was screened and found to potentially trigger concerns that would require resolution through a full cycle ESIA study. As such, the NEMA screening procedure as expounded in Legal Notice 101 of Cap 387 was adopted leading to development of this ESIA Report.

Data collection for the ESIA Study report

Desk Study: The study process involved review of diverse documents with a view to familiarizing with the baseline environment. These include: -

- Range Management Handbook for Marsabit District (obtained map for the Project Area)
- Research Work by Sean Avery and others on the Hydrology and climatology of the lake Turkana Basin
- CIDPs for Marsabit County

Accruing secondary data was reviewed so as to provide an insight into the socio-environmental baseline of the program area. Preliminary opinions formed from literature review were re-validated during fieldwork undertaken on the ground.

Field data collection: Field data collection employed diverse methodologies including observations during drives along the target road, observations and photography, identification and detailed investigations at sites of interest, among others. Emergent concerns were further interrogated through interviews with thematic experts.

Stakeholder engagement: In line with statutory requirements, views of stakeholders to the proposed development were solicited as part of the EIA process. Such views/comments were used to refocus the project design and have been appended to the Report as manifest of the public attitude towards the proposed development.

Data Analysis and Impact Prediction: Upon data analysis, potential environmental impacts (both positive and adverse) were predicted based mainly on concerns raised by stakeholder and expert observations on the ground and available tools. The magnitude, significance, and acceptability of predicted impacts were evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation. Impacts were further screened for occurrence and significance of residual (those which cannot be mitigated satisfactorily) and cumulative impacts with a view to providing a basis of making recommendations on the way forward for the project.

APPROACH TO STAKEHOLDER ENGAGEMENT

It is a mandatory requirement under Legal Notice of 101 of EMCA 1999 for all environmental assessment process in Kenya to incorporate Public Consultation. The aim is to ensure that all stakeholder interests are identified and incorporated in project development, implementation and operation.

Identification of other stakeholders

Numerous people are likely to be affected by the project and are therefore bonafide stakeholders demarcated by the decision to follow the proposed route of traverse. The same were identified and approached for discussion of their concerns, apprehension and wishes in respect of the proposed road project. This study also identified a second category of stakeholders comprised of GoK officers in charge of diverse sectors, which are likely to be impacted by the project. This category was also consulted as key informants on sectoral policy and to advise this EIA study on mitigation measures to be put in place so as to minimize adverse impacts in respective sectors.

Consultation with Project Affected People

Consultation with roadside neighbours and other primary stakeholders mainly took the form of public barazas arranged by respective chief. The primary stakeholders were mostly residents of the North Hoor, El Beso and Darathe settlements within and around the neighbourhood along the proposed road. These are the stakeholders who by virtue of their proximity/ association with the project site are likely to be directly affected, positively or negatively, by the project. Effort was made to access and collate their views/ concerns regarding the proposed development. A total of 3 barazas were held with residents in various settlements giving their opinions on the proposed project. These being largely a low population density rural traverse, the discussions with some of the residents centred on the environmental, social and economic impacts of the proposed project to the area and the surroundings too.

Consultations with Secondary Stakeholders

Under this category, a cross section of stakeholders was met and these included; civil servants, local government officials and the local residents. Consultations took place in respective offices and in the field where possible. Consultations were made either with individual officers or in Focus Group Discussions involving several officers in a group. For this category of stakeholders, a semi-structured questionnaire providing for the Institution, name and designation of officer consulted, issues raised and signed feedback was used to guide the discussions. Discussions started with the consultant team explaining the project to the target officer following which, they were asked to identify their fundamental concerns on the same. After discussion, the officers were requested to fill and sign the form administered by the consultant in a system that was deemed useful and as a strategy to cut down on paperwork while capturing and documenting for future reference-the signed comments of target informants.

Indirect consultations

Numerous individuals and institutions previously played diverse roles in the formulation and design of the power road and though it was not possible to make direct contacts with them, the same was achieved through study and review of outputs left behind in form of reports. Thus, considerable time input was devoted to review of project documents towards preparation of this Environmental and Social Impact Assessment report. In total, 14 meetings were held in which, 194 people were met. Through liaison with the local Provincial Administration, times and venues were selected for which to hold a public baraza.

Specific concerns from local residents:

The key findings were as follows: -

- (i) Role of Project in Supporting GoK Policies: Though discussions with stakeholders in Government, it was clarified that GoK is committed to creating an environment favourable for attaining sustainable development in line with Vision 2030 and County Development Goals.
- (ii) Potential to trigger conflict: The proposed road is starting and ending within the territory of one community and not extending to Ileret occupied by a protagonist community. Caution is needed in explain the project formulation to tone down incidence of conflict.
- (iii) Courtesy and Public support for the project: In all the public barazas and public consultations held, the project enjoys overwhelming public support. No opposition ever was encountered during the field survey. There was a general consensus that this project has been longed for in many years.
- (iv) Potential for increased economic activities: Improvement of the road to Ndarathe will be a great boost especially for the livestock market. The construction of the road will also assist the local community to access to cheaper commodities and also access to government services.

- (v) Land Acquisition and compensation: Employment: It was the wish of the stakeholders that priority of employment opportunities for skilled, semi-skilled and unskilled labour, be given to the local residents. However, if the local residents do not have adequate or none at all of the skilled labour, then these can be sourced from outside the region. It was agreed that the modalities and quotas for employment for different locations be agreed upon by the local residents, local administration and the contractor.
- (vi) Long-term sustainability: Many stakeholders are quite clear that the proposed project should not lead to environmental degradation and require that comprehensive assessment of potential impact areas be carried out on material borrow areas, civil works sites, fuel storage/maintenance camps all of which should be reported in standalone reports.
- (vii) Impacts on water resources: The amounts required for the construction of the roads will be substantial. The water to be used will be drawn directly from river sources if the quality allows. However, in all cases, diverse stakeholders under the MW&I have specific requirements pertaining to activities in riparian areas: -

FINDINGS OF THE STUDY

Findings from Baseline Characterization

The baseline characterization served to map the scenario pre-existing the proposed upgrading of the 105 Km long road as a background against which impact prediction was then be undertaken. Main concerns emerged as follows: -

- a) Incidence of high levels of poverty occasioned by low economic production imposed by both aridity and barrenness of the soil
- b) Lack of viable alternative means to livelihood
- c) High vulnerability to droughts and escalation of poverty
- d) Occurrence of sensitive natural resources mainly the Sibiloi National Park and its Koobi Fora beds.
- e) The disappearing wildlife

These concerns were carried through the impact prediction process

Findings from Stakeholder Engagement

All stakeholders are largely in support of the project which is expected to open up the North Horr Hinterland of the Eastern shoreline of Lake Turkana inclusive of the Sibiloi National Park and the fishery resources at Ileret. From consultations with local Administration, the Study was sensitised on the need to manage stakeholder perceptions, more-so those of the Daasanach Community in Ileret who may not understand why the road project is not extending to their territory.

Findings from Analysis of Alternatives

The TOR requires that at most two alternative competing routes with the existing alignment be studied in a bid to come up with the most desirable and the most cost-effective route. Project alternatives were considered at diverse levels namely; technological options and route of coverage etc out of which, a bitumen class road following the current alignment was selected.

The existing road currently linking North Horr and Darathe AP camp junction takes a near direct route but detours to the north from Km 59 to Km 90. This is within a section characterized by a series of rocky ridges and wide valleys. The existing alignment attempts to avoid this undesirable terrain and subsequently substantial quantities of earthworks.

Two possible alternatives were however identified within this section. The identified routes form more direct and shorter links. For purposes of comparisons, the following parameters were checked and assisted in the prioritization process.

Length: Length for each route has been determined from developed chainages on individual alignments. Length has a direct link on vehicle operating costs and travelling times

Earthworks and Pavement quantities: Estimates on the quantities of earthworks as well as pavement materials were determined following a preliminary design conducted on all routes.

Major Structures required: Catchment characteristics determines the number and sizes of major structures. The characteristics vary from one alignment to the other. These have a direct effect on the cost of each alternative.

Environmental and Safety issues: Based on the terrain, the depth of cuts on some routes was significant with adverse effect on the environment. These high cuts also pose danger to people and livestock. It is worth noting that the communities residing in this area are mainly pastoralists.

Land Acquisition: The two competing routes (options 2 and 3) will require land acquisition in their entirety for the section under consideration while the existing road will only require partial acquisition. Land acquisition can at times attract significant cost escalation on a project.

From the foregoing, Option 01 route that closely follows the existing road but with minor adjustments on the geometrics is preferred for the following reasons.

1. Most cost effective;
2. Minimum Environmental effects;
3. Safest due to high geometric standards at low cost;
4. Minimal land acquisition and
5. Fewer major drainage structures.

This preliminary design and the report thereto are therefore based on option 01 alignment.

Key Impacts

a) Positive Impacts

The significant positive impacts expected from the design, construction and operation phases include the following and are discussed in the subsequent section:

- Improved local socio-economy
- Improvement to public transport
- Creation of employment
- Increased business opportunities:
- Faster means of transport:
- Cheap / affordable fares
- Easy and fast movement of goods and people

- Interaction of people from different communities
- Growth of towns
- Potential for increased economic activities
- Transfer of skills
- Improved security
- Improved response to emergency services

b) Negative impacts

- Dust generation
- Noise pollution
- Increased Accidents – human and livestock, especially at materials borrow sites
- Impact on water resources
- Waste disposal and spoils
- Loss of vegetation cover
- Road accidents
- Disruption and loss of businesses
- Cultural erosion
- Increase in the spread of STD, HIV and AIDS

Summary of Mitigation measures

Construction phase

Environmental effect	Mitigation measure
Legal Compliance	Preparation of a detailed legal register.
Air Quality: Exhaust Emissions	<ul style="list-style-type: none"> • Use (where appropriate) catalytic converters; • Use low Sulphur fuel; • Regular maintenance of engines; • Turn off engines to reduce idling.
Air Quality: Dust Emissions	<ul style="list-style-type: none"> • Minimize bare earth; • Minimize movement and speed of vehicles on unsealed surfaces; • Cover vehicle loads of soil / aggregate; • Cover or treat bare earth and stock piles in dry and windy conditions. • Regular cleaning of site access points to prevent build-up of dirt and mud on roads to reduce dust;
Soil Erosion	<ul style="list-style-type: none"> • The staging of site clearance activities to minimize the area of exposed ground and the duration of disturbance; • Installation of cut-off ditches or geotextile silt-fences around excavations sites, exposed ground and stockpiles to collect turbid surface water run-off; • Suitable siting and covering or surface treating of stockpiles that are required to stand in place for extended periods of time; • Areas that need to be cleared of vegetation to accommodate construction and roadway development will be minimized and any slopes will be stabilized to prevent erosion - cleared areas will be promptly re-vegetated with native grass and shrubs as soon possible;

	<ul style="list-style-type: none"> • Overland drainage will be controlled to prevent channeling and sediment transport by diverting flows away from areas that are exposed; • Fully contained vehicle wheel wash facilities, where required, to reduce the amount of dirt / mud that may be transported off-site onto the surrounding road network
Water Quality: Spills	<ul style="list-style-type: none"> • The collection, retention and testing of any groundwater resulting from dewatering activities within potential contaminated sites; • Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, including the siting of the storage area away from surface water drains and on an impermeable base with an impermeable containment that has no outflow and is of adequate capacity to contain 100% of the contents; • Secure and separate service bays for machinery with oil and water separators; • Plant and machinery will be kept away from surface waters and will have drip trays installed beneath oil tanks / engines / gearboxes / hydraulics which will be checked and emptied regularly via a licensed waste disposal operator; • Re-fueling and delivery areas will be located away from surface water drains and natural water bodies and courses; • Provision of booms, containment and absorbent material response equipment to respond to contain and clean-up spills; • Provision of spill response training to all relevant construction workforce personnel
Water Quality: Concrete / Cement Products	<ul style="list-style-type: none"> • Mixing and handling of wet concrete will be undertaken in designated areas; • A designated and contained area will be used for washing down plant and /or equipment associated with concrete or cementing processes;
Contaminated Sites	<ul style="list-style-type: none"> • Develop a Contaminated Sites Control Plan for work in any areas that are known to have existing contamination; • The collection, retention and testing of any groundwater resulting from dewatering activities within potential contaminated sites; • Immediate inspection by the environmental monitor of all areas where construction activities disturb new ground to determine whether or not contaminated land is encountered and if there is a potential for contaminants to be mobilized; • In the event that additional contamination is discovered, immediately stop work and implement measures to prevent further disturbance and potential mobilization of contaminants, until the contamination can be treated or removed; • Remediate contaminated soils and groundwater in accordance with the Contaminated Sites Control Plan.
Construction Waste	<ul style="list-style-type: none"> • A minimization / collection / storage / treatment / re-use / disposal strategy for each waste stream in accordance with local requirements; • Develop, under the guidance of a qualified professional, a soil management and disposal program;

	<ul style="list-style-type: none"> • Include a strategy for returning packaging waste (containers, plastic wrapping, pallets etc. to their point of origin, if practical) or recycled; • Identify potential third-party re-users and recyclers as per NEMA requirements; • Methods for properly managing (e.g. storing, containerizing, labelling, transporting and disposing) wastes; • Maintain records of hazardous waste generated/disposed. • Minimize the creation of hazardous wastes and must be properly handled/transported and properly disposal off. • Develop safe on-site storage facility that is locked, contained, away from site drainage; • Liaise with the local authorities on suitable dumping site for generated waste. • Maintain detailed records of hazardous wastes material in storage; • Secure legal disposal options and keep chain of custody records; • Provide on-site temporary sanitary facilities; • Arrange for contractors to empty holding tanks on a regular basis and dispose of in local treatment facilities. • Re-use some of the excavated soil wastes for backfilling while the rest to be disposed-off at designated areas. • Dispose of waste in accordance with the NEMA guidelines.
Noise	<ul style="list-style-type: none"> • Hydraulic construction to be used in preference to percussive techniques where practical; • All plant and equipment will be properly maintained, silenced where appropriate and operated to prevent excessive noise and switched off when not in use; • Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the site will be conducted as far as practicable during day time hours; • Noise complaints will be immediately investigated.
Public and Employee Safety	<ul style="list-style-type: none"> • Mechanisms for making public announcements (e.g. newspaper / radio) about the construction programme and in particular when public roads will be used by heavy transport vehicles; • Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health and safety due to the construction operation; • Incident recording and reporting protocols; • Emergency contact details in the event of an accident; • Develop and implement an emergency plan including spill response • Train all contractor staff in emergency planning and spill response; • Develop a detailed health and safety plan; • Train all contractor staff on the plan.
HIV/AIDS	<ul style="list-style-type: none"> • Institute prevention programs such as education awareness campaigns, videos, t-shirts showing preventive logos and provision of condoms at affordable prices to local people and workers at large;

	<ul style="list-style-type: none"> • Collaboration with the existing NGOs in the area with the local community to alleviate the problem.
Damage to existing infrastructure	<ul style="list-style-type: none"> • Detailed design needs to consult relevant telephone, electricity and water authorities to identify exact paths so as to avoid damage.

The Environmental / Social Management and Monitoring Plan (ESMMP)

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	<ul style="list-style-type: none"> 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) 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; Carry out inspection of each of the site's soil stability before excavation; All borrow pits sites shall be clearly indicated on a plan and approved by the RE; Borrow pits and quarries shall be located more than 20 meters from watercourses to minimise storm water runoff into watercourse; The Contractor shall give 14 days' notice to nearby communities of his intention to begin excavation in the borrow pits or quarries; Prepare health and safety plan before any work on the quarries is commenced; Cordon off the quarry and borrow areas to keep livestock and children off; The Contractor shall rehabilitate and decommission all borrow pits and quarries Stockpile top soil on site and use during rehabilitation of the borrow site and quarries; Plant suitable saplings where it is deemed feasible; 	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> In case of blasting: <ol style="list-style-type: none"> The Contractor will obtain a current and valid authorization from the Department of Mines and Geology prior to any blasting activity. A qualified and registered blaster shall supervise all blasting and rock-splitting operations; The contractor shall develop a safety policy on site. 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. ALL QUARRIES SHOULD BE SUBJECTED TO AN ESIA STUDY BY THE CONTRACTOR 				
2.	Air Pollution	<ul style="list-style-type: none"> Sensitize workers on air pollution. Maintained all construction machinery serviced in accordance with the owner's manual; Workers shall be trained on dust minimization techniques; 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; 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 To minimize further generation of dust, vehicles delivering soil materials shall be covered to reduce spills and wind-blown dust; Any complaints received by the Contractor regarding dust 	<ul style="list-style-type: none"> 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 only. Sh. 750,000 for provision of dust masks.

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>should be recorded and communicated to the RE;</p> <ul style="list-style-type: none"> • Comply with all legal and statutory requirements as contained in EMAC air quality regulations. • Project-specific design improvements to limit motor vehicle air pollution impacts should be prepared and implemented. • Crusher plants to be installed with dust suppressants. 				
3.	Noise pollution	<ul style="list-style-type: none"> • The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours across North Horr-Ndarathe • 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 • Construction workers will be required to use PPE appropriately • Equipment should be maintained regularly to reduce noise resulting from friction; • No unnecessary hooting by project vehicles within 200 m of noise sensitive receptors. • Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE. 	<ul style="list-style-type: none"> • To avoid exposure of the community living around the project area and workers to noise nuisance 	Contractor	Construction	Best Practices, no additional cost
4.	Vegetation loss	<ul style="list-style-type: none"> • To avoid conflicts on trees within the Road reserve, a clear understanding of ownership should be reached with the immediate neighbours before any tree is felled. • 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 	<ul style="list-style-type: none"> • 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
		<p>unauthorized planting of vegetation take place;</p> <ul style="list-style-type: none"> • 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; • Areas to be cleared should be agreed and demarcated before the start of the clearing operations; • 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; • 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; • Trees should be trimmed rather than removed wherever possible; • The use of fuel wood by construction workers should be discouraged. Workers should be encouraged to use clean energy sources. • The contractors to ensure suppliers are legally compliant and environmentally sensitive. 				
5.	Impacts on soils and drainage including landslides	<ul style="list-style-type: none"> • As far as possible earthworks should avoid the wet seasons that are always intense to prevent soil erosion and landslides; • Excavated materials and excess earth should be kept at appropriate sites approved by the Supervising Engineer; • Wherever possible, the earth dumping sites will be designed in such a manner as to facilitate natural water discharge; 	<ul style="list-style-type: none"> • To conserve soil and avoid stripping of top soil 	Contractor	Construction	<p>To be included in drainage structures cost</p> <p>Set aside</p>

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> 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); The Contractor shall protect areas susceptible to severe erosion such as across steep slopes by installing necessary temporary and permanent drainage works. Areas affected by construction related activities and/or susceptible to erosion or landslides must be monitored regularly. On areas where the risk of erosion is evident, stabilize the areas and prevent erosion. These may include, but not be limited to: <ul style="list-style-type: none"> 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. Cut areas susceptible to landslides should be protected 				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
		immediately after the works, and works should not be prolonged at such sites unnecessarily				
6.	Water resources	<ul style="list-style-type: none"> The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006. Ensure community complaints related to water abstraction activities are promptly mitigated 	<ul style="list-style-type: none"> To ensure the community's right to access water is not infringed continued supply of water 	Contractor	Construction	No additional cost required
7.	Contractors camp	<ul style="list-style-type: none"> The site for the Contractor's Camp shall be determined in collaboration with the RE taking into consideration the following: <ul style="list-style-type: none"> 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 The Contractor shall implement the following as required with the approval by the RE: <ul style="list-style-type: none"> 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; 	<ul style="list-style-type: none"> To ensure proper siting of contractor's camp 	Contractor	Construction	To be specified in the BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		ix. Facilities for solid waste collection; x. Facilities for waste water management.				
8.	Sanitation	<ul style="list-style-type: none"> The Contractor shall comply with laws and by-laws relating to public health and sanitation; All temporary/ portable toilets or pit latrines shall be secured to the ground. The type and exact location of the toilets/septic tanks shall be approved by the RE. All toilets shall be maintained by the Contractor in a clean sanitary condition. A wash basin with adequate clean water and soap shall be provided alongside each toilet. Ensure that solid/liquid exhausts are disposed by licensed agents or through approval by the local Public Health Office. 	<ul style="list-style-type: none"> To ensure proper sanitation 	Supervising Engineer and Contractor	Construction	To be specified in construction contract
9.	Workshops	<ul style="list-style-type: none"> All maintenance of equipment and vehicles shall be performed in the workshop. 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; The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water. The workshop shall be kept tidy at all times and shall have the following as a minimum: <ol style="list-style-type: none"> An impermeable floor either constructed of concrete or suitable plastic fabric 	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> 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 lubricants. iv. The drip trays shall be inspected and emptied daily; v. Drip trays shall be closely monitored during wet weather 				
10.	Solid wastes	<ul style="list-style-type: none"> • The contractor should develop a waste management plan; • All personnel shall be instructed to dispose of all waste in a proper manner; • Contractor shall provide litter collection facilities; • The final disposal of the site waste shall be done by approved waste disposal agents; • Wherever possible, materials used or generated by construction shall be recycled; • Provision for responsible management of any hazardous waste generated according to NEMA regulations on waste management. • Dispose of surplus material ("spoil") only at designated sites and by approved methods. • The spoil designated area needs to be more than 20 meters from watercourses. • The development and rehabilitation of spoil areas shall include the following activities; <ul style="list-style-type: none"> i. Stripping and stockpiling of topsoil; ii. Contouring of spoil site to approximate natural topography 	<ul style="list-style-type: none"> • To maintain sound waste management practice. 	Supervising Engineer and the Contractor.	Construction	<p>Sh. 2,500,000 for waste disposal site and its management.</p> <p>The operational costs to be contained in BoQ</p>

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>and drainage and/or reduce erosion impacts on the site;</p> <p>iii. Placement of excavated subsoil and then topsoil over spoil material;</p> <p>iv. Contouring and re-vegetation;</p> <p>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.</p>				
11.	Liquid wastes	<ul style="list-style-type: none"> • No grey water runoff or uncontrolled discharges from the site/working areas; • Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. • The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas. • 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; • Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted; • The Contractor shall notify the RE of any pollution incidents on site. 	<ul style="list-style-type: none"> • To maintain properly dispose wastewater 	Supervising Engineer and the Contractor.	Construction	As contained in Item No. 11
12.	Fuels, Oils, Hazardous Substances and other	<ul style="list-style-type: none"> • Hazardous materials shall be stored above flood level and at least 20 metres from any watercourse; • Areas for the storage of fuel and other flammable materials 	<ul style="list-style-type: none"> • To ensure proper handling of fuels and 	Supervising Engineer and the 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
	Liquid Pollutants	<p>shall comply with standard fire safety regulations;</p> <ul style="list-style-type: none"> 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); 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; Pipe-work carrying product from the tank to facilities outside the containment shall be provided with secondary containment; Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment; Fence of the tank compound with locks or other adequate security controls at the site; Appropriate training for the handling and uses of fuels and hazardous material is to be provided by the Contractor as necessary. This includes providing spill response and contingency plans; 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 the perimeter bund to a containment pit. All chemicals stored within the bunded areas shall be clearly labelled detailing the nature and quantity of chemicals within individual containers; 	hazardous substances			

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> 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; 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	<ul style="list-style-type: none"> The plant should be situated on flat ground; Topsoil shall be removed prior to site establishment and stockpiled for later rehabilitation of the site; 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; The area shall be covered to prevent rainwater from contacting the areas containing fuels, oils, bitumen etc and potentially generating contaminated runoff; The plant shall be secured from trespassers and animals through the provision of fencing and a lockable gate to the satisfaction of the RE; Well-trained staff shall be responsible for plant workings. Within the bitumen plant site, areas shall be demarcated/marked for plant materials, wastewater and contaminated water; An area should be clearly marked for vehicle access; Drums/tanks shall be safely and securely stored; 	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Materials requiring disposal shall be disposed off by a licensed waste disposal agent 				
14.	Cement / Concrete Batching	<ul style="list-style-type: none"> Concrete batching plant shall be located more than 20 m from the nearest stream/river channel; Topsoil shall be removed from the batching plant site and stockpiled; Concrete shall not be mixed directly on the ground; The concrete batching works shall be kept neat and clean at all times; 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; Unused cement bags are to be stored so as not to be effected by rain or runoff events; Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via wind-blown dust); Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment; Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching; Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site; All visible remains of excess concrete shall be physically 	<ul style="list-style-type: none"> 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
		<p>removed on completion and disposed at an approved disposal site. Washing the remains into the ground is not acceptable;</p> <ul style="list-style-type: none"> • All excess aggregate and sand shall also be removed; • 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	<ul style="list-style-type: none"> • 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; • Where possible the diversion must be limited to already connecting routes in the area; • The Contractor shall comply with all applicable laws and by-laws in Kenya with regard to road safety and transport; • Access to the construction site and works area shall utilize existing roads and tracks where possible; • Upgrading of the access roads shall be undertaken within the existing confines of the road, unless otherwise agreed with the RE; • All diversion and temporary access routes shall be rehabilitated at the end of the contract to the satisfaction of the RE; • 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; • To avoid dusts and air pollution, the Contractor must sprinkle 	<ul style="list-style-type: none"> • 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
		water in the diversion route, as necessary, this must be supervised by RE.				
16.	Disruption of Access to Property	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Minimise disruption of access to property 	Supervising Engineer and the Contractor.	Construction	Standard procedures to be followed
17.	Relocation of public utilities	<ul style="list-style-type: none"> Undertake inventory of existing utilities in the project area before beginning construction; Relocation of services is provided for in the BOQs Notice should be given to the utility users prior to any interruption in supply; Liaise with relevant parties 	<ul style="list-style-type: none"> Minimum disruption of access to public utilities 	Supervising Engineer, Contractor, Kenya Power	Construction	To be contained in RAP and BoQ
18.	Delays in transportation	<ul style="list-style-type: none"> 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; Temporary road signs that are visible both during the day and at night indicating road works and restrictions will be required; The contractor should also set aside parking bays for heavy goods vehicles and public transport vehicles; Areas where construction is taking place should have clearly marked speed reduction signage. 	<ul style="list-style-type: none"> Traffic management plan 	Supervising Engineer, and Contractor	Construction	Standard procedures to be followed
19.	Emergence of unplanned settlements	<ul style="list-style-type: none"> 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; 	<ul style="list-style-type: none"> To curb against unplanned settlements 	County Administration	Construction	No cost at construction stage

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> 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. 				
20.	Discrimination on employment opportunities	<ul style="list-style-type: none"> 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; To promote the livelihood of vulnerable groups such as the women-headed households, the Contractor should make deliberate efforts to include and retain women in construction Make deliberate efforts to include at least 33% of women to be included as employees within the road construction project Contractor to put in place a code of conduct to prevent sexual harassment / exploitation of women employees 	<ul style="list-style-type: none"> Employment of local communities 	Contractor and local administration	Construction	Prudent hiring practices
21.	Occupational Health and Safety	<ul style="list-style-type: none"> 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; The Contractor shall provide a standard first aid kit at the site office; There should be a Safety Officer on site who has first aid training and knowledge of safety procedures; Speed limits appropriate to the vehicles driven are to be 	<ul style="list-style-type: none"> To reduce chances of accidents 	Supervising Engineer and Contractor.	Construction	PPEs 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
		<p>observed at all times on access and haul roads;</p> <ul style="list-style-type: none"> No unauthorized firearms are permitted on site; The Contractor shall provide the appropriate Personal Protective Equipment for staff; The contractor must have insurance cover for the workmen. 				
22.	Public Health	<ul style="list-style-type: none"> 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 pedestrians and traffic in areas affected by the construction activities; 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; 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; 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 	<ul style="list-style-type: none"> To reduce transmission of diseases; To create awareness of the HIV/AIDS. 	Supervising Engineer, Contractor, NGOS, Provincial and District HIV/AIDS control councils, and health officers	Construction	HIV/AIDS awareness costs 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
		<p>phase of the road;</p> <ul style="list-style-type: none"> 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 behaviour change. The assessment will be supported by qualitative information from focus group discussions. The contractor should follow the recommendations of the Kenya National Aids Strategic Plan in communicating prevention measures 				
23.	Disruption of Community	<ul style="list-style-type: none"> Are adequately addressed in the Resettlement Action Plan 	<ul style="list-style-type: none"> To minimize disruptions 	KENHA	Pre-construction	
24.	Site Security	<ul style="list-style-type: none"> Security arrangements must be included in the Bills of Quantities to avoid any delays which might be caused due to insecurity; The Supervising Engineer and Contractor in liaison with the security organs must create awareness to the security situation on the ground all the times; 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; The Contractor must ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; 	<ul style="list-style-type: none"> To improve site security and avoid cases of theft 	Supervising Engineer and Contractor.	Construction	

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> 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. 				
25.	Fire Prevention and Control	<ul style="list-style-type: none"> The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site; The Contractor shall ensure that there is basic fire-fighting equipment available on site; Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires; Hot' work activities shall be restricted to a site approved by the RE; Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include: <ul style="list-style-type: none"> 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; 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: <ul style="list-style-type: none"> 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; 	<ul style="list-style-type: none"> Fire prevention and control 	Supervising Engineer and Contractor.	Construction	Fire 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
		<ul style="list-style-type: none"> iv. In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and 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	<ul style="list-style-type: none"> • Maintenance engineers from KeNHA shall inspect all drainage structures and outfalls; • All the damaged culverts, wing walls and aprons shall be repaired and additional measures for velocity reduction and erosion protection shall be implemented. 	<ul style="list-style-type: none"> • To ensure drainage systems are in good condition 	KeNHA	Operation	Included in design
28.	Road Accidents	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> 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. Require that road design audits be done, at final design stages, by specialists in road safety and traffic operations; and iii. Draft traffic management plans, including details of signs, markings, and intersection layouts, channelization of flows, 	<ul style="list-style-type: none"> • 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
		<p>access restrictions, footpaths, bus stops, and provisions for non-motorized vehicles;</p> <p>iv. Painting of edge lines in order to separate shoulders;</p> <p>v. Establishment of non-motorised vehicle waiting area;</p> <p>vi. Improvement of visibility;</p> <p>vii. Provision of speed limit signs;</p> <p>viii. Construction of bumps to reduce speeds;</p> <p>ix. Improvement of crossing sites paintings of zebra crossings;</p> <p>x. Regulations, educations and safety trainings.</p> <ul style="list-style-type: none"> • Active police enforcement of speeds; • 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: • KeNHA shall monitor traffic accidents through records kept at the local police stations along the project road; • KeNHA and the relevant Livestock Office shall record accidents with livestock; • A report will be required after two years of monitoring and the results used to recommend further mitigation measures, if necessary. 				
29.	HIV/AIDS	<ul style="list-style-type: none"> • Sensitisation and awareness campaigns should be the responsibility of the National Aids Control Councils in Kenya together with their district co-ordinators. • Prevention measures to include access to free condoms to all 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> Proactive planning by all the Counties traversed by the project road 	<ul style="list-style-type: none"> To forestall unplanned urban development 	County Governments	Operation	-

RECOMMENDATION:

Through this ESIA Study, the Kenya National Highway Authority (KeNHA) through the Director General - the proponent - wishes to disclose that the proposed upgrading of Darathe Jn –Darathe (A4) Road has impacts that can readily be mitigated and managed. The majority of adverse impacts identified are of a short-term nature and will cease once the civil works phase is completed. Further, other impacts can be eliminated through effective planning and management through available means of mitigation. By such disclosure, the prayer of the client to NEMA is for an Environmental License for this project to be issued in line with Section 10(2) of Part II of Legal Notice 101.

TABLE OF CONTENTS

DISCLOSURE PAGE	II
1 Executive Summary	III
1.1 THE REPORT.....	III
1.2 APPROACH TO THE ESIA STUDY	III
1.2.1 <i>Scope Of The Study</i>	X
1.2.2 <i>Legal Scope Of The Study</i>	X
1.2.3 <i>Data Collection For The Esia Study Report</i>	X
1.3 FINDINGS OF THE STUDY	XI
1.3.1 <i>Findings From Baseline Characterization</i>	xiii
1.3.2 <i>Findings From Baseline Characterization</i>	xiii
1.3.3 <i>Benefits From The Project</i>	xiv
1.3.4 <i>Advance Impacts That May Require Mitigation</i>	Error! Bookmark not defined.
1.3.5 <i>The Need For Strategic Mitigation</i>	Error! Bookmark not defined.
1.3.6 <i>Viability Of The Impact Mitigation Program</i>	Error! Bookmark not defined.
1.4 RECOMMENDATION:.....	I
TABLE OF CONTENTS	II
1 Chapter One: Introduction	6
1.1 BACKGROUND	6
1.2 SCOPE OF THE EIA STUDY.....	7
1.3 CONCEPTUAL FRAMEWORK FOR THE STUDY.....	ERROR! BOOKMARK NOT DEFINED.
1.4 STUDY METHODOLOGY	7
1.4.1 <i>Statutory Content Of Project Reports</i>	8
1.4.2 <i>Data Collection For The Esia Study Report</i>	9
1.4.3 <i>Field Work And Public Consultations</i>	9
1.5 DATA ANALYSIS AND IMPACT PREDICTION	9
1.5.1 <i>Description And Establishment Of The Environmental And Socio-Economic Baseline Condition</i> ..	10
TABLE 1.1: APPROACH TO BASELINE CHARACTERIZATION.....	10
1.5.2 <i>Description Of Policy, Legislative, Regulatory And Institutional Framework</i>	11
1.5.3 <i>Determination Of Impacts Of Proposed Project Road</i>	11
1.5.4 <i>Identification Of Mitigation Measures</i>	13
1.5.5 <i>Identification Of Monitoring Requirements</i>	13
1.5.6 <i>Environmental & Social Impact Assessment (Esia) Report</i>	13
1.6 PRESENTATION OF THE REPORT.....	14
2 Chapter Two: Project Description	15
2.1 OWNERSHIP AND REGIONAL PLANNING CONTEXT	15
2.2 PROJECT DESCRIPTION	15
2.2.1 <i>Project Location</i>	15
2.2.2 <i>Current Condition And Traverse</i>	15
2.3 FEATURES OF THE PROJECT ROAD.....	16
2.3.1 <i>The Broad Design Objective</i>	16
2.3.2 <i>Design Specifications:</i>	17
2.4 ACTIVITIES DURING PROJECT CONSTRUCTION AND OPERATION	19
2.4.1 <i>Activities During Construction</i>	19
2.4.2 <i>Activities During Operation And Decommissioning</i>	20
2.4.3 <i>Materials To Be Used, Products And By-Products</i>	20
2.5 COST OF THE PROJECT.....	20
3 Chapter Three: Policy, Legal And Administrative Framework	22
3.1 POLICY FRAMEWORK WITHIN THE NATIONAL PLANNING CONTEXT.....	22
3.1.1 <i>Policy Framework For Development Planning</i>	22
3.1.2 <i>Policy Framework For Devolved Government</i>	25
3.1.3 <i>Policy Framework For Environmental Management</i>	25

3.1.4	<i>Sessional Paper No. 3 On National Land Policy, 2009</i>	26
3.1.5	<i>National Gender And Development Policy (2000):</i>	26
3.1.6	<i>The New Constitution Of August 2010 On Gender:</i>	27
3.1.7	<i>Sessional Paper Number 1 Of 2002</i>	28
3.2	REGULATORY FRAMEWORK FOR ENVIRONMENTAL MANAGEMENT IN KENYA	35
3.2.1	<i>Constitutional Provisions</i>	35
3.2.2	<i>The Environment Management And Coordination Act (Emca) 1999 And Its Tools</i>	36
3.2.3	<i>Inter-Sectoral Coordination In Environmental Protection</i>	40
3.2.4	<i>International Conventions, Treaties And Agreements</i>	51
3.3	THE INSTITUTIONAL FRAMEWORK	51
3.3.1	<i>Institutional Framework Under Emca 1999</i>	51
3.3.2	<i>The Ministry Of Roads - Environmental And Social Unit:</i>	52
4	Chapter Four – The Baseline Environment	53
4.1	ADMINISTRATIVE AND POLITICAL JURISDICTION	53
4.2	BIOPHYSICAL BASELINE	53
4.2.1	<i>General Physiography And Altitude</i>	53
4.2.2	<i>Physiography Of The Project Traverse</i>	54
4.2.3	<i>Geology And Ecological Conditions</i>	55
4.3	CLIMATIC CONDITIONS	57
4.3.1	<i>Sources Of Climatic Data</i>	57
4.3.2	<i>Temperature</i>	57
4.3.3	<i>Relative Humidity</i>	58
4.3.4	<i>Rainfall</i>	58
4.3.5	<i>Range Ecology And Productivity</i>	59
4.3.6	<i>Hydrology And Water Resources</i>	61
4.3.7	<i>Other Natural Resources</i>	62
4.4	THE SOCIO-ECONOMIC BASELINE	64
4.4.1	<i>The People And Population Distribution</i>	64
4.4.2	<i>Land Use And Economic Activity</i>	65
4.5	EMERGING CONCERNS AND TRENDS	70
4.5.1	<i>Low Economic Productivity And Vulnerability To Poverty</i>	70
4.5.2	<i>Vulnerability To Drought, Famines And Escalating Poverty</i>	72
4.5.3	<i>The Factor Of Climate Change</i>	73
4.5.4	<i>Distressing Trends In Wildlife Numbers</i>	73
4.5.5	<i>The Factor Of Insecurity</i>	75
4.6	THE SYNOPSIS	75
5	Chapter Five: Stakeholder Consultations	79
5.1	APPROACH TO STAKEHOLDER CONSULTATIONS	79
5.1.1	<i>Briefing By The Client</i>	79
5.1.2	<i>Identification Of Other Stakeholders</i>	79
5.2	MODALITIES FOR STAKEHOLDER CONSULTATION	79
5.2.1	<i>Consultation With Project Affected People</i>	79
5.2.2	<i>Consultations With Secondary Stakeholders</i>	79
5.2.3	<i>Indirect Consultations</i>	80
5.3	OUTCOME OF THE STAKEHOLDER CONSULTATIONS	80
5.3.1	<i>General Outcomes</i>	80
5.3.2	<i>Specific Concerns From Local Residents:</i>	80
5.3.3	<i>Way Forward With Stakeholder Engagements:</i>	88
6	Chapter Six: Analysis Of Alternatives	89
6.1	OVERVIEW	89
6.1.1	<i>Alternative Routes</i>	89
6.1.2	<i>Length</i>	Error! Bookmark not defined.
6.1.3	<i>Comparison Matrix</i>	Error! Bookmark not defined.
6.1.4	<i>Conclusion</i>	93

7	Chapter Seven: Potential Impacts From The Project	ERROR! BOOKMARK NOT DEFINED.
7.1	BACKGROUND	ERROR! BOOKMARK NOT DEFINED.
7.2	SPECTRUM OF POTENTIAL IMPACTS	ERROR! BOOKMARK NOT DEFINED.
7.2.1	<i>Outcome Of The Screening</i>	<i>Error! Bookmark not defined.</i>
7.2.2	<i>Analysis Of Impact Severity</i>	<i>Error! Bookmark not defined.</i>
7.3	DESCRIPTION OF POTENTIAL IMPACTS	ERROR! BOOKMARK NOT DEFINED.
7.3.1	<i>Design And Construction Phase Impacts</i>	<i>Error! Bookmark not defined.</i>
8	Chapter Eight: The Environmental And Social Management Plan	115
8.1	OVERVIEW	115
8.2	THE STRATEGIC MITIGATION PLAN	115
8.2.1	<i>The Need For A Strategic Mitigation Plan</i>	115
8.1.2	<i>Requisite Strategic Intervention</i>	115
8.3	MITIGATION OF CONSTRUCTION STAGE IMPACTS	117
8.4	MITIGATION OF IMPACTS AT OPERATION STAGE	125
8.5	EFFECTIVENESS OF THE MITIGATION PROGRAMME	125
8.5.1	<i>Viability Of Mitigation</i>	125
8.5.2	<i>Prevalence Of Residue Impacts</i>	126
8.5.3	<i>Prevalence Of Residue Impacts</i>	126
8.8	<i>Management Of Decommissioning</i>	126
8.8.1	<i>Decommissioning Of Contractor/ Resident Engineer's Camps</i>	126
8.8.2	<i>Decommissioning Of The Road</i>	126
	Chapter Nine: Environmental/ Social Management And Monitoring Plan	127
9.2	FEASIBILITY OF IMPACT MITIGATION	127
9.3	PHASING OF MITIGATION ACTION	127
9.4	RESPONSIBILITY FOR MITIGATION	127
9.5	ENVIRONMENTAL AND SOCIAL MONITORING REQUIREMENTS:	127
9.5.1	<i>Terminologies</i>	127
9.5.2	<i>Requirements Of The 'Impacts Monitoring' Programme</i>	128
9.5.3	<i>The Compliance Monitoring Strategy</i>	128
9.5.4	<i>Monitoring Reports</i>	154
	Chapter Ten: Conclusion And Recommendations	156
10.1	THE REPORT	156
10.2	APPROACH TO THE ESIA STUDY	156
10.2.1	<i>Scope Of The Study</i>	156
10.2.2	<i>Legal Scope Of The Study</i>	157
10.2.3	<i>Data Collection For The Esia Study Report</i>	157
10.3	FINDINGS OF THE STUDY	158
10.3.1	<i>Findings From Baseline Characterization</i>	158
10.3.2	<i>Findings From Baseline Characterization</i>	158
10.3.3	<i>Benefits From The Project</i>	158
10.3.4	<i>Advance Impacts That May Require Mitigation</i>	158
10.4	<i>The Need For Strategic Mitigation</i>	159
10.6	RECOMMENDATION:	160

ACRONYMS

AIDS	- Acquired Immuno-Deficiency Syndrome
Asl	- above sea level
BOQs	- Bill of Quantities
CITES	- The Convention on Trade in Endangered Species
DEC	- District Environment Committee
DG	- Director General - NEMA
EA	- Environmental Assessment
EIA	- Environmental Impacts Assessment
EMCA	- Environmental Management & Coordination Act, 1999
ESU	- Environmental & Social Unit
EU	- European Union
FAO	- Food and Agriculture Organisation
GoK	- Government of Kenya
HIV	- Human Immuno-Virus
IMP	- Impact mitigation plan
KeRRA	- Kenya Rural Roads Authority
KFS	- Kenya Forest Service
KWS	- Kenya Wildlife Service
LN	- Legal Notice
MOR	- Ministry of Roads
NEMA	- National Environment Management Authority
OHS	- Occupational Health and Safety
OSHA	Occupational Safety and Health Act
PE	- Project Engineer
PET	- Potential Evapo-transpiration
PRSP	- Poverty Reduction Strategy Paper
RAP	- Resettlement Action Plan
RE	- Resident Engineer
SOW	- Supervisor of Works
STDs	- Sexually Transmitted Diseases
TOR	- Terms of Reference
UNEP	- United Nations Environment Programme
VCT	- Voluntary Counselling and Testing
WRMA	- Water Resources Management Authority

1 CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

1.1.1 The Project

The Government of Kenya, through its implementing agency, the Kenya National Highways Authority (KeNHA) has earmarked funds through the Development Vote towards undertaking Feasibility Study, preliminary and detailed engineering design of North Horr – Jn Darathe Ap Camp (A4) Road.

Under this Contract, KENHA has commissioned Ms Norken-Kenya Ltd (The Consultant) to render all technical support services, which may be deemed relevant to the above project and as specified in the Terms of Reference issued by Implementing Agency. As part of the contract, and in line with existing national legislation and international practice, the Consultant is expected to undertake Environmental Impact Assessment (EIA) for the said Project.

This Report outlines the findings of the Environmental and Social Impacts Assessment Study undertaken as an integral part of the design project. The EIA Report highlights salient social and environmental issues associated with the design, construction and operational aspects of the North Horr – Jn Darathe AP Camp (A4) Road.

The Report has been prepared under contract by Lead Experts from Repcon associates, an Environmental Firm of Experts duly registered and licensed by NEMA (NEMA Registration No. 0002) and other Government of Kenya (GoK) agencies.

The Consultant shall conduct analyses which shall detail the positive and negative effects of the development of the project on the environment, and prepare an ESIA report recommending appropriate solutions to minimize any undesirable effects resulting from improvements of the road. The analyses shall include, but not limited to the following:

- a) Review all existing documentation, and previous ESIA, RAP and ESMP reports pertaining to the project
- b) Concise documentation of the existing environmental and social baseline information in the project areas and their surrounding areas
- c) Concise outline of the project activities that will be undertaken during implementation of project works;
- d) Provide justification for the project taking into account the development plans at national and regional level;

1.1.2 Design Objectives and Justification

These improvements are expected to amongst others achieve the following objectives:

Select and design a pavement to enable it to carry the updated future traffic projections.

- Improve the road's geometric features to meet Class A standards.
- Improve the road's drainage
- Reduce journey times along both A4 road
- Provide a shorter route to vehicles/traffic destined to Darathe Ap Camp, Ileret to Ethiopia

- Enhance road capacity
- Reduce road accidents and improve safety
- Improve accessibility to the project area of influence and access to government services
- Improve trade
- Improve and support draught management and mitigation measures
- Enhance security and improve livestock development and management.

1.2 SCOPE OF THE EIA STUDY

The Consultant shall conduct analyses which shall detail the positive and negative effects of the development of the project on the environment, and prepare an ESIA report recommending appropriate solutions to minimize any undesirable effects resulting from improvements of the road. The analyses shall include, but not limited to the following:

- a) Review all existing documentation, and previous ESIA, RAP and ESMP reports pertaining to the project
- b) Concise documentation of the existing environmental and social baseline information in the project areas and their surrounding areas
- c) Concise outline of the project activities that will be undertaken during implementation of project works;
- d) Provide justification for the project taking into account the development plans at national and regional level; KeNHA/2390/2021 :- North Horr – Jn Darathe Ap Camp (A4) Road 45
- e) Identify and review national, regional and international policies, legislations and institutional frameworks governing social and environment management and relating to the project
- f) Identify and provide a description and an evaluation of possible project alternatives in terms of the technology, design and lay outs, levels of works in the works and location consideration of the project sites. The assessment of alternatives should cover assessment of the sites, routes and alignments for the project infrastructures. An analysis for each alternative in terms of cost and technical feasibility should be given and the best option justified. The analysis should include parameters considered along with weightage criteria for shortlisting selected site;
- g) Conduct ecological evaluation of the available project alternatives to compare their viability taking into account a number of considerations such as environmental costs, ecological values and uses and inherent opportunity costs against each of the alternatives; Present the preferred project design option, based on the technical and ecological alternatives evaluation.
- h) Describe development activities to be undertaken in the project and map out key environmental and social impacts of the project in terms of their extent, duration and reversibility. The ESIA should provide matching feasible mitigation measures for such impacts;
- i) Assess noise and vibration effects associated with the construction and operation of the proposed road. The assessment process should focus into various activities including construction related traffic movements; construction operations and the future operations of the road; It is expected that, noise sources in the project area include vehicular traffic ranging from motorcycles, personal vehicles, public service vehicles and heavy vehicles. Atmospheric conditions that may affect noise levels include humidity, wind direction, and wind speed. The noise assessment should be based on equivalent ambient noise levels that should not be exceeded and general recommendations for prevention and control of noise are described in the General EHS Guidelines;

- j) Conduct project public consultations and describe disclosure requirements;
- k) Identify the negative environmental and social impacts of the project and propose feasible mitigation measures to address such impacts. In doing so consideration should be made to the size and extent of the impacts based on quantitative data rather than qualitative assessment;
- l) Provide a set of recommendations for the project design to avoid and/or minimize the negative impacts and maximize the positive;
- m) Occupational health and safety issues during the construction, operations and decommissioning of road project and ancillary facilities are to be outlined in the ESIA in line with OHS requirements for large infrastructure in line with internationally acceptable practices and standards such as General recommendations for managing physical hazards as addressed in the OSHA 2007. This should comprehensively cover among others protections against, KeNHA/2390/2021 :- North Horr – Jn Darathe Ap Camp (A4) Road 46 exposure to dust and hazardous materials that may be present in construction materials and demolition waste and a host physical hazard associated with the use of heavy equipment, or the use of explosives in line with this nature of project;
- n) Undertake Risk Assessment and propose a Disaster Management Plan including emergency evacuation during natural and man-made disaster like mud slides, rock falls, and or floods amongst others;
- o) Assess the direct and indirect impacts of the planned project activities on the environment and propose mitigation measures;
- p) Prepare an Environmental and Social Management Plan (ESMP) detailing measures for addressing potential negative environmental and social impacts of the project. In addition, the ESMP should clearly identify institutional roles, responsibilities and costs in addressing the mitigation measures that will be proposed in the ESIA; and
- q) Propose an Environmental and Social Monitoring Plan with clear monitoring indicators and institutional roles to be used in tracking the implementation and compliance of the proposed mitigation measures.

The Environmental and Social Impact Assessment (ESIA) study will be in accordance with the Environmental Management and Co-ordination Act (EMCA), CAP 387 and the Environmental (Impact Assessment and Audit) Regulations, 2002. The consultant will assist the client in following up and obtaining the approval and the NEMA licence.

1.3 STUDY METHODOLOGY

1.3.1 Statutory Content of ESIA Study Report

The Second Schedule of EMCA specifies projects that require to be subjected to EIA studies. In line with the Second Schedule, the proposed construction of the Road was screened and found to devoid of concerns that would require resolution through a full cycle EIA. As such, the NEMA screening procedure as expounded in Legal Notice 101 of June 2003 was adopted leading to development of a Project Report whose focus and scope are defined in Regulation 6, 7 and 8 of Legal Notice 101. Section 6 of part 1 of the LN 101 stipulates that *“An application for an Environmental Impact Assessment License shall be in the form of a Project Report in the form set out in the First Schedule to these Regulations, and the applicant shall submit the application together with the prescribed fee to the Authority...”* Section 7(1) of Part 11 of the Legal Notice 101 specifies the contents (scope) of the project report.

A proponent shall prepare a project report stating: -

- a) The nature of the project;

- b) The Division of the project including the physical area that may be affected by the project's activities;
- c) The activities that shall be undertaken during the project construction, operation and decommissioning phases;
- d) The design of the project;
- e) The materials to be used, products, by-products, including waste to be generated by the project and the methods of disposal;
- f) The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation;
- g) An action plan for the prevention and management of possible accidents during the project cycle;
- h) A plan to ensure the health and safety of the workers and neighbouring communities;
- i) The economic and socio-cultural impacts to the local community and the nation in general;
- j) The project budget;
- k) Any other information that the Authority may require

1.3.2 Data collection for the ESIA Study report

The study process involved review of diverse documents with a view to familiarizing with the baseline environment. These include: -

- Range Management Handbook for Marsabit District (obtained map for the Project Area)
- Research Work by Sean Avery and others on the Hydrology and climatology of the lake Turkana Basin
- CIDPs for Marsabit County

Accruing secondary data was reviewed so as to provide an insight into the socio-environmental baseline of the program area. Preliminary opinions formed from literature review were re-validated during fieldwork undertaken on the ground.

1.3.3 Field work and public consultations

Field data collection: Field data collection employed diverse methodologies including observations during drives along the target road, observations and photography, identification and detailed investigations at sites of interest, among others. Emergent concerns were further interrogated through interviews with thematic experts.

Stakeholder engagement: In line with statutory requirements, views of stakeholders to the proposed development were solicited as part of the EIA process. Such views/comments were used to refocus the project design and have been appended to the Report as manifest of the public attitude towards the proposed development.

1.4 DATA ANALYSIS AND IMPACT PREDICTION

Upon data analysis, potential environmental impacts (both positive and adverse) were predicted based mainly on concerns raised by stakeholder and expert observations on the ground and available tools. The magnitude, significance, and acceptability of predicted impacts were evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation. Impacts were further screened for occurrence and significance of residual (those which cannot be mitigated

satisfactorily) and cumulative impacts with a view to providing a basis of making recommendations on the way forward for the project.

1.4.1 Description and establishment of the environmental and socio-economic baseline condition

1.4.1.1 Documentation of pre-project baseline:

The TORs require the Consultant to collect, collate and present baseline information to characterize the pre-project baseline along both the immediate traverse and its receiving area. Indeed, the TORs have identified parameters to be investigated towards documentation of the baseline environment and in sections below, we present in tabular form, our preferred approach to documentation of the biophysical and socio-economic baseline.

Table 1.1: Approach to baseline characterization

Parameter	Factors	Approach to characterization	Authorities
Physical environment	Geology, physiography and topography	Review of available Reports and on-the-ground documentation On site topographic measurements with hand held GPS	Range Management Handbook for Marsabit, National Museums of Kenya - Sibiloi and Koobi for beds, Sean Avery-Hydrology of Lake Turkana; others,
	Climate	Analysis of available data on rainfall, temperature, radiation, windspeed, evapotranspiration, etc	
	Hydrology and water resources	Review of secondary data to obtain maps on drainage and hydrology, Computation of water balance based on available data to be validated against published data reports	
Biological Environment	Habitat mapping	Review of available reports supplemented by on the ground observations and interviews with respective Lead Agencies-KWS, KFS, etc	Respective Lead Agencies and NGOs such as the AWF, LWF etc
	Species diversity and availability	Review of available reports, on the ground observations and interviews with villagers, cross checking with Lead Agencies	Lead Agencies, NGOs and Community Elders
	Trends in species dynamics	Review of Reports and interviews with local communities	IUCN RED List, AEWa and CMS
Social cultural environment	Population, ethnicity, religion, settlement patterns, resource use and control, livelihoods, income levels,	A socio-economic survey based on administration of a questionnaire to a representative sample \\Revalidation of data based on review of reports and interviews with respective authorities	National Welfare Monitoring Reports, other reports

Parameter	Factors	Approach to characterization	Authorities
	access to services, status of welfare.		
	Livelihood patterns	Dominant resources e.g. pastures, water resources, dry season grazing grounds, salt licks and associated livelihood systems will be documented through Focus Group Discussions and questionnaire survey	Range Management Handbook, Available Reports
	Socio-cultural assets	A Cultural Impact Assessment along the traverse to identify all cultural assets	Op 4.10 and Cap 261 of laws of Kenya. Interviews with NMK
	Socio-economic profile	Computation of welfare indicators based on data from the questionnaire survey	Welfare monitoring Survey Reports
	Drought vulnerability mapping	Drought and other emergent concerns such as conflicts, banditry and highway crime, etc will be mapped through public hearing meetings and key informant interviews	National Drought Monitoring Authority
Economic activities	Livelihood mapping	As part of the study, our sociologist will map dominant livelihood systems and correlate them with productive resources.	County Integrated Development Plans, National Drought Management Authority, CEM for planning, agriculture and natural resources.

1.4.1.2 Documentation of Emergent concerns and trends:

Of critical importance to any baseline mapping is the need to identify and document all emerging concerns and trends such as in land use, vegetation and cover patterns, wildlife occurrence, resource use, prevalence of invasive species, status of water resource development and use, social trends, poverty levels, employment patterns, education achievement, trends in disease prevalence among others to set the background for the proposed intervention, in this case road upgrading project. As such, as part of the baseline mapping, current trends in all resources will be established and documented and latter crosschecked against project interventions to predict potential trends and attendant impacts.

1.4.2 Description of Policy, Legislative, Regulatory and Institutional Framework

The legal study started with a mapping of all interests/stakeholders potentially impacted by the road followed by identification of critical requirements of their respective policies, legal tools and instruments to be complied with at all stages of project cycle.

1.4.3 Determination of impacts of proposed project road

Phases in Impact Assessment: Impact prediction essentially started at the Scoping Stage to be submitted as part of the Project Report. Further, impact prediction will target all stages of project development namely; - Design, Construction, Commissioning and abandonment.

Approach to impact assessment

Impact prediction in the ESIA Study adopted diverse tools as amplified below. Given the critical importance of Stakeholder Consultation as a forum for identifying potential project impacts a comprehensive stakeholder consultation process was adopted to ensure that all pertinent concerns especially from minorities have been factored into project design.

- **Use of Checklists:** Impact prediction in this study relied on two checklists such as the Leopold Matrix developed by the US Department of Agriculture, World Bank Checklist for Roads Sector, among others. A sample of the Leopold Matrix as applied in impact analysis and interpretation is presented in sections below.

	Industrial sites and buildings	Highways and bridges	Transmission lines	Surface excavation	Mineral processing	Trucking	Emplacement of tailings	Spills and leaks
	Waste water Sewage Washing Runoff from paving	Runoff during construction Runoff from finished road	Sediment from cleared zone Construction sediment	Sediment from fill Effects of ore exposures Effects of deep seepage	Sulfuric acid use Acidity of yard runoff	Spilled sulfur compounds	Erosion of fill Deep seepage Acidity of seepage	Highway truck spills Tailings pond leak Tailings dams washout Plant spills of acid
Water quality	3/3 3/3 1/1 1/2	1/1 1/2	1/1 1/1	2/2 1/1 1/1	1/1 1/3	1/4	3/3 1/2 1/2	1/3 1/3 1/1 1/1

- **Information/ concerns from stakeholder consultations:** Concerns raised by diverse categories of stakeholders provided a firm indication of the possible impacts of the project. Indeed, from stakeholders in Government and NGOs, a firm indication of potential triggers to sectoral interests was obtained while the community in general raised concerns specific to their interests and livelihoods.

Approach to impact interpretation

The magnitude, significance, and acceptability of predicted impacts was evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation. To achieve this, predicted impacts were described in both quantitative and qualitative terms through application of existing body of knowledge, checklists, flow charts, monographs and input from diverse stakeholders. At this juncture, predicted impacts were evaluated against, existing standards, laws and regulations, reference to pre-set criteria, government policy objectives, acceptability to the local community and the general public, etc. Impacts were further screened for occurrence and significance of residual impacts (those which cannot be mitigated satisfactorily) with a view to providing a basis of making recommendations on the way forward for the project.

1.4.4 Identification of Mitigation Measures

Measures or interventions necessary to minimise, reduce, avoid or offset identified adverse impacts were evaluated and presented in form of an Impact Mitigation Plan for the proposed development. Such evaluation also included an assessment of the No-Go Option as reported in Chapter 8.

1.4.5 Identification of Monitoring Requirements

As part of the study output, a monitoring and evaluation programme was developed as a means for monitoring compliance during implementation of proposed mitigation measures and to ensure continuous generation of project data and information.

1.4.6 Environmental & Social Impact Assessment (ESIA) Report

Once all analysis of information obtained in the procedure outlined above has been concluded, a Draft ESIA report will be prepared in line with Legal Notice 101 of Cap 387. Regulation 18 of Legal Notice 101 of EMCA sets the standard content for ESIA Study Reports as follows: - *(1) A proponent shall submit to the Authority, an environmental impact assessment study report incorporating but not limited to the following information: -*

- ✓ *The proposed location of the project;*
- ✓ *A concise description of the national environmental legislative and regulatory framework;*
- ✓ *Baseline information and any other relevant information related to the project; the objectives of the project;*
- ✓ *The technology, procedures and processes to be used, in the implementation of the project;*
- ✓ *The materials to be used in the construction and implementation of the project;*
- ✓ *The products, by-products and waste generated by project;*
- ✓ *A description of the potentially affected environment;*
- ✓ *The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated;*
- ✓ *Alternative technologies and processes available and reasons for preferring the chosen technology and processes;*
- ✓ *Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.*
- ✓ *An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;*
- ✓ *Provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;*

- ✓ *The measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;*
- ✓ *An identification of gaps in knowledge and uncertainties which were encountered in compiling the information;*
- ✓ *An economic and social analysis of the project;*
- ✓ *An indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures; and*
- ✓ *Such other matters as the authority may require.*

The draft version of the ESA Study Report will be submitted to KeNHA for review in line with the contract and emergent comments will be applied towards development of this Final Report which will be submitted to NEMA in line with Regulation 19 of Legal Notice 101.

1.6 PRESENTATION OF THE REPORT

The ESIA study as proposed above culminated with production of this ESIA Study Report prepared for submission to NEMA. This report has been designed to ensure that the proposed development complies with the Environmental Management and Coordination Act (EMCA, 1999) whose Section 58 requires that *all development projects to be preceded by an EIA undertaken by the project proponent*. Other goals of this document include presentation of an Environmental Impact Assessment Statement for the proposed development to enable the National Environmental Management Authority- NEMA, to undertake an Environmental Screening in line with Legal Notice No. 101 of June 2003.

The report is organized in 10 chapters as outlined below: -

- Chapter 1:** Gives Background Information to the Study Describing the Objectives and the Terms of Reference.
- Chapter 2:** Unveils the Project as currently conceived
- Chapter 3:** Gives the Policy, Legal and Regulatory Framework Policy, Legal, Institutional and Administrative Framework
- Chapter 4:** Outlines the Baseline Information of the Study Area
- Chapter 5:** Summarizes the outcome of the Public Consultations process
- Chapter 6:** Analyses alternatives in Project Development
- Chapter 7:** Identification of Potential Impacts of the Project
- Chapter 8:** Mitigation of Potential Impacts of the Project.
- Chapter 9:** Environmental and Social Management and Monitoring Plan (ESMP)
- Chapter 10:** Concludes the Project and recoups the core recommendations.

CHAPTER TWO: PROJECT DESCRIPTION

2.1 OWNERSHIP AND REGIONAL PLANNING CONTEXT

The North Horr-Jn Darathe Ap Camp Road falls entirely in Marsabit County and is owned by the Republic of Kenya through the implementing agency, Kenya National Highway Authority-KENHA. It is however a small part of the wider Maralal - South Horr- North Horr – Ileret (A4) corridor Project which is among the very few Class A roads that remain unpaved and upgrading of the road corridor is one of the top priorities of the GoK, and consistent with the transport policy of bituminizing of all Class A roads in the country. It transverses a region with rudimentary road infrastructure, isolated and with high incidence of poverty.

Development objectives of the immediate project are to improve the movement of goods and people along North Horr- Jn Darathe Ap Camp Part of the Gilgil - Nyahururu - Maralal- South Horr- North Horr – Ileret road corridor and to enhance connectivity between Kenya and Ethiopia. The project seeks to address development constraints caused by poor infrastructure in the Northern region of Kenya, which is one of the most impoverished and isolated regions of the country. This project is also a key link to the LAPSSET Project and opening up of the Northern corridor. Improving the road will no doubt stimulate the development, integrate, and contribute to improving security and bringing about sharing the prosperity of the country with this region.

2.2 PROJECT DESCRIPTION

2.2.1 Project Location

The project road is situated in Marsabit which, according to the national Constitution, is County No. 10. Marsabit County has a total area of 70,961km² and occupies the extreme part of Northern Kenya. It has an international boundary with Ethiopia to the North. It borders Lake Turkana to the West, Samburu County to the South, Wajir and Isiolo Counties to the East. It lies between latitude 02°45' North and 04°27' North; 37°57' East and 39°21' East.

Marsabit County has four administrative units (sub-counties) namely Marsabit Central, Laisamis, North Horr and Moyale. It has four Political units (Constituencies) namely Saku, Laisamis, North Horr and Moyale. Within Marsabit, the Road traverses the North Horr Location/Ward located within North Horr Constituency of North Horr Sub-County all of which are administered from the North Horr Town.

2.2.2 Current condition and Traverse

Fig 2.1 shows the traverse/alignment of the Project Road. The Road starts off at North Horr Town, about 196 km north west of Marsabit town at the junction of Maralal-Baragoi-Loyangalani- North Horr road (A4 formerly C77) and Marsabit – North Horr road B75. The entire road is currently earthen starting at North Horr Town and proceeds in a generally northwesterly direction through El Beso Market Centre. At Km 79+00, the road changes direction and heads westwards to cross minor rift valleys of which the main one is the Chalbi Ndogo and proceeds westwards to end at the Darathe AP Camp at the edge of Sibiloi National Park located on the north-eastern shores of Lake Turkana, approximately 108 km away from North Horr Town (Fig 2.1 and Plates 2.1 and 2.2).



Plate 2-1: Satellite Image of North Horr Town showing the North Horr Junction start of Project Road

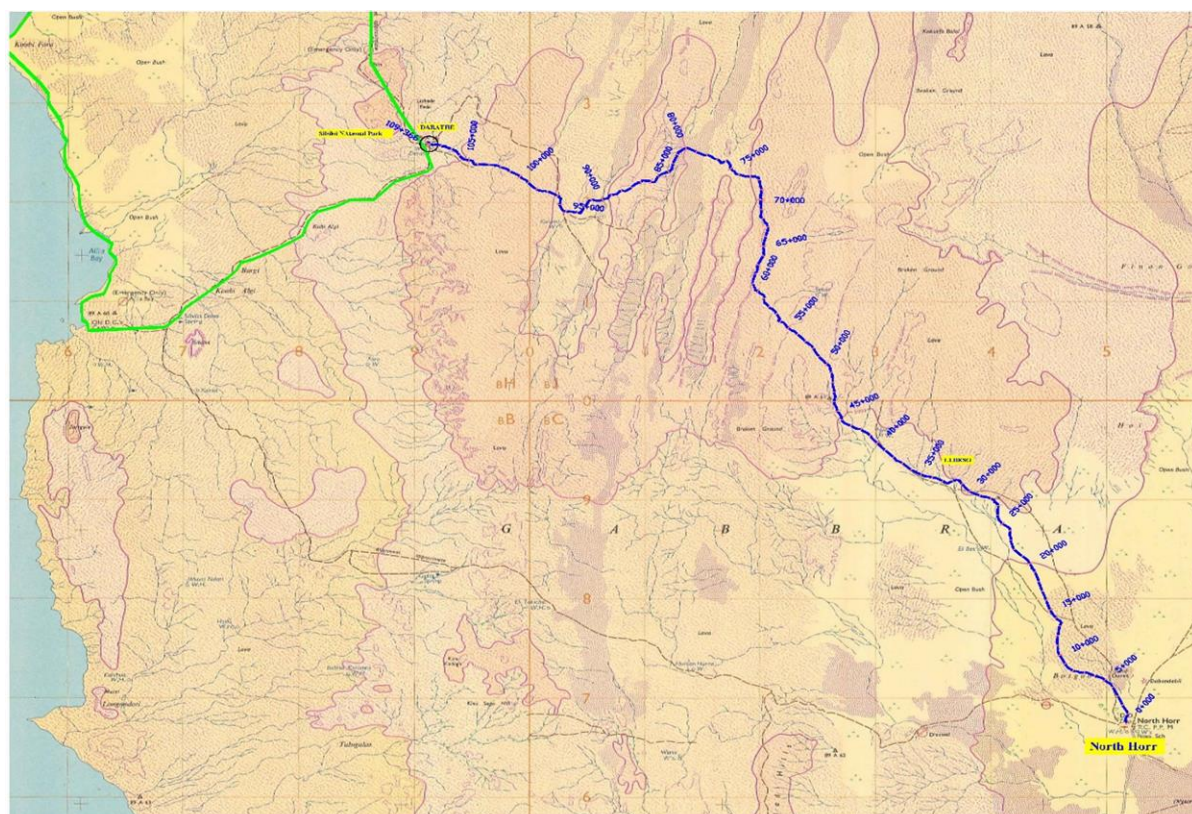


Fig 2.1: Alignment of the proposed Road Project in Marsabit County

2.3 FEATURES OF THE PROJECT ROAD

2.3.1 The broad design Objective

Activities to be undertaken as part of the project are described in section 3.4 below.

The TORs call for design to allow construction of the North Horr Jn-Ndarathe AP Camp Road to Bitumen Standard. The design is further required to incorporate design for all access roads to

Government institutions including but not limited to schools, colleges, District headquarters and other Government offices. Major loop roads and through townships and bypasses or market centres along the road shall also be included. Also design of interchanges where necessary shall be undertaken.

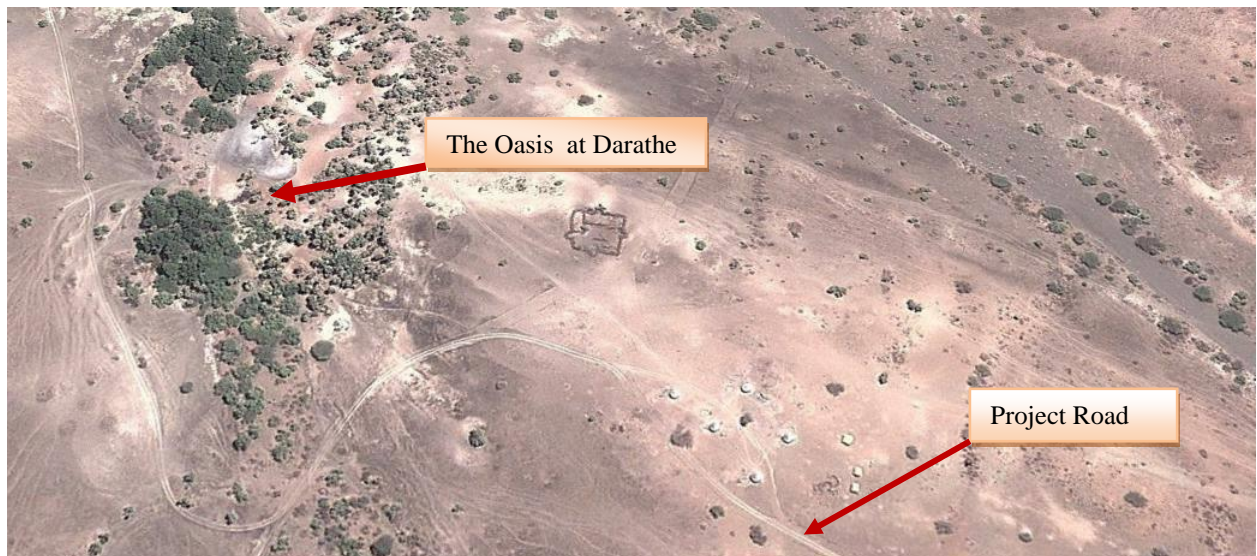


Plate 2-2: Satellite Image of the Darathe AP Post.

2.3.2 Design specifications:

Project Description:

The proposed project starts at the junction of B75 (Marsabit – North Horr road) and A4 (Maralal – North Horr road) within North Horr market. The initial proposed start point within North Horr market has been shifted based on the approved alignment designs for the connecting roads, that is, A4 and B75. This shift of the start point avoids possible demolitions within the market where the corridor is constrained. From North Horr, the road proceeds in a north-westerly direction through El Beso market centre and ends at Darathe AP Camp Junction; a distance of approximately 105.51 km.

Currently, the road is of gravel standard and is currently maintained by KeNHA and generally in good condition. The road is drained by seasonal rivers/streams at various sections, with existing structures including one single span bridge at km 99+070, one box culvert (5mx2m high) at Km 32+600, six drifts and several pipe culverts. Human habitation along the project road is very sparse.



Plate 2-3 Existing Road condition near Darathe AP Camp

The existing road is currently made of earth / gravel and has been designed for upgrading to bitumen standard. The road traverses through flat terrain at the start, rolling and mountainous terrain spread out from Elbeso market towards the end. The terrain can be classified as follows: -

Table 2.1 – Terrain Classification

Item	Start Station	End Station	Length (Km)	Design Speed (Km/hr)	Comment
1	0+000	2+000	2	60	Flat Terrain North Horr Town Section-
2	2+000	37+360	35.36	100	Flat Terrain
3	37+360	45+300	7.94	80	Rolling Terrain
4	45+300	52+830	7.53	100	Flat Terrain
5	52+830	98+400	45.57	80	Rolling Terrain
6	98+400	105+508	7.11	60	Mountainous Terrain

The road is designed to Class A standards and therefore design speeds adopted were 60 – 100 kph as shown in table 2.1 above, varying from section to section in accordance with RDM 1 guidelines.

The cross-section for the project road chosen was based on the road function, basic capacity and design speed. Section 4 of RDM Part 1 requires that for class A and B roads with design speeds greater than 90 km/h, the higher standard of the cross section should be considered. The adopted road cross-section is a Type II, with 7.0 m carriageway and 2.0m shoulders on both sides as per RDM Part 1: Geometric Design of Rural Roads, Roads Department, Ministry of Works, Republic of Kenya, January 1979 and circulars issued by the Chief Engineer (Roads) for minimum width of the road shoulders.

It is assumed that the designed road has a 60m wide right of way and generally coincides with the centerline of existing road with minor design realignments for geometric reasons. This is line with section 2.4 of RDM Part 1; the desirable road reserve width for class A roads is 60m.

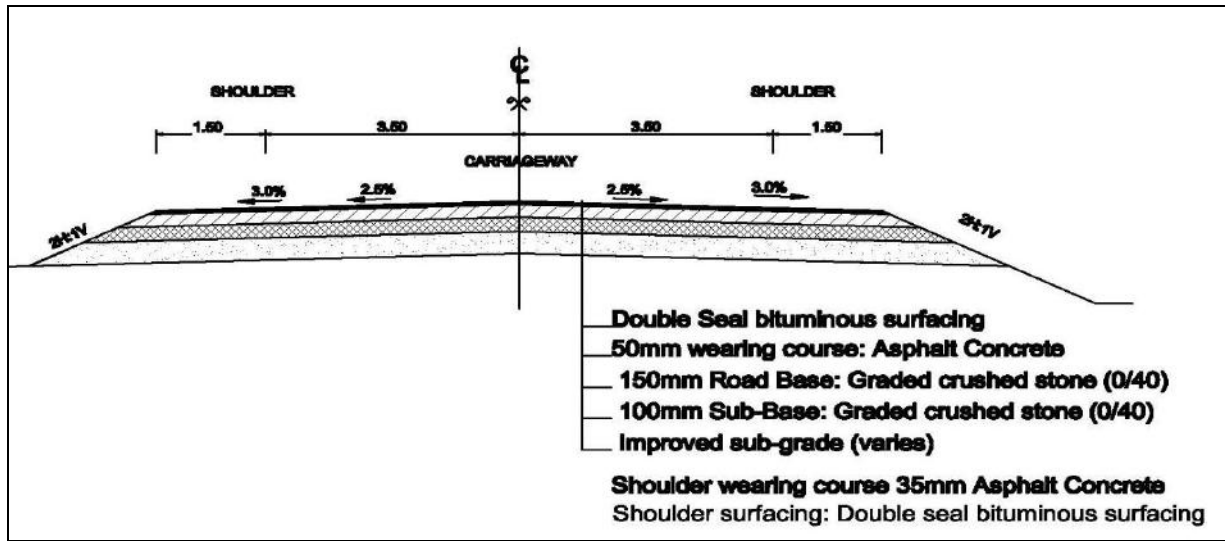
The horizontal alignment closely follows the existing road. Minor realignments are incorporated at various sections to improve geometric alignment. A particular realignment will be designed to bypass a series of animals watering points at Elbeso Market from Km 30+300 to Km 34+000. Some access roads to public institutions from the main road have been proposed as follows.

Table 2.2 – Proposed Access roads to Public Institutions

Item	Access Road	Length (Km)	Institutions Served
1	IEBC Access Road	1.664	IEBC offices, Vocational Training Centre, Youth Empowerment Centre, Technical Training Institute, and North Horr market
2	KPLC Access Road	1.065	First Born Primary School, Kenya Power Offices, North Horr Girls Sec. School and Muslim Girls Sec. School.
3	Elbeso Loop	2.10	Elbeso market, Primary School, Public Water Borehole and Public Dispensary.

Fig 2.2 below provides a cross-section pavement in the proposed road. Design provides for a nine-metre-wide road comprised of 2 lanes each 3.5m wide with a one-metre-wide shoulder on either side.

The road surface will entail a double seal bituminous surface supported by a 50mm Asphalt wearing course, 150mm Graded Crushed Stone Road Base, 100mm Graded Crushed Stone sub base and an improved sub base in that order.



Source: Design Report

2.4 ACTIVITIES DURING PROJECT CONSTRUCTION AND OPERATION

The works specified under this project will include all general and auxiliary works and work of any nature that is deemed to be necessary for the due and satisfactory construction, completion, and maintenance of approximately 108 Km of bitumen standard main road.

2.4.1 Activities during Construction

The major items of work during construction included in the contract are as follows; -

- i) Erection of office and laboratory for the Resident Engineer (RE) and the Residential Houses for the REs staff.
- ii) Stripping of topsoil over the entire construction area and stockpiling the material on the road-side for re-use in grassing-planting and rehabilitation of borrow sites.
- iii) Construction earthworks by cutting to spoil, cutting to fill and borrow to fill;
- iv) Processing of soil (earthworks) material in layers by watering, mixing and compacting with heavy equipment to the required compaction strength.
- v) Quarrying gravel (murrum) material from designated material sites and transporting the material to the road; total volume of gravel for pavement.
- vi) Quarrying hard stone from designated material sites by blasting, crushing, screening and grading the material before transporting the chippings to the road;
- vii) Application of bituminous spray coat to the road, spreading chippings on top and rolling the layer. The process is repeated for two layers.
- viii) Construction of pipe culverts, headwalls for culverts and improvement of other drainage and soil erosion protection works.
- ix) Accommodation of traffic crossing through the works;
- x) Gravelling of detours, deviations, junction and accesses;

- xi) Diversion of services water, electricity and telephone lines from the construction area to the edge of road reserve;
- xii) Provision and erection of new road furniture (guardrails, road signs, marker posts and speed bumps);
- xiii) Road markings;
- xiv) Top-soiling and grass planting and watering until growth are ensured to improve aesthetics.
- xv) Tree planting and watering until growth is ensured of approved tree seedlings

2.4.2 Activities during Operation and Decommissioning

The Contractor will be required to maintain the road for a period of 24months. The major items of work during maintenance period included in the contract are as follows; -

- Repair of any defects on the road and road furniture;
- Cleaning and desilting culverts and road side drains;
- Regular road markings;
- Grass and bush clearing within the road reserve;
- Removal of construction camps, removal of un-used material stockpiled on the road, tidying and general cleanness of the road and construction sites.

2.4.3 Materials to be used, products and by-products

The road will utilise as much as possible material from within the area and imported material will be limited to cement and bituminous products.

2.5 COST OF THE PROJECT

The summary of the Estimated Construction cost for the project road is provided using the headings of Bill of quantities (BOQ) in Kenya shillings in Table 2.1. A sum total of Ksh 10,034,742,654.18 is anticipated to be spent on the road as broken down in Table 2.2 below.

Table 2.1: Estimated cost of the Works

Summary Bill of Quantities		
Preliminary Design: North Horr - Jn Darathe Ap Camp (A4) Road		
Item	Description	Amount (Kshs.)
1	Preliminary and General Items	672,677,203.42
4	Site Clearance and Topsoil Stripping	158,480,000.00
5	Earthworks	1,694,576,680.00
7	Excavation & Filling for Structures: Box Culverts & Bridges	136,548,932.50
8	Culvert and Drainage Works	297,487,034.00
9	Passage of Traffic	67,954,300.00
12	Natural Material for Sub-base and Base	2,294,400.00
13	Graded Crushed Stone Base and Sub-base	880,502,100.00
15	Bituminous Surface Treatments and Surface Dressing	671,271,000.00
16	Bituminous Mix Bases, Binder Courses and Wearing Courses	1,330,665,000.00
17	Concrete Works	766,064,638.00
20	Road Furniture	121,948,918.38
21	Miscellaneous Bridge Works	5,534,435.00
22	Day works	47,967,534.00

24	Environmental Mitigation Measures	20,185,000.00
25	HIV/AIDS Awareness and Education	12,875,000.00
26	Road Safety and Awareness Campaign	8,280,000.00
27	Occupational Safety and Health Administration	25,200,000.00
	Sub-total 1	6,920,512,175.30
	Add 10% of Sub-total 1 for Physical Contingencies to be expended in whole or in part or deleted as directed by the Engineer.	692,051,217.53
	Add 15% of Sub-total 1 for Variation of Prices in accordance with Clause 70 of the Conditions of Contract.	1,038,076,826.29
	Sub-total 2	8,650,640,219.12
	Add 16% of Sub-total 2 for Value Added Tax (VAT)	1,384,102,435.06
Total carried forward to form of Bid		10,034,742,654.18

CHAPTER THREE: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter outlines the policy, legal, regulatory and institutional framework for Environmental Management in Kenya, which calls for compliance by all development projects including those of the road transport sub- sector.

3.1 POLICY FRAMEWORK WITHIN THE NATIONAL PLANNING CONTEXT

Three policy frameworks are considered relevant to development planning as envisaged in North-Horr Jn-Darathhe Road Project:-

- Policy Framework for development planning;
- Policy Framework for development of Northern Kenya; and
- Policy Framework for environmental management.

1.4.7 Policy framework for Development Planning

The mandate for development planning: The policy framework for development planning in Kenya is vested in the Constitution and the long term development blue print - Kenyan Vision 2030. Chapter Four of the Constitution focuses on the Bill of Rights. Article **19** (1) describes the Bill of Rights as “an integral part of Kenya’s democratic state” and “as the framework for social, economic and cultural policies”. Article **69** (2) states that: - “every person has a duty to cooperate with State Organs and other persons to protect and conserve the environment; and ensure ecologically sustainable development and use of natural resources”.

Chapter Eleven of the constitution describes development planning through devolution. Article **174** defines the object of devolution of government including (f) “to promote social and economic development and the provision of proximate, easily accessible services throughout Kenya”. It also allows county assemblies to receive and approve plans and policies for the development and management of its infrastructure and institutions (Article **185** (4) (b)). However, it also notes that the structure of the development plans and budgets of counties shall be prescribed through national legislation (Article **220**. (2)(a)). In Chapter Twelve, the Principles of Public Finance is positioned, including Article **201**.(b)(iii) stating that “expenditure shall promote the equitable development of the country, including by making special provision for marginalized groups and areas”.

Kenya Vision 2030: At the country level, development of Infrastrucuture is considered an Enabler to the Economic Pillar to Vision 2030 intended to spur economic development by creating new opportunities and unlocking the latent economic potential particularly in the larger hinterland of Northern and North Eastern parts of Kenya. Through the Vision, Kenya is anticipated to transform into a newly- industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment by the year 2030. At the point of development, the Vision aimed at meeting the Millennium Development Goals (MDGs) while making the country globally competitive.

The overarching vision is “A globally Competitive and Prosperous Nation with a high quality of life by the year 2030”. The vision is anchored on three pillars namely Economic, Social and Political pillars. To support the three pillars are transversal institutional reforms and infrastructure development interventions. To drive the economic pillar, six priority sectors were identified, i.e. Tourism, Agriculture, Wholesale and Retail Trade, Manufacturing, Business Process Out sourcing (BPO) and Financial Services (see Figure 3.1). And the growth target was to be achieved through implementation of several flagship projects in the six priority sectors.

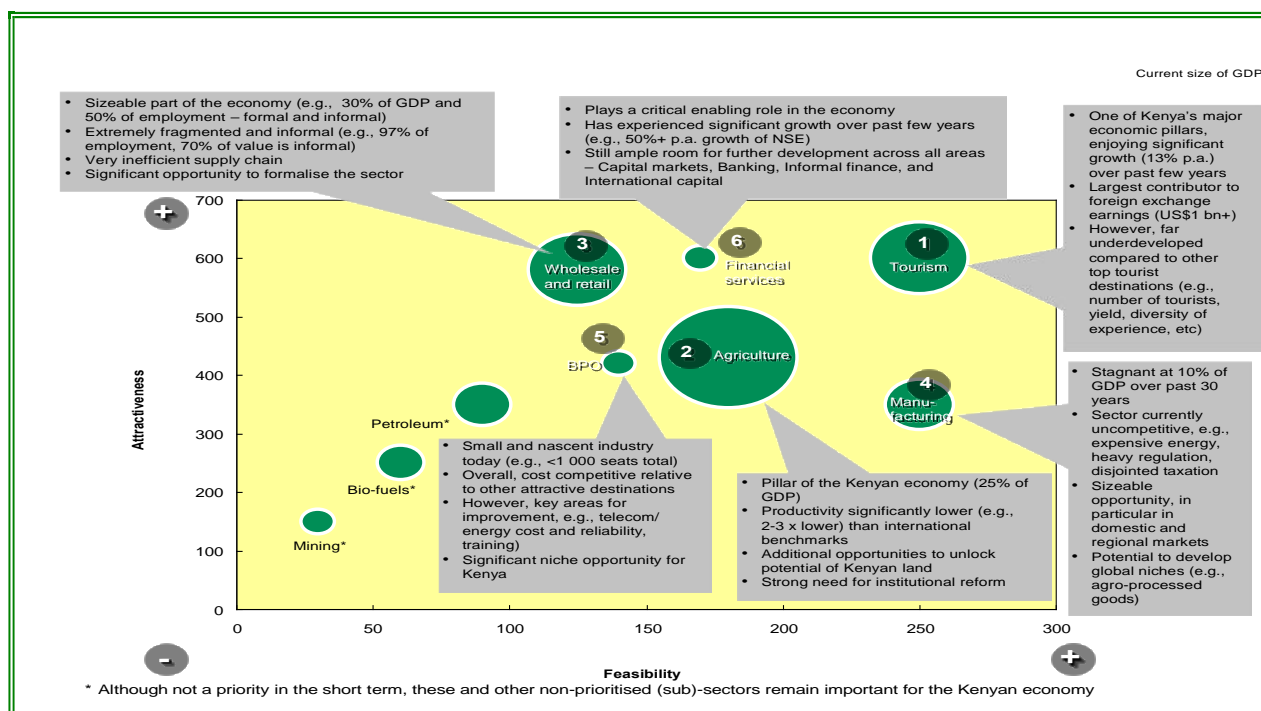


Figure 3.1: The six priority areas in the Kenya Vision 2030

Visions, goals and strategies were developed for each of the six priority economic sectors. The visions were as follows:-

- Tourism - “To be among the top 10 long haul tourist destinations offering a high-end, diverse, and distinctive visitor experience”;
- Agriculture - “Innovative, commercially oriented and modern farm and livestock sector”;
- Wholesale and Retail - “Move towards a formal sector that is efficient, multi-tiered, diversified in product range, and innovative”;
- Manufacturing - “A robust, diversified and competitive manufacturing”;
- Business Process Outsourcing - “The top BPO destination in Africa”;
- Financial Services - “A vibrant and globally competitive financial sector driving high-levels of savings and financing Kenya’s investment needs”.

There were 20 major projects strategized for the Economic Pillar (Table 3.1)

Table 3.1: The Flagship Projects for the various sectors

Priority sector	Flagship projects
Tourism Sector	1) Development of 3 resort cities two at the coast and one in Isiolo. 2) Premium Park Initiative. 3) Under Utilized Parks Initiative. 4) Development of Niche Tourism Products.
Agriculture Sector	5) Enactment of the Consolidated Agricultural Reform Bill. 6) Fertilizer Cost-Reduction Initiative. 7) Setting up of five livestock Disease Free Zones in the ASAL regions. 8) Land registry.

	9) Land use master plan. 10) ASAL Development Projects.
Manufacturing Sector	11) Development of Special Economic Zones in all the eight regions. 12) Development of 5 SME parks.
Wholesale and Retail Sector	13) Build 1 free trade port in Mombasa in order to bring Dubai to Kenya. 14) Create at least 10 hubs and 1000-1500 Producer Business Groups (PBGs) - start with a pilot in Maragua. 15) Build at least 10 Tier 1 mark in all the regions - starting with a pilot in Athi River.
ICT and BPO Sector	Establish one major BPO park
Financial Sector	16) Issuance of benchmark sovereign bond. 17) Pursue comprehensive remittances strategy 18) Develop and execute comprehensive model for pension reform. 19) Facilitate transformation towards stronger, larger scale banks.

The social pillar of Vision 2030 seeks to create “**a just, cohesive and equitable social development in a clean and secure environment**”. It, therefore, presents comprehensive social interventions aimed at improving the quality of life of all Kenyans and Kenyan residents. The vision classifies interventions in the social pillar into six broad areas of focus. These include education, health, water and sanitation, environment, housing and urbanization, and gender, youth and vulnerable groups.

Kenya Vision 2030 Strategy for Developing Northern Kenya and Other Arid Areas: The Kenya Vision 2030 Development Strategy for Northern Kenya and other Arid Lands observed that previous resource allocation in development planning in Kenya favored the so-called high-potential areas – those which, in the words of Sessional Paper Number 10 of 1965, have ‘abundant natural resources, good land and rainfall, Different parts of the country will be moving towards this goal from different starting points.

Accelerated investment in previously neglected regions, such as the north, is required if all Kenyans are to have an equal chance of sharing in the promise and benefits of Vision 2030. The Strategy Document sets out what form that investment will take in the north of Kenya and the country’s arid and semi-arid lands. It explains how the distinctive characteristics of the region will be taken into account, and sets out the broad strategies and priorities which will be pursued. It will be operationalized through a series of costed five-year medium-term investment plans, the first of which is in preparation in 2011.

The National Policy for the Sustainable Development of Northern Kenya and other Arid Lands (Releasing Our Full Potential): The thrust of this Policy is that Kenya will not achieve sustained growth in her economy and progress as a nation if the ASALs are not appropriately factored into national planning and development. The goal of this policy is to facilitate and fast-track sustainable development in Northern Kenya and other arid lands by increasing investment in the region and by ensuring that the use of those resources is fully reconciled with the realities of people’s lives. The objectives of this policy are:-

- 1) To strengthen the integration of Northern Kenya with the rest of the country and mobilize the resources necessary to reduce inequality and release the region’s potential;
- 2) To improve the enabling environment for development in Northern Kenya and other arid lands by establishing the necessary foundations for development;

- 3) To develop alternative approaches to service delivery, governance and public administration which accommodate the specific realities of Northern Kenya and pastoral areas;
- 4) To improve the standard of living of communities in the ASALs and ensure sustainable livelihoods.

Implementation of this policy is targeted to contribute towards the Government's vision of security, justice and prosperity for the people of Northern Kenya and other arid lands while helping achieve the three pillars of Vision 2030 – economic, social and political – but particularly the social pillar, which seeks to 'create a just and cohesive society that enjoys equitable social development in a clean and secure environment'. Finally, it will reduce dependence on relief interventions and the heavy financial burden of emergency response.

1.4.8 Policy framework for devolved government

Devolution under the Constitution of Kenya, 2010 entails the transfer of fiscal, administrative and political power to the devolved entities with citizens playing a central role in governance. This is a departure from the past where power and resources were centralized and citizens had minimal participation in governance. The devolved system created a two-tier government: the national and the 47 County governments listed in the First Schedule to the Constitution. Both levels of government are distinct and interdependent and are required to conduct their mutual relations on the basis of consultation and cooperation.

The devolved system operates within the context of overarching national and county frameworks. Such frameworks include Kenya Vision 2030, Medium Term Plans (MTPs), national and county strategic plans, and County Integrated Development Plans (CIDPs). Additional frameworks include the policies and guidelines of Ministries Departments and Agencies (MDAs) as well as constitutional commissions and independent offices, with specific roles in the devolved governance and service delivery.

Currently, there is no sessional paper to drive devolution though a draft policy was published in 2015 (GOK, 2015). The draft policy, once adopted, will provide a framework to harness the gains and opportunities of devolution, respond to the challenges and emerging issues, and fill in any gaps in the existing policy framework on devolution. The policy aims to provide a framework for: -

- Efficient and effective service delivery at both levels of government;
- Enhance the alignment of roles, coordination, and collaboration among citizens, governments and non-state actors in the devolution implementation process; and
- Monitoring and evaluation mechanisms to ensure better management of devolution for high impact service delivery at both levels of government.

The draft policy focuses on the critical foundations of devolved governance including the objects of devolution. These are: Leadership and Governance; Equity and Inclusivity, Capacity Building and Public Service Delivery; Decentralized Units, Transfer of Powers and Functions and Intergovernmental Relations; Public Finance Management; and Public Participation and informed Citizen Engagement.

1.4.9 Policy framework for Environmental Management

The Constitution embodies elaborate provisions with considerable implications for sustainable development. These range from environmental principles and implications of Multilateral Environmental Agreements (MEAs) to the right to clean and healthy environment enshrined in the

Bill of Rights. Its Chapter V is entirely dedicated to land and environment. It also embodies a host of social and economic rights of an environmental character, such as the right to water, food and shelter – among others.

The National Environment Policy (2012) provides a holistic framework to guide the management of the environment and natural resources in Kenya. It further ensures that the linkage between the environment and poverty reduction is integrated in all government processes and institutions in order to facilitate and realize sustainable development at all levels in the context of green economy enhancing social inclusion, improving human welfare and creating opportunities for employment and maintaining the healthy functioning of ecosystem.

1.4.10 Sessional Paper No. 3 on National Land Policy, 2009

The policy regulates rights over land and provides for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Specifically, “the policy offers a framework of policies and laws designed to ensure the maintenance of a system of land administration and management” that will provide:

- a) All citizens with the opportunity to access and beneficially occupy and use land; [SEP]
- b) Economically viable, socially equitable and environmentally sustainable allocation and use of land; [SEP]
- c) Efficient, effective and economical operation of land markets; [SEP]
- d) Efficient and effective utilization of land and land-based resources; and [SEP]
- e) Efficient and transparent land dispute resolution mechanisms.

1.4.11 National Gender and Development Policy (2000):

The National Gender and Development Policy was adopted in 2000 with an overall objective to facilitate the mainstreaming of the needs and concerns of men and women in all areas in the development process in the country. It thus provides a framework for advancement of women and an approach that would lead to greater efficiency in resource allocation and utilisation to ensure empowerment of women.

The National Policy on Gender and Development is consistent with the Government's efforts of spurring economic growth and thereby reducing poverty and unemployment, by considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines. The policy is also consistent with the Government's commitment to implementing the National Plan of Action based on the Beijing Platform for Action (PFA). The Policy's concerns cover the following critical areas:-

- a. The Economy; -To enable men and women to have equal access to economic and employment opportunities.
- b. Poverty and Sustainable Livelihoods; - To remove obstacles to women's access to and control over productive assets, wealth and economic opportunities, shelter, safe drinking water, and promote measures for conserving the environment.
- c. Law; - To guarantee Kenyan men and women equality before the law, as provided for in the Constitution and under the obligations of the Kenyan State in international law.
- d. Political Participation and Decision- Making; - To enhance gender parity in political participation and decision – making

- e. Education and Training; - To enhance and sustain measures to eliminate gender disparities in access, retention, transition and performance in education for both boys and girls
- f. Health and Population; - To achieve the highest attainable standard of health for both men and women through addressing gender inequalities pertaining to access and use of basic health services and facilities at an affordable cost.
- g. The Media; - To increase the participation of women in the media and communications sector and promote gender sensitive portrayal of both men and women in the media.
- h. Policy Implementation Framework and Resource Mobilisation- empowering both men and women to be equal partners in development- It focuses on the elimination of existing disparities between the two genders. It also advocates for an affirmative action to address gender disparities.

1.4.12 The New Constitution of August 2010 on Gender:

The New Constitution provides for safeguarding of the rights and dignity of women as follows: -

- a. The New Kenyan Constitution ensures that women will be able to pass on citizen ship to their children regardless of whether or not they are married to Kenyans- Article 14 (1)
- b. The New Kenyan Constitution provides that parties to a marriage will be entitled to equal rights at the time of marriage, during the marriage and at its dissolution- Article 45 (3)
- c. The New Kenyan Constitution assures that parental responsibility shall be shared between parents regardless of marital status- Article 53 (1) (e).
- d. The New Kenyan Constitution eliminates gender discrimination in relation to land and property and gives everyone including women the right to inheritance and unbiased access to land- Article 60 (1) (f).
- e. The New Kenyan Constitution provides for the enactment of legislation for the protection of matrimonial property with special interest on the matrimonial home during, and upon the termination of the marriage- Article 68 (c) (iii).
- f. The New Kenyan Constitution maintains a one third requirement for either gender in elective bodies giving women of Kenya at least 1/3 minimum in elective public bodies- Article 81 (b).
- g. The New Kenyan Constitution ensures that gender equality is maintained in political parties providing a basic requirement for political parties as amongst other to respect and promote gender equality- Article 91 (f)
- h. The New Kenyan Constitution provides that Parliament shall formulate law to promote the representation of women, persons of disabilities, ethnic and other minorities and marginalized communities in Parliament- Article 100.
- i. The New Kenyan Constitution ensures that women and men will have the right to equal treatment and opportunities in political, economic, cultural and social spheres without discrimination- Article 27 (3).
- j. The New Kenyan Constitution accords the right to health including reproductive health to all- Article 43 (1) (a).

- k. The New Kenyan Constitution affords adequate and equal opportunities for appointment, training and advancement for women and men at all levels within the Public Service Commission- Article 232 (i).

1.4.13 Sessional Paper Number 1 of 2002

This Sessional paper on sustainable development which is an update of Sessional Paper Number 4 of 1984 on population policy guidelines, addresses issues on environment, gender, poverty and problems faced by segments of the population including the youth, the elderly and persons with disabilities. Outlined in the paper are population and development goals and objectives including improvement on standards of living and quality of life of the people; full integration of population concerns into development process; motivating and encouraging Kenyans to adhere to responsible parenthood; and empowerment of women. The problem of HIV/AIDS is also addressed. The proposed project is therefore in line with this Sessional paper.

3.1.8: Policies and Action Plans on Climate Change

In 2010 the Kenyan government published the National Climate Change Response Strategy (NCCRS) while the Climate Change Act 2016 establishes a National Climate Change Council chaired by the President, with the authority to oversee "the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya".

The National Climate Change Action Plan (NCCAP 2013-2017) launched in 2013 established that that adaptation is the main priority for the country because of the adverse socio-economic impacts related to climate change being experienced and the ever-increasing vulnerabilities of the different sectors. Kenya's recommended approach for addressing climate change is mainstreaming of climate change actions in development planning, budgeting and implementation.

A second National Climate Change Action Plan (NCCAP) 2018-2022 was launched in 2018 as a 5-year nationwide sectoral Plan to guide Kenya's climate change actions, including the reduction of greenhouse gas emissions, built on the progress achieved during the implementation of NCCAP 2013-2017. The Plan builds on the previous one but focuses more on adaptation and mitigation measures aimed at "low carbon, climate resilient development".

3.1.9: Sustainable Development Goals (SDG`s)

The SDG`s consist of 17 goals to be achieved by 2030 which constitute an integrated, indivisible set of global priorities for sustainable development. Their target is to build on the foundation laid by the MDGs, by seeking to complete the unfinished business of the MDGs, and respond to new challenges. SDG`s are accompanied by targets and will be further elaborated through indicators focused on measurable outcomes. The goals and targets integrate economic, social and environmental aspects and recognize their inter-linkages in achieving sustainable development in all its dimensions. Each government will set its own national targets guided by the global level of ambition but taking into account national circumstances. These goals include;

Table 3-1 Sustainable Development Goals-SDGs

Goal	Broad Target	Status	Reason
Goal 1	End poverty in all its forms everywhere	Triggered	Poverty levels in traverse area quite high
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Triggered	Entire Marsabit County is a hunger prone area
Goal 3	Ensure healthy lives and promote well-being for all at all ages	Triggered	Access to basic health facilities constrained by poor transport

Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Triggered	Traverse area has only 2 schools at North Horr and El Beso, 50 Km apart
Goal 5	Achieve gender equality and empower all women and girls	Triggered	Aridity and poverty exposes all to hardship
Goal 6	Ensure availability and sustainable management of water and sanitation for all	Triggered	Water is basically a very scarce commodity, only available in two oases and several shallow wells
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all	Triggered	Modern energy is not available in the entire traverse
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Triggered	Due to aridity, nomadic pastoralism is only economic activity but is prone to periodic droughts.
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Triggered	The Road will be the first main economic enabler which could attract economic drivers.
Goal 10	Reduce inequality within and among countries	Triggered	Marsabit have among the lowest levels of Gini Coefficient in Kenya.
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable	Triggered	Settlements within the traverse are prone to insecurity centred on conflict for water and pastures along
Goal 12	Ensure sustainable consumption and production patterns	Triggered	Aridity restrict production to nomadic pastoralism which is highly vulnerable to droughts
Goal 13	Take urgent action to combat climate change and its impacts*	Triggered	Droughts are a frequent occurrence in the traverse area
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Not triggered	Lake Turkana the only marine environment is far removed from the traverse.
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Triggered	Local terrestrial ecosystems are degraded by overgrazing which is restricted by the rocky lithology. Wildlife habitat is increasingly being lost in the traverse area
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Triggered	Traverse area is occasionally plagued by ethnic conflict
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Triggered	Proposed Road is part of an international Corridor connecting Tanzania to Ethiopia through Kenya and has potential to foster global partnership with the Horn of Africa Countries
Total triggers		16	

Analysed against the focus of the SDGs, the Project Road is highly aligned and relevant to 16 out of 17 goals (Table 3-1) which, in itself is testament to the monumental local development needs that wait to be addressed.

3.2 POLICY FRAMEWORKS OPERATED BY STRATEGIC PARTNERS

3.2.1: Operational Standards of the African Development Bank (AfDB)

The AfDB remains one of the most active Strategic partners in Kenya as manifested in involvement in development of the Bagamoyo-Malindi International Trunk Highway and the Kenol-Marua Road Dualling Project among others. The Bank's Strategy for 2013-2022 emphasises the need to assist regional member countries in their efforts to achieve inclusive growth and transition to green growth. In addition, the Bank is committed to ensuring the social and environmental sustainability of the projects it supports through the Integrated Safeguard Systems (ISS). The ISS is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects by ensuring that projects:-

- i) Avoid adverse impacts of projects on the environment and affected people, while maximising potential development benefits to the extent possible;
- ii) Minimise, mitigate, and/ or compensate for adverse impacts on the environment and affected people when avoidance is not possible; and
- iii) 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 these safeguard requirements during project preparation and implementation. The Integrated Safeguards Policy Statement sets out the basic tenets that guide and underpin the Bank's approach to environmental safeguards.

In addition, the Bank has adopted five Operational Safeguard Systems (OSS), limiting their number to just what is required to achieve the goals and optimal functioning of the ISS:-

- **Operational Safeguard 1: Environmental and social assessment** – This overarching safeguard governs the process of determining a project's environmental and social category and the resulting 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, and incorporates a number of refinements 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 Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It also ensures greater harmonisation with most other multilateral development banks.

AfDB Operational Safeguard	Focus	Status	Reasons
Operational Safeguard 1:	Environmental and social assessment	Triggered	Project entails widening the road corridor and will thus trigger wider non-

			anticipated scope of impacts which require additional ESIA
Operational Safeguard 2:	Involuntary resettlement land acquisition, population displacement and compensation	Triggered	For the same reason, scope of displacement will be bigger
Operational Safeguard 3:	Biodiversity and ecosystem services	Triggered	Road widening will touch on biodiversity conservation areas of
Operational Safeguard 4:	Pollution prevention and control, hazardous materials and resource efficiency	Triggered	Impacts of road widening require to be assessed anew
Operational Safeguard 5:	Labour conditions, health and safety	Triggered	Implications of expanded scope of project on labour conditions, health and safety require to be looked a new

3.1.2: World Bank's Safeguard Policies

The World Bank is among Strategic Partners active in the Roads Sector in Kenya whose future involvement in the proposed development of the North North Horr-Jin Ndarathe Road by the Kenya National Highways Authority (KeNHA) cannot be overruled. The World Bank's safeguard policies are designed to ensure that projects proposed for Bank financing are environmentally and socially sustainable, and thus improve decision-making. These operational policies include:

- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.09 Pest Management ;
- OP 4.11 Cultural Heritage;
- OP 4.12 Involuntary Resettlement;
- OP 4.10 Indigenous People;
- OP 4.36 Forests;
- OP 4.38 Safety of Dams;
- OP 7.50 Projects on International Waterways ;
- OP 7.60 Projects in Disputed Areas.

An analysis of possible triggers of the WB SGPs by the road project (Table 3.2) indicates that the project is likely to trigger 6 out of 10 of the Safeguards which are briefly highlighted in sections below. For a full description of all WB safeguard policies, the reader is referred to www.worldbank.org.

Table 3.2: Analysis of Potential Triggers to World Bank Safeguards Policies

SN	World Bank Safeguard policy	Triggers	Trigger mechanism
1.	Environmental Assessment (OP4.01)	Triggered	Project is category B and has to undergo mandatory Environmental Assessment in line with OP4.01
2.	Natural Habitats (OP 4.04)	Triggered	Project passes through the pastoral rangelands whose biodiversity potential is largely non documented.
3.	Forestry (OP 4.36)	Triggered	Project traverses through Rangelands though none is gazetted
4.	Pest Management (OP 4.09)	No trigger	Project has no known interaction with this trigger
5.	Indigenous Peoples (OP4.10)	Possible Trigger	Communities within the traverse are largely trapped in traditional production and livelihood systems dominated by nomadic pastoralism
6.	Physical Cultural Property	Triggered	Road is meant to open up the Sibiloi National

	(OP 4.11)		Park and neighborhood which harbour the Koobi fora beds world renown as the origins of the Hominid Species.
7.	Involuntary Resettlement (OP 4.12)	Triggered	Project has potential to displace human settlements especially at North Horr Town.
8.	Safety of Dams (OP 4.38)	No Trigger	Project will not involve construction of dams
9.	Projects on International Waters (OP 7.50)	No Trigger	No project activities are planned for in International Waters
10.	Projects in Disputed Territories (OP 7.60)	No Trigger	Though the traverse area occasionally suffers ethnic flare-ups, the land is not disputed
	Total triggers	6	

Environmental Assessment (OP 4.01)

OP 4.01 requires Environmental Assessment (EA) for projects proposed for Bank financing to ensure that they are environmentally sound and sustainable, and as a basis for decision making. Under OP 4.01 projects are screened and assigned either of four categories each of which requires different levels of environmental assessment as follows:-

- *Category A:* A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
- *Category B:* A proposed project is classified as Category B if it's potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.
- *Category C:* A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.
- *Category FI:* A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary in subprojects that may result in adverse environmental impacts.

The proposed construction of the North Horr Jn Ndarathe Road is possibly an Environmental Category B Project and hence requiring environmental assessment. From experience, subjecting of proposed projects to environmental and social impact assessment as stipulated under Cap 387 and its tools simultaneously resolves requirements of OP 4.01 and the same will be achieved in terms of the project under review.

OP 4.01 also requires full disclosure of Projects which, in the case of the North Horr Jn Ndarathe Road has been partly achieved through stakeholder consultations as reported in Chapter Five below while more disclosure will take place during the Public Review Period stipulated for ESIA Study Reports. During this process, the ESIA Study Report will be made publicly available to project-affected groups within the entire route of traverse at places to be specified by NEMA following which, their comments will be incorporated into the final ESIA Study Report and will also influence design of the project.

OP 4.12 on Involuntary Resettlement: OP 4.12 requires that a Resettlement Action Plan (RAP) be prepared for all projects that anticipate displacement of both settlements and livelihoods. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts. Given that road reserves for the proposed road do not exist, land acquisition will be inevitable thus displacing people from livelihoods and property in full trigger of OP 4.12. A RAP process for the Road is already underway.

OP 4.36 on Forestry: The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services. This policy applies to the following types of Bank-financed investment projects:

- (a) projects that have or may have impacts on the health and quality of forests;
- (b) projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and
- (c) projects that aim to bring about changes in the management, protection, or utilization of natural forests or plantations, whether they are publicly, privately, or communally owned.

There are no gazetted forests traversed by the North Horr Jn Ndarathe Road. However, the scrubland vegetation is the critical resource which supports nomadic pastoralism largely based on the Camel and is likely to come under heavy exploitation for fuel-wood when the area is opened up by road development. OP 4.36 is therefore largely triggered.

OP 4.04 on Natural Habitats: This Policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present). Specifically, the policy prohibits Bank support for projects which would lead to the significant loss or degradation of any Critical Natural Habitats, whose definition includes those natural habitats which are legally protected, officially proposed for protection, or unprotected but of known high conservation value.

The proposed North Horr Jn Ndarathe Road does not traverse protected areas but passes through natural disturbed habitats and desert ecosystems whose full biodiversity status is yet to be documented. Indeed, given that the conservation status for individual species as required of by Legal Notice 160 of Cap 387 is yet to take place, the pre-cautionary principle has been invoked in this Study so as to allow for a possible trigger to OP 4.04.

OP 4.10 on Indigenous People: According to the Bank, “Indigenous Peoples refers to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:-

- a) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- b) collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories
- c) customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- (d) an indigenous language, often different from the official language of the country or region

Going by this definition and criteria, both the Gabbra and Daasanaach communities whose territories are traversed by the North Horr Jn Ndarathe clearly fit this description. As such, were WB funding to be required in development of this Road, an Indigenous Peoples Management Plan would have to be put in place.

OP 4.11 on Physical Cultural Property: This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings,

and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community. Clearly, given the close proximity of the Project Road to the Sibiloi National Park and its Koobi Fora beds, a precautionary approach calls for invocation of OP 4.11.

Harmonization of WB and GOK requirements for social and environmental sustainability

Experience has shown that both OP 4.10 of the World Bank and EMCA 1999 are generally aligned in principle and objective in that:-

- Both require Environmental Assessment before project implementation leading to development of comprehensive Environmental and social Management plans to guide resolution of social and environmental impacts as anticipated.
- Both require public disclosure of ESIA Study Report and stakeholder consultation during preparation,
- While OP 4.01 of World Bank stipulates different scales of ESIA Study Report for different category of projects, EMCA requires ESIA Study Report for all sizes of projects, which are required to be scoped as relevant
- Where EMCA requires consultation of Lead Agencies comprising of relevant sectors with legal mandate under GoK laws, the WB has equivalent safeguards for specific interests.
- The Bank requires that stakeholder consultations be undertaken during planning, implementation and operation phases of the project which is equivalent to the statutory annual environmental audits at the operation phase of projects in Kenya.

The understanding of this ESIA Study Report study is that, pursuit of an in-depth ESIA Study process as stipulated by EMCA 1999 is adequate to address all World Bank requirements for environmental and social assessment. This is a major guiding principle in this study.

3.1.3: JICA Guidelines for Environmental and Social Consideration

JICA requires that, in principle, appropriate environmental and social considerations be undertaken, according to the nature of the project, and along procedures set by host governments, Cap 387 in case of Kenya. Towards this, JICA requires that an analysis of gaps between provisions of host governments and JICA Safeguards be undertaken whereby measures are then proposed to resolve any observed gaps. By so doing, JICA ascertains that project supported and in full compliance with standards of environmental and social quality.

Standards for environmental and social assessment:

JICA classifies projects under three categories according to the extent of environmental and social impacts. To make this classification, JICA considers an outline of the project, the scale, the site condition, and the environmental impact assessment scheme in host countries.

Category A: Projects are classified as Category A if they are likely to have significant adverse impacts on the environment and society. Projects with complicated impacts or unprecedented impacts, which are difficult to assess or which have a wide range of impacts or irreversible impacts, are also classified as Category A. Projects are also classified as Category A if they require a detailed environment impact assessment by environmental laws and the standards of the recipient governments. The impacts may affect an area broader than the sites or facilities subject to physical construction. Category A, in principle, includes projects in sensitive sectors (i.e., characteristics that are liable to cause adverse environmental impact) and projects located in or near sensitive areas.

The proposed Mombasa Gate Bridge falls among Appendix 2.1(7/8) for sensitive sectors and accompanies large scale resettlement and is therefore decidedly a Category A project.

Category B: Projects are classified as Category B if their potential adverse impacts on the environment and society are less adverse than those of Category A projects. Generally, they are site-

specific; few if any are irreversible; and in most cases normal mitigation measures can be designed more readily.

Category C: Projects are classified as Category C if they are likely to have minimal or little adverse impacts on the environment and society.

3.3 REGULATORY FRAMEWORK FOR ENVIRONMENTAL MANAGEMENT IN KENYA

3.3.1 Constitutional provisions

With regard to environment, Section 42 of the Constitution states as follows: -

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.

In Sections 69 and 70, the Constitution has *inter alia* identified National Obligations in respect of the environment and Enforcement of Environmental Rights respectively as follows:-

Section 69 (1): The State shall—

- a. ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;*
- b. work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;*
- c. protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;*
- d. encourage public participation in the management, protection and conservation of the environment;*
- e. protect genetic resources and biological diversity;*
- f. establish systems of environmental impact assessment, environmental audit and monitoring of the environment;*
- g. eliminate processes and activities that are likely to endanger the environment; and*
- h. utilise the environment and natural resources for the benefit of the people of Kenya.*

(2) Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Section 70 provides for enforcement of environmental rights thus:-

(1) If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

(2) On application under clause (1), the court may make any order, or give any directions, it considers appropriate—

(a) to prevent, stop or discontinue any act or omission that is harmful to the environment;

(b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or

(c) to provide compensation for any victim of a violation of the right to a clean and healthy environment.

(3) For the purposes of this Article, an applicant does not have to demonstrate that any person has incurred loss or suffered injury.

Essentially, the Constitution has embraced and provided further anchorage to the spirit and letter of EMCA 1999 whose requirements for environmental protection and management have largely informed Sections 69 through to 71 of the Document. In Section 72 however, the constitution allows for enactment of laws towards enforcement of any new provisions of the Supreme Law.

3.3.2 The Environment Management and Coordination Act (EMCA) 1999 and its tools

The most pertinent and overriding statute that will be evoked is the Environmental Management and Coordination Act (EMCA 1999). EMCA 1999 was enacted in 2000 to harmonize environmental legislation previously scattered among 77 national laws. EMCA is the principal legislation governing conduct of EIA in Kenya. Section 58 of EMCA 1999 requires that an Environmental Impact Assessment (EIA) study precede all development activities proposed to be implemented in Kenya. The Act further requires that EIA studies so designed, be executed in accordance with the Guidelines for Conduct of EIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003) as published by the National Environmental Management Authority (NEMA).

The Second Schedule of EMCA 1999 specifies projects that require to be subjected to EIA studies. Under this schedule, there is no minimum size threshold below which an EIA is not necessary. Indeed, an appraisal of the proposed construction of North Horr Jn-Darathe A4 Road indicates that the project triggers requirements for an EIA under this Second Schedule. The EIA Report has thus been prepared in compliance with this requirement. As the principal environmental legislation in Kenya, EMCA sets the legal framework for environmental management basically as follows: -

(i) Requirement for Environmental Impact Assessments for all new projects

Section 58 of the Environmental Law requires that an Environmental Impact Assessment (EIA) study precede all development activities proposed to be implemented in Kenya. The Act further requires that EIA studies so designed, be executed in accordance with the Guidelines for Conduct of EIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003) as published by the National Environmental Management Authority (NEMA).

(ii) Requirement for Annual Environmental Audits

In order to mitigate and control environmental damage from ongoing projects, Sections 68 and 69 EMCA require that all ongoing projects be subjected to annual environmental audits as further expounded in Regulation 35 (1) and (2) of Legal Notice 101 of June 2003.

(iii) Gazettement of Environmental Regulations:

Under EMCA 1999, NEMA has gazetted legal tools that govern conduct of EIAs and general environmental protection. The North Horr Jn-Darathe A4 Road to be developed by KENHA has been screened against these tools with results that (table below) seven of the tools will be triggered. Detailed analysis of the trigger mechanism and modalities for mitigation are provided in Chapter Ten below.

Table 3.3: Analysis of the project triggers to EMCA and its tools

Regulation	Focus	Status
Legal Notice 101 of June 2003 - Environmental (Impact Assessment and Audit) Regulations, 2003	This is the tool that gives legal foundation to conduct of ESIA Studies in Kenya.	Triggered
Legal Notice 160 of 1 st Dec 2006- Environmental Management and Co-ordination Act (Conservation of Biological Diversity) Regulations 2006	This legislation requires full measures be taken to prevent introduction of alien/ invasive species of flora and fauna and is important because of the Prosopis menace in the coast.	Triggered
Legal Notice 19 (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009	Regulation 17 requires special measures to be taken to prevent siltation of the seashore.	Not Triggered
Legal Notice 61 of 22 nd May 2009- Environmental Management and Co-ordination Act (Noise, and Excessive Vibration Pollution)(Control) Regulations, 2009	Sets standards for noise levels	Triggered
Legal Notice No.34 Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Sets standards for Air Quality	Triggered
Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations, 2006	This regulation is triggered as the proponent will use vehicles and equipment that depend on fossil fuel as their source of energy	Triggered
Legal Notice 120 of 29 th Sept 2006- Environmental Management and Co-ordination Act (Water Quality Standards) Regulations 2006	Regulation 24 prohibits any kind of pollution of water meant for fisheries, recreation or any other use and sets quality standards for diverse waters.	Triggered
Legal Notice 121 of 29 th Sept 2006- Environmental Management and Co-ordination Act (Waste Management) Regulations 2006	Sets standards for waste management	Triggered
Prevention of Pollution in Coastal Zone and other segments of the environment regulations, 2003	Regulation 3 prohibits discharge any hazardous substance, chemical, oil or oily mixture into the territorial waters of Kenya or any segment of the environment.	Triggered

National Sand Harvesting Guidelines, 2007	Sets guidelines for sustainable sand harvesting in Kenya	Triggered
Integrated National Land Use Guidelines	Upgrading of infrastructure such as roads mainly triggers realignment in Land-use	Triggered
Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya	Maintenance of heavy plant and equipment commonly used in road construction is likely to generate grease and oil sludge which, on account of containing heavy metals which when discharged in the environment pollute the air, soils and water bodies creating irreversible environmental problems.	Triggered
Legal Notice 73 of 31st May 2007 - Environmental Management and Co-ordination Act (Controlled Substances) Regulations	Sets guidelines on handling and use of controlled substances.	Triggered

In particular, specifications of these guidelines would require to be captured in the Contracts for Construction to ensure that contractors are legally bound to undertake mitigation alongside general construction work. The EMCA Tools likely to be triggered by the proposed construction of the road sections are briefly reviewed below.

Environmental (Impact Assessment and Audit) Regulations, 2003 (Legal Notice 101- Kenya Gazette Supplement No. 56 of 13th June 2003): The Act further requires that EIA studies so designed, be executed in accordance with the Guidelines for Conduct of EIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003) as published by the National Environmental Management Authority (NEMA). The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs). Regulation 3 states that “*the Regulations should apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act*”. Regulation 4(1) further states that: “...no proponent should implement a project (i) Likely to have a negative environmental impact; or (ii) For which an environmental impact assessment is required under the Act or these Regulations; unless an environmental impact assessment has been concluded and approved in accordance with these Regulations...”. Among other requirements, these guidelines also prescribe the Format and content of Project Reports and EIA Study Reports.

Environmental Management and Co-ordination Act (Waste Management) Regulations 2006: These are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006. These Regulations apply to all categories of waste as provided in the Regulations. These include; Industrial wastes; Hazardous and toxic wastes; Pesticides and toxic substances; Biomedical wastes; Radio-active substances. These Regulations outline requirements for handling, storing, transporting, and treatment / disposal of all waste categories as provided therein.

Environmental Management and Coordination Act (Water Quality) Regulations 2006: These are described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006. These Regulations apply to drinking water, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purposes. This includes the following: Protection of sources of water for domestic use; Water for industrial use and effluent discharge; Water for agricultural use. These Regulations outline: -

- Quality standards for sources of domestic water;
- Quality monitoring for sources of domestic water;
- Standards for effluent discharge into the environment;
- Monitoring guide for discharge into the environment;
- Standards for effluent discharge into public sewers;
- Monitoring for discharge of treated effluent into the environment.

Conservation of Biological Diversity (BD) Regulations 2006: These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84 of December 2006. These Regulations apply to conservation of biodiversity which includes Conservation of threatened species, Inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

National Sand Harvesting Guidelines, 2007: These Guidelines apply to all sand harvesting activities in Kenya to ensure sustainable utilization of the sand resource and proper management of the environment. Among Key features, the guidelines empower respective CECs to regulate sand harvesting within areas of jurisdiction implying that, sand should only be sourced from approved sites and by approved dealers.

The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61: effected in November 2009 to regulate noise and vibrations across the spectrum of various activities. The regulations give the noise limits applicable at different times of the day and has provisioned for issuance of licences and permits for noise levels exceeding the stated standards. For regulation of noise at workplaces, these regulations have given reference to the Factories and other places of Work Act regulations on noise at workplaces. In conformity to these guidelines, the EIA will formulate measures to ensure that; - the Contractor keeps noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours in the residential areas; Schools, hospitals and other noise sensitive areas shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity. Any excessively noisy activity shall be conducted outside of school hours, where approved by the Project Engineer (PE) and NEMA. Any complaints received by the Contractor regarding noise will be recorded and communicated to the PE. The Contractor must adhere to Noise Prevention and Control Rules of April 2005.

The Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009

The aim of these Regulations is to ensure conservation and sustainable use of wetlands in Kenya. The regulations provide guidelines on wetland management even for those found on private land. The Regulation indicates that clear guidelines on management of the different types of wetlands found in the country has not been developed thus it is recommended that while working in aquatic environments the relevant Lead Agencies should be consulted to guide on the correct application of the law. Despite that the regulation also recommends use of precautionary principal when working near wetlands in order to conserve them thus existing regulation on wetland management should be applied. This is the approach recommended especially for both North Horr and Daratthe which are within close vicinity of two oases.

The Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations, 2006

These Regulation aims at eliminating or reducing emissions generated by internal combustion engines to acceptable standards. The regulation provides guidelines on use of clean fuels, use of catalysts and

inspection procedures for engines and generators. This regulation is triggered as the proponent will use vehicles and equipment that depend on fossil fuel as their source of energy. It is recommended the requirements of the regulation be implemented in order to eliminate or reduce negative air quality impacts.

3.3.3 Inter-Sectorial Coordination in Environmental Protection

In recognition that EMCA is an umbrella law coordinating diverse sectoral statutes all of which are still in force, Legal Notice 101 of EMCA requires that the respective sectors be consulted as Lead Agencies in making decisions pertaining to environmental assessment for projects in respective sectors. This is to ensure that NEMA does not approve projects that contradict sector policies and legislation. In conformity with this requirement, we have screened the proposed development against most relevant statutes to map out the potential triggers. And in sections below, we highlight such sectoral laws and policies likely to be triggered by the Proposed Road project.

The Occupation Health and Safety Act 2007: This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act has the following functions among others: -

- Part II of the Act provides the General Duties that the Occupier must comply with respect to health and safety in the workplace. Such duties include undertaking S&H risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences, etc. A number of sections under this part shall be applicable to the proposed project.
- Part III of the Act provides the administrative framework for supervision of the Act.
- Part IV deals with the enforcement provisions that the DOHSS has been provided with under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of OSH officers. This part of the Act will be mandatory for the Occupier to comply with for the proposed project.
- Part V of the Act requires all workplaces to be registered with the DOHSS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOHSS on completion of the construction phase and before the operational phase of the project.
- Part VI of the Act gives the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This part of the Act will apply to the Occupier especially during the operational phase of the project.
- Part VII of the Act contains provisions for the safe operation of machinery and includes all prime movers and transmission equipment. Additionally, this part includes the safe operation of cranes, chains, ropes, lifting tackles, pressure vessels and their statutory examination by DOHSS Approved Persons. This part of the Act will apply to the Occupier during the operational phase of the project.
- Part VIII of the Act contains provisions for general safety of a workplace especially fire safety. This part of the Act will apply to the proposed project during the design, construction and operational phases respectively of the project.
- Part IX of the Act deals with Chemical Safety. This will not be applicable to the proposed project as it will not handle and transport hazardous materials.

- Part X of the Act deals with the General Welfare conditions that must be present during the operational phase of the project. Such conditions include first aid facilities, supply of drinking water, etc.
- Part XI of the Act contains Special Provisions on the management of health, safety and welfare. These include work permit systems, PPE requirements and medical surveillance. All sections of this part of the Act will be applicable to the proposed project during the operational phase.
- Part XII of the Act deals with Special Applications such as platforms erected over water and workplaces where steam boilers or hoists and lifts are used. This part of the Act may not be applicable to the proposed project.
- Part XIII of the Act stipulates the various fines and penalties associated with noncompliance of the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions.
- Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere. Most of the sections under this part of the Act will be apply to the proposed project and it in the interest of the Occupier to read, understand and ensure compliance with it.

Section 8.2 of this Project Report has outlined clear modalities to be followed by contractors towards mitigating/minimizing/avoiding occupational health and safety hazards.

The Environment and Land Court Act No. 19 of 2011: This law was assented to on 27th August, 2012 and commenced on 30th August, 2012 to give effect to Article 162(2) (b) of the Constitution; to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes. Section 13 (1) of the Act gives the Court original and appellate jurisdiction to hear and determine all disputes in accordance with Article 162(2) (b) of the Constitution and with the provisions of this Act or any other written law relating to environment and land. In exercise of its jurisdiction under Article 162 (2) (b) of the Constitution, the Court shall have power to hear and determine disputes relating to environment and land, including disputes: -

- a) relating to environmental planning and protection, trade, climate issues, land use planning, title, tenure, boundaries, rates, rents, valuations, mining, minerals and other natural resources;
- b) relating to compulsory acquisition of land;
- c) relating to land administration and management;
- d) relating to public, private and community land and contracts, choices in action or other instruments granting any enforceable interests in land; and
- e) any other dispute relating to environment and land.

This statute is deemed relevant to all development proposed for implementation in Kenya as it provides for legal recourse for disputes relating to environment and land. This is a law that any developer including KENHA should familiarize with.

The Lands Act No. 6 of 2012: The Land Act was enacted by Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes. The Act applies to all land declared as (a) public land under Article 62 of the Constitution; (b) private land

under Article 64 of the Constitution; and (c) community land under Article 63 of the Constitution and any other written law relating to community land.

The Land Act guarantees security of tenure for land under (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under the Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution and guarantees equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems.

Under the Lands Act 2012, The Way leaves Act, Cap 292 and The Land Acquisition Act, Cap. 295 have been revoked but Sections 8 and 9 allow for Compulsory Acquisition as an option in acquiring land for public utility.

National Land Commission Act, 2012: This Act of Parliament makes further provision for the functions and powers of the National Land Commission; that gives effect to the objects and principles of devolved government in land management and administration.

The Community Land Act No 27 of 2016: This is an Act of parliament giving effect to Article 63(5) of the Constitution; to provide for the recognition, protection, management and administration of community land; to establish and define the powers of Community Land Boards and management committees; to provide for the role of county governments in relation to unregistered community land and for connected purposes.

The Act (Part II (4)(3) defines community land tenure system as customary, freehold, leasehold, and such other tenure system recognized under the Act or other written law. The law allows the conversion of community land to public land by (i) compulsory acquisition, (ii) transfer or (iii) surrender (Part V (22.)(1).

The Climate Change Act, No. 11 of 2016: The Climate Change Act, 2016 is the key legislation guiding Kenya's climate change response, setting the legal basis for mainstreaming climate change considerations and actions into sector functions, and providing the legal foundation of the NCCAP. In order to achieve its primary goals and objectives, the provisions of the Act were enacted to be applied in all sectors of the economy by the national and county governments so as to, firstly, mainstream climate change responses into development planning, decision making and implementation as well as reinforcing climate change disaster risk reduction into strategies and actions for both public and private entities.

Secondly, the Act was enacted to build resilience and enhance an adaptive capacity as to the impacts of climate change through the formulation of programmes and plans that primarily focus on achieving enhanced resilience and adaptive capacity of human and ecological systems to the impacts of climate change.

Thirdly, the Act was to provide incentives and obligations for the private sector to contribute in achieving low carbon climate resilient development as well as to promote low carbon emitting technologies, improve efficiency and reduce emissions intensity by facilitating approaches and development of technologies that support low carbon, and climate resilient development.

Fourthly, the provisions of the Act were enacted to facilitate capacity development for public participation in climate change responses through awareness creation, consultation, representation and access to information in addition to mainstreaming intergenerational and gender equity in all aspects of climate change responses and mainstreaming the principle of sustainable development into the planning and decision making on climate change response.

The Act is guided by Article 42 and 69 of the Constitution which provides for the right to a clean and healthy environment including the right to have the environment protected for the benefit of present

and future generations through legislative and other measures as well as the states obligation to ensure that the environment is well conserved, protected, managed and the natural resources sustainably and adequately utilized.

The Act establishes an unincorporated body, the National Climate Change Council which is chaired by the President of the Republic of Kenya and also comprises of the Deputy President, the Cabinet Secretary in charge of the environment and climate change affairs and the Directorate, serving as the secretariat, established under the Act. The Council is tasked with the responsibility of providing an overarching national climate change coordination mechanism by ensuring that the legislative and policy making functions of the national and county governments remain mainstream and that the advice given to those bodies ensure that the measures proposed to counter climate change are geared towards positive climate change response and attaining low carbon, climate change resilient development.

The Physical Planning Act, 1996 (Revised 2012): Section 16 of the Physical Planning Act (Chapter 286) provides that the Director may prepare a regional physical development plan. The plan shall consist of inter alia, a statement of policies and proposals with regard to the allocation of resources and the locations for development within the area. The Act requires the Director to invite any person interested to make representations to do so within sixty days of the publication of the plan. On approval of the regional physical development plan no development shall take place on any land unless it is in conformity with the plan.

Section 24 provides for the Director to prepare also a local physical development plan whose purpose is to guide and coordinate development and for the control of the use and development of land. Physical planning thus provides a mechanism for the assessment of options and establishment of policy objectives and goals. These provisions notwithstanding, the physical planning process has so far not been used to elaborate policy options for development. This omission does not however detract from the potential of the physical planning process to facilitate the identification and regulation of policy options for resource development and use.

The Water Act, 2016: Article 43 of the Constitution stipulates that every person in Kenya has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation. In conformity to this constitutional requirement, the Water Act, 2016 was enacted to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes”. The law provides for national public water works (Article 8(2)) that include water storage, water works for bulk distribution and provision of water services, inter-basin water transfer facilities, and reservoirs for impounding surface run-off and for regulating stream flows to synchronize them with water demand patterns which are of strategic or national importance. It vests the administration of water resources to the National Government (Article 9) and calls for public participation in the formulation of a National Water Resource Strategy (Article 10 (1)) on five-year cycles. The Strategy shall provide the Government’s plans and programs for the protection, conservation, control and management of water resources (2).

Article 10(3) gives the details of the contents of the National Water Resource Strategy, i.e.:

- (a) existing water resources and their defined riparian areas;
- (b) measures for the protection, conservation, control and management of water resources and approved land use for the riparian area;
- (c) minimum water reserve levels at national and county levels;
- (d) institutional capacity for water research and technological development;
- (e) functional responsibility for national and county governments in relation to water resources management; and

- (f) any other matters the Cabinet Secretary considers necessary.

For the regulation of management and use of water resources, the Act establishes the **Water Resources Authority** as a body corporate that will, among others, enforce the Regulations made under the Act (Article 12). The Authority will be responsible for sustainable management of water resources including allocation plan within a basin. (28.3c&d).

The Act also establishes a **National Water Harvesting and Storage Authority** that will, among other things, be responsible for water resources storage and flood control (32. (1)(a)). While the interests and rights of consumers in the provision of water will be vested in the **Water Services Regulatory Board** (Article 70(1)).

Public Health Act (Cap. 242): This is an Act of Parliament that makes provision for securing and maintaining health. Part IX, contains provision regarding sanitation and housing. Section 115 of the Act states that no person shall cause nuisance or cause to exist on any land or premises any condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health.

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin.

The Act also contains provisions on discharges of pollutants into water sources. On responsibility of the Local Authorities Part XI, section 129, of the Act states in part “It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes

Part XII, Section 136, states that all collections of water, sewage, rubbish, refuse and other fluids which permit or facilitate the breeding or multiplication of pests shall be deemed nuisances under this Act. This part seeks to guard against the breeding of mosquito which causes malaria. Malaria is one of the major causes of death in this country particularly for children less than five years.

The Wildlife Conservation and Management Act 2013: The Wildlife Conservation and Management Act, 2013, came into force on 27th December 2013 to provide for the protection, conservation, sustainable use and management of wildlife in Kenya and for connected purposes including giving effect to the process of devolution occasioned by the Kenya Constitution 2010. The Act applies to all wildlife resources on public, community and private land and though none of the roads targeted under this contract pass through a wildlife conservation area, the law is still considered relevant given the close proximity of the traverse areas to the Sibiloi National Park and possible wildlife dispersal through the same.

On closer scrutiny, it emerges that the WCMA is designed to ensure provisions with respect to conservation, protection and management of the environment shall be in conformity with the provisions of the Environmental Management and Coordination Act. Indeed, under Section 34, the WCMA enforces the requirement for EIA as follows: -

(i) No user rights or other licence or permit granted under this Act shall exempt a person from complying with any other written law concerning the conservation and protection of the environment.

(2) A user or other related right shall not be granted under this Act where the requirement for a strategic environmental, cultural, economic and social impact assessment licence under the Environmental Management and Coordination Act, 1999 has not been complied with.

This Project Report Study in the upgrading of the target roads thus simultaneously fulfils requirements of both EMCA 1999 and WCMA 2013. The WCMA 2013 also has other clauses deemed relevant to conservation as follows:-

- Section 35: No provision of this Act and no rights or entitlements conferred and granted under this Act shall, wherever appropriate operate to exempt a person from compliance with the provisions of the Water Act, 2002 concerning the right to the use of water from any water resource, reservoir or point.
- Section 36: The holder of a permit or licence under this Act shall use the land in question in accordance with the requirement for sustainable use of land.
- Section 37: Any activity which is likely to have adverse effects on the environment, including the seepage of toxic waste into streams, rivers, lakes and wetlands is prohibited.

Given all these observations, the WMCA has been used to screen the proposed road development project for possible impacts on wildlife and the environment in general.

Roads Act 2007: The core feature of the Kenya Roads Act 2007 which came into effect in September 2007 was the creation of three autonomous Authorities (KeNHA), KeRRA and KURA) to take care of National, Rural and Urban Roads respectively. Sections 3(2) (b), 4(2) (b) and 10(2) (b) are quite relevant to development and operation of power distribution lines as they place all road reserves under the respective jurisdictions of KeNHA, KeRRA and KURA depending on the category of the road. In essence, any infrastructure service provider intending to utilize a road reserve will require consent of the respective road authority. Further, under Section 27, the respective road authority has power to cause relocation of infrastructure from the road reserve thus: -

(2) Where any infrastructure utility is located within a road reserve, the provider or operator of such infrastructure utility shall, upon written request by the responsible Authority, relocate such infrastructure utility to a location or alignment approved by the Authority at no cost to the Authority.

(3) Where an Authority intends to exercise any power under subsection (2) it shall give reasonable notice of its intention to do so to the person having control of such infrastructure utility, and such person shall cause to be removed such infrastructure utility within sixty days.

(4) Where, under subsection (2) or (3), any person having control of an infrastructure utility fails to remove such infrastructure utility within the time stated in the notice, the concerned Authority may remove such infrastructure utility at the cost of the person who was unable to comply with the notice under subsection (3).

The County Government Act 2012: The County Government Act of 2012, which has been adapted to the Constitution's State and County structure in relation to devolution, stipulates the County planning issues in Part IX. The County Government Act declares the County Integrated Plan to be central to the County's administration and prohibits any public spending outside of the plan. The Act clarifies that the County Integrated Plan to be broken down into the economic plan, physical plan, social environmental plan and spatial plan. Also, the Act states that the County Plan commands,

- County integrated development plan

- County Sectoral plans
- County spatial plan
- Cities and urban area plan as stipulated by Urban Areas and Cities Act of 2011.

The Public Health Act (Cap. 242): The Public Health Act provides for the protection of human health through prevention and guarding against introduction of infectious diseases into Kenya from outside, to promote public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within Kenya, to advice and direct local authorities in regard to matters affecting the public health to promote or carry out research and investigations in connection with the prevention or treatment of human diseases. This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health all of which are infringed by road construction and operation activities.

Part IX section 115 states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into Public Street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

On the responsibility of local authorities, Part XI section 129 of the Act states in part “It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes, and purifying such supply so polluted”. Section 130 provides for making and imposing on local authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129.

The Penal Code (Cap. 63): Section 191 of the Penal Code states that any person who voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons in dwellings or business premises in the neighbourhood or those passing along public way, commit an offence.

The Traffic Act, Cap. 403: The Act empowers police officers to stop and remove from the road vehicles producing noxious emissions or to charge their owners in a court of law. Under the Traffic Rule, every motor vehicle shall be constructed, maintained and used that no avoidable smoke or visible vapour is emitted there from. Pollution of the atmosphere occurs on the highway either by use of adulterated petroleum products or non-roadworthy vehicles, aircraft, rail-locomotives and ships. The Traffic Act requires that the vehicles shall only use the fuel specified in the vehicle license. The control of vehicular pollution is an example of grossly inadequate standards and enforcement. The Traffic Act prohibits the operation of motor vehicles that emit black fumes that pollute the air and cause visibility problems. The problem with this requirement is that there is no standard measure or definition of what constitutes black fumes or visibility problems. The Act does not address specific pollutants that are particularly harmful, such as Lead and Carbon monoxide.

Public Procurement and Disposal Act 2005: The purpose of this Act is to establish procedures for procurement and the disposal of unserviceable, obsolete or surplus stores and equipment by public entities to achieve the following objectives: -

- b) to maximize economy and efficiency;
- c) to promote competition and ensure that competitors are treated fairly;
- d) to promote the integrity and fairness of those procedures;
- e) to increase transparency and accountability in those procedures; and
- f) to increase public confidence in those procedures;
- g) to facilitate the promotion of local industry and economic development.

All procurement of services related to the North Horr Jn - Darathe AP Post Road will be subject to this statute.

Standard Specification for Road and Bridge Construction: The Ministry of Roads produced the “Standard Specification for Road and Bridge Construction” in 1986. These are often referred to when addressing aspects of road projects environmental impacts. The Standard Specifications for Road construction have guidelines on environmental protection and mitigation. Standard Specification Clauses 116, 117, 125, 135, 137 address protection of the environment, with regard to water, health, safety and accidents, water supply, maintenance of the engineers’ staff houses, offices, laboratories, and attendance upon the engineer and his staff.

The provisions of these laws, standards and codes must not be contravened during project implementation, thus the provisions are largely supportive of EMCA 1999; must form part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement. The following key clauses are included in the specifications:

- i Section 1: General*
- ii Clause 115, Sub-clauses (c), (e), (f), (g), (i) and (k) General conditions for protection of environment;*
- iii Clause 116 Protection of water resources;*
- iv Clause 117 Health, safety and accidents;*
- v Clause 118 Preservation and maintenance of fences and gates;*
- vi Clause 119 Use of explosives;*
- vii Clause 120 Protection of existing works and services;*
- viii Clause 124 Provision of land;*
- ix Section 6: Quarries, borrow pits, stockpile and spoil areas.*

The Standard Specifications for Road construction have guidelines on environmental protection and mitigation. Standard Specification Clauses 116, 117, 125, 135, 137 address protection of the environment, with regard to water, health, safety and accidents, water supply, maintenance of the engineers’ staff houses, offices, laboratories, and attendance upon the engineer and his staff. The provisions of these laws, standards and codes must not be contravened during project implementation, thus the provisions are largely supportive of EMCA 1999; must form part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement.

3.3.4: National legal provisions on gender equity and mainstreaming

Gender issues in the country are institutionalized through: -

The National Constitution of August 2010

In the New Constitution, Chapter Four—The Bill Of Rights, Section 21 (3) All State organs and all public officers have the duty to address the needs of vulnerable groups within society, including women, older members of society, persons with disabilities, children, youth, members of minority or marginalized communities, and members of particular ethnic, religious or cultural communities

Section 27 (3) Women and men have the right to equal treatment, including the right to equal opportunities in political, economic, cultural and social spheres.

Part 2 on the Composition and Membership of Parliament, Section 97 (1) The National Assembly consists of, a) two hundred and ninety members, each elected by the registered voters of single member constituencies; (b) forty-seven women, each elected by the registered voters of the counties, each county constituting a single member constituency;

Section 98. (1) The Senate consists of— (a) forty-seven members each elected by the registered voters of the counties, each county constituting a single member constituency; (b) sixteen women members who shall be nominated by political parties according to their proportion of members of the Senate elected under clause (a) in accordance with Article 90; (c) two members, being one man and one woman, representing the youth; (d) two members, being one man and one woman, representing persons with disabilities;

Section 100: Parliament shall enact legislation to promote the representation in Parliament of— (a) women;

Section 127 (1) Establishes the Parliamentary Service Commission consisting of (a) The Speaker of the National Assembly, as chairperson; (b) A vice-chairperson elected by the Commission from the members appointed under paragraph (c); (c) Seven members appointed by Parliament from among its members of whom, four shall be nominated equally from both Houses by the party or coalition of parties forming the national government, of whom at least two shall be women;

In Chapter Thirteen, on the Public Service, Part 1—Values and Principles of Public Service

Section 232 (1) The values and principles of public service include—(i) affording adequate and equal opportunities for appointment, training and advancement, at all levels of the public service, of—

- (i) Men and women;
- (ii) The members of all ethnic groups; and
- (iii) Persons with disabilities.

Section 232 (2) the values and principles of public service apply to public service in— (a) All State organs in both levels of government; and (b) All State corporations. (3) Parliament shall enact legislation to give full effect to this Article. In the composition, appointment and terms of office, the new constitution says that the chairperson and vice-chairperson of a commission shall not be of the same gender. In addition, clause (8) says that the State shall take legislative and other measures to implement the principle that not more than two-thirds of the members of elective or appointive bodies shall be of the same gender.

The new constitution provides for the elimination of gender discrimination in law, customs and practices related to land and property. Under Kenya's previous law, inheritance was governed by customary law, often preventing women from inheriting property from their parents or laying claim to joint assets when their husbands' died. In summary, the New Constitution provides as follows-

- The New Kenyan Constitution ensures that women will be able to pass on citizen ship to their children regardless of whether or not they are married to Kenyans.
- Article 14 (1)
- The New Kenyan Constitution provides that parties to a marriage will be entitled to equal rights at the time of marriage, during the marriage and at its dissolution. Article 45 (3)
- The New Kenyan Constitution assures that parental responsibility shall be shared between parents regardless of marital status. Article 53 (1) (e).
- The New Kenyan Constitution eliminates gender discrimination in relation to land and property and gives everyone including women the right to inheritance and unbiased access to land. Article 60 (1) (f).

- The New Kenyan Constitution provides for the enactment of legislation for the protection of matrimonial property with special interest on the matrimonial home during, and upon the termination of the marriage. Article 68 (c) (iii).
- The New Kenyan Constitution maintains a one third requirement for either gender in elective bodies giving women of Kenya at least 1/3 minimum in elective public bodies. Article 81 (b).
- The New Kenyan Constitution ensures that gender equality is maintained in political parties providing a basic requirement for political parties as amongst other to respect and promote gender equality. Article 91 (f)
- The New Kenyan Constitution provides that Parliament shall formulate law to promote the representation of women, persons of disabilities, ethnic and other minorities and marginalized communities in Parliament. Article 100.
- The New Kenyan Constitution ensures that women and men will have the right to equal treatment and opportunities in political, economic, cultural and social spheres without discrimination. Article 27 (3).
- The New Kenyan Constitution accords the right to health including reproductive health to all. Article 43 (1) (a).
- The New Kenyan Constitution affords adequate and equal opportunities for appointment, training and advancement for women and men at all levels within the Public Service Commission. Article 232 (i).

National Gender and Development Policy (2000)

The National Gender and Development Policy provide a framework for advancement of women and an approach that would lead to greater efficiency in resource allocation and utilisation to ensure empowerment of women. The National Policy on Gender and Development is consistent with the Government's efforts of spurring economic growth and thereby reducing poverty and unemployment, by considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines. The policy is also consistent with the Government's commitment to implementing the National Plan of Action based on the Beijing Platform for Action (PFA). The overall objective of the Gender and Development 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. The Policy's concerns cover the following critical areas: -

- i) The Economy; -To enable men and women to have equal access to economic and employment opportunities.
- ii) Poverty and Sustainable Livelihoods; - To remove obstacles to women's access to and control over productive assets, wealth and economic opportunities, shelter, safe drinking water, and promote measures for conserving the environment.
- iii) Law; - To guarantee Kenyan men and women equality before the law, as provided for in the Constitution and under the obligations of the Kenyan State in international law.
- iv) Political Participation and Decision- Making; - To enhance gender parity in political participation and decision – making
- v) Education and Training; - To enhance and sustain measures to eliminate gender disparities in access, retention, transition and performance in education for both boys and girls
- vi) Health and Population; - To achieve the highest attainable standard of health for both men and women through addressing gender inequalities pertaining to access and use of basic health services and facilities at an affordable cost.
- vii) The Media; - To increase the participation of women in the media and communications sector and promote gender sensitive portrayal of both men and women in the media
- viii) Policy Implementation Framework and Resource Mobilisation- empowering both men and women to be equal partners in development- It focuses on the elimination of existing disparities between the two genders. It also advocates for an affirmative action to address gender disparities.

The Sexual Offences Act (No. 3 of 2006)

24- Sexual offences relating to position of authority and persons in position of trust.

25- Sexual relationship which pre-date position of authority or trust.

26- Deliberate transmission of HIV or any other life threatening sexually transmitted disease.

Other Policy/legal provisions for gender mainstreaming:

Other provisions include: -

- i) Vision 2030 Flagship projects
- ii) The Presidential Directive of 2006 on 30% women's' appointments to all positions of leadership employment and promotions
- iii) MTPs handbook has gender outcome indicators
- iv) Sessional Paper No.2 of 2006
- v) Gender Department in the Ministry for Gender Children and Social Development.
- vi) The National Commission on Gender and Development created through an Act of Parliament in 2003 is mandated to Monitor Government Implementation of its Commitments to Women's Rights and Gender issues: -
- vii) Employment Act, No. 11 of 2007 prohibits: -
 - ✓ discrimination in access to employment and in employment
 - ✓ security on the basis of sex, among others
 - ✓ Guarantees equality of opportunity in employment
 - ✓ Provides for equal pay for work of equal value
 - ✓ Prohibits sexual harassment which the law defines to include use of language, whether written or spoken, of a sexual nature
- viii) **A National Framework on Gender-based Violence:** The government through the National Commission on Gender and Development has developed a National Framework on Gender Based Violence (February 2009) to form that basis of investigation of instances of sexual violence and strengthen coordination of responses to stem the vice
- ix) The Prohibition of Female Genital Mutilation Act No. 32 of 2011 already in force.

HIV and AIDS Prevention and Control Act, No. 14 of 2006

An Act of Parliament to provide measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection, and for connected purposes. The Act came into force on 30th March 2009 with the objective to prevent and control the spread of HIV and AIDS and for reinforcing the legal and human rights of persons infected with and affected by HIV and AIDS. It also seeks to protect the rights of healthcare providers.

Under Section 13, The Act makes it illegal for any person to compel another to undergo an HIV test as a precondition to, or for continued enjoyment of- (a) employment; (b) marriage; (c) admission into any educational institution; (d) entry into or travel out of the country; or (e) the provision of healthcare, insurance cover or any other service. However, under section 13(3), a person charged with an offence of a sexual nature under the Sexual Offences Act, 2006 may be compelled to undergo an HIV test.

Under Section 24 (1), a person who is and is aware of being infected with HIV or is carrying and is aware of carrying the HIV virus shall- 15 (a) take all reasonable measures and precautions to prevent the transmission of HIV to others; and (b) inform, in advance, any sexual contact or person with whom needles are shared of that fact. (2) A person who is and is aware of being infected with HIV or who is carrying and is aware of carrying HIV shall not, knowingly and recklessly, place another person at risk of becoming infected with HIV unless that other person knew that fact and voluntarily accepted the risk of being infected.

Section 31 of the Act is quite relevant to project management in that it stipulates that no person shall be- (a) denied access to any employment for which he is qualified; or (b) transferred, denied promotion or have his employment terminated, on the ground only of his actual, perceived or

suspected HIV status. This however does not apply in any case where an employer can prove, on application to the Tribunal that the requirements of the employment in question are that a person be in a particular state of health or medical or clinical condition.

3.4 INTERNATIONAL CONVENTIONS, TREATIES AND AGREEMENTS

Kenya is a signatory as well as a party to diverse international conventions, treaties and protocols relating to the environment and aimed at achieving sustainable development. While there are few treaties pertaining to impacts of manufacturing, many international treaties touch on this issue. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1989), there are 216 such treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and, protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority.

The Declaration of the United Nations Human Environment, Stockholm 1972, and the 1982 World Charter for Nature and the Rio Declaration on Environment and Development have significant nature, industry and transport issues embedded in them.

- The Convention on Trade in Endangered Species (CITES)
- The Ramsar Convention on Wetlands of International importance especially as Waterfowl Habitat.
- The Convention on Biodiversity (1992)
- The United Nations Framework Convention on Climate Change (1992)
- The convention concerning the protection of workers against occupational hazards in the working environment.
- The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes (1989).

3.5 THE INSTITUTIONAL FRAMEWORK

This ESIA Study recognizes 2 institutional set-ups that are critical to the successful execution of the EIA process namely:-

3.5.1 Institutional framework under Cap 387

In 2001, the Government established the administrative structures to implement EMCA, 1999 as follows:-

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

The National Environmental Management Authority: EMCA 1999 allows for formation of the National Environmental Management Authority (NEMA) as the body charged with overall responsibility of exercising 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. Under the Act, NEMA was established in 2001 when the first Director General was appointed by the President.

Activities of NEMA are rolled out through three core directorates in charge of Enforcement, Education and Policy. To facilitate coordination of environmental matters at District level as per

requirements of EMCA 1999, NEMA has established County Environmental Committees (CEC) traditionally chaired by respective District Commissioners and bringing together representatives from all the ministries; representatives from local authorities within the province/district; two farmers / pastoral representatives; two representatives from NGOs involved in environmental management in the province/district; and a representative of each regional development authority in the County. To each CEC in the country is attached a County Environmental Officer who is the NEMA Officer on the ground charged with responsibility of overseeing environmental coordination among diverse sectors and is also secretary to the CEC. This is the institutional framework under which the ESIA Study Report for the North Horr Jn-Darathe AP Camp Road upgrading will be regulated and processed to conclusion.

Public Complaints Committee: Under EMCA 1999, a Public Complaints Committee has been established to provide an administrative mechanism for addressing environmental harm. The Committee whose membership include representatives from the Law Society of Kenya, NGOs and the business community has the mandate to investigate complaints relating to environmental damage and degradation.

3.5.2 The Ministry of Roads - Environmental and Social Unit:

The Ministry of Roads has established an Environmental and Social Unit (ESU) in the Roads Department whose objectives is to achieve a comprehensive policy in terms of environmental management in the road sub-sector and to strengthen the capacity within the Ministry to be able to handle environmental and social issues. The role of the ESU is to:-

- 1) *Develop environmental road sub-sector standards and guidelines;*
- 2) *Ensure compliance with Environmental Management and Co-ordination Act of 1999, and Environmental Impacts Assessment and Audit Regulation of 2003 as they relate to the road sub-sector;*
- 3) *Review and update Roads Department documents e.g. standard specification and contract documents;*
- 4) *Participate in inspection for certification of substantial completion of work carried out by the roads department;*
- 5) *Screen proposed road rehabilitation project to determine environmental impact assessment category;*
- 6) *Review environmental and social management plans that have been prepared;*
- 7) *Set up a system for continuous monitoring and periodic surveillance;*
- 8) *Audit road rehabilitation, improvement and maintenance activities;*
- 9) *Work with and obtain feedback from the District and Provincial Engineers on all roads.*
- 10) *Liaise with Government, Parastatals and non-governmental organisations concerned with environmental issues including NEMA, with a view to addressing common priorities;*
- 11) *Create awareness and sensitise the public with regard to proposed road projects, their potential impacts and the need for planning in the event that people are going to be affected;*
- 12) *Ensure compliance of the road sub-sector EIAs with public consultation and disclosure procedures as required by the Environmental Management and Co-ordination Act and the requirements of the various international financing institutions and development partners;*
- 13) *Set up a computerized environment and socio-economic database relevant to road work activities.*

CHAPTER FOUR – THE BASELINE ENVIRONMENT

4.1 ADMINISTRATIVE AND POLITICAL JURISDICTION

From past discussion with local administration, the road is located in the North Horr Location, Division and Sub County within Marsabit County and is part of the North Horr-Ileret road that then proceeds to enter Ethiopia 25Km past Ileret. Marsabit County has a total area of 70, 961km² and occupies the extreme part of Northern Kenya. It has an international boundary with Ethiopia to the North, borders Lake Turkana to the West, Samburu County to the South and Wajir and Isiolo Counties to the East. It lies between latitude 02°45' North and 04°27' North; 37°57' East and 39°21' East.

Marsabit County has four administrative units (sub-counties) namely Marsabit Central, Laisamis, North Horr and Moyale. It has four Political units (Constituencies) namely Saku, Laisamis, North Horr and Moyale. The County has twenty (20) assembly wards. The project road is located entirely within North Horr County Assembly Ward and Constituencies within Marsabit County.

The road is an important trade route through which fish from L. Turkana (Ileret) is evacuated for sale in Busia and beyond. There is a proposal by the GOK to develop a major transport artery linking Gilgil, Rumuruti-Maralal-Baragoi-North Horr to Ileret and Ethiopia and upgrading of the North Horr Jn-Darathe Road is part of this Project.

4.2 BIOPHYSICAL BASELINE

4.2.1 General Physiography and Altitude

Most of Marsabit County constitutes an extensive plain lying between 300m and 900m above mean sea level, sloping gently towards the south-east. The plain is bordered to the west and north by hills and mountain ranges and is broken by volcanic cones and calderas. The most notable topographical features of the county are: -

- Ol donyo Ranges (2066m above sea level) in the South West.
- Mt. Marsabit (1865m above sea level) in the Central part of the county.
- Hurri Hills (1685m above sea level) in the North-Eastern part of the county
- Mt. Kulal (2235m) above sea level) in North West.
- The Mountains around Sololo – Moyale escarpment (up to 1400m above sea level) in the North East.

The main physical feature is the Chalbi Desert which forms a large depression covering an area of 948 km². This depression lies between 435m and 500m elevation. The depression is separated from Lake Turkana, which is 65-100m lower in elevation, by a ridge that rises to 700m. There are no permanent rivers in the county, but four drainage systems exist, covering an area of 948 km². The Chalbi Desert is the largest of these drainage systems.

The depression receives run-off from the surrounding lava and basement surfaces of Mt. Marsabit, Hurri Hills, Mt. Kulal and the Ethiopian plateau. The seasonal rivers of Milgis and Merille to the extreme south flow eastward and drain into the Sori Adio Swamp. Other drainage systems include the Dida Galgallu plains which receive run-off from the eastern slopes of Hurri hills and Lake Turkana into which drain seasonal rivers from the Kulal and Nyiru Mountains.

4.2.2 Physiography of the Project Traverse

A physiographic profile for the North Horr Jn-Darathe Road is provided in Plate 4.1 below. The Road starts at an elevation of 380 m asl at North Horr project road starts at an altitude of about 361 m amsl at North Horr and follows a gentle climb to 479 m asl at El Beso following which it climbs consistently to hit 765m asl at KM 95 and then drops to 600m asl at Darathe AP camp. While the geomorphology between North Horr and El Beso generally comprises low lying piedmont sandy plains to same rapidly changes to become rugged and hill rocky terrain. Between Km 65 and 85, the rocky terrain is broken by two san filled minor Rift Valleys one is which is called the small Chalbi.

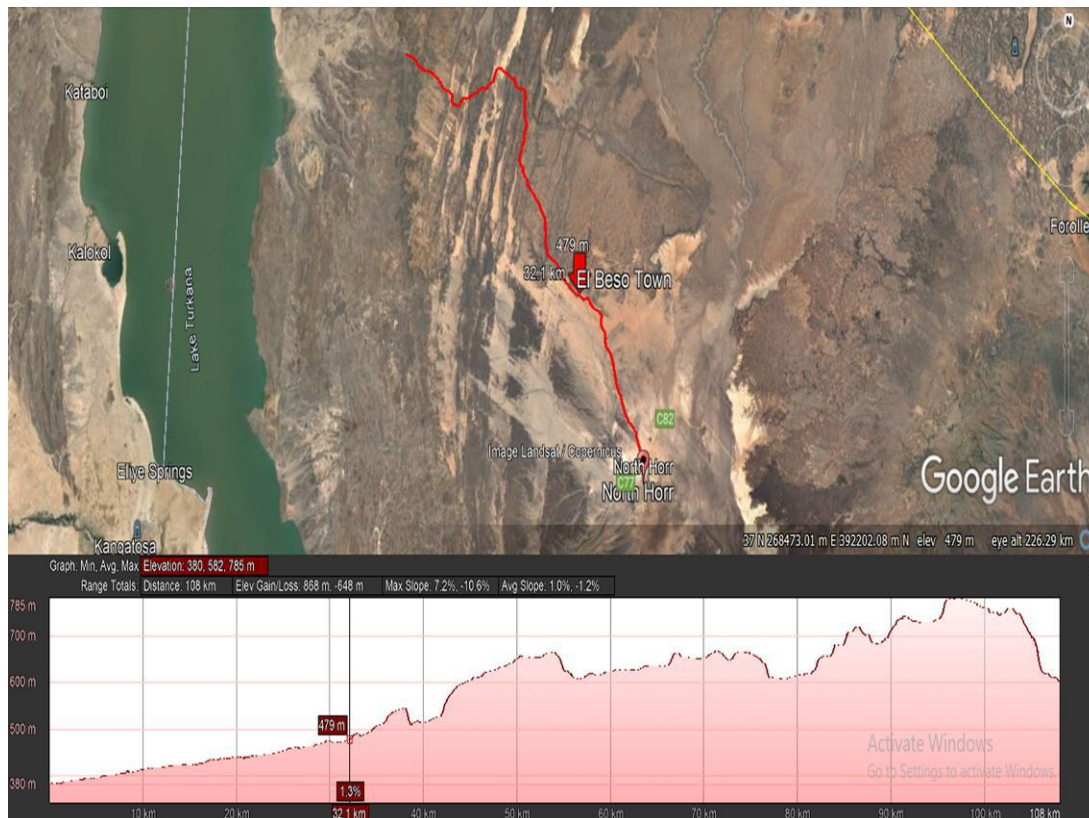


Plate 4.1: Relief Profile for the North Horr-Jn Darathe AP Road

The same physiography described above is provided in Plate 4.2 below as mapped under auspices of the range Management Handbook for Marsabit District (Republic of Kenya, 1998).

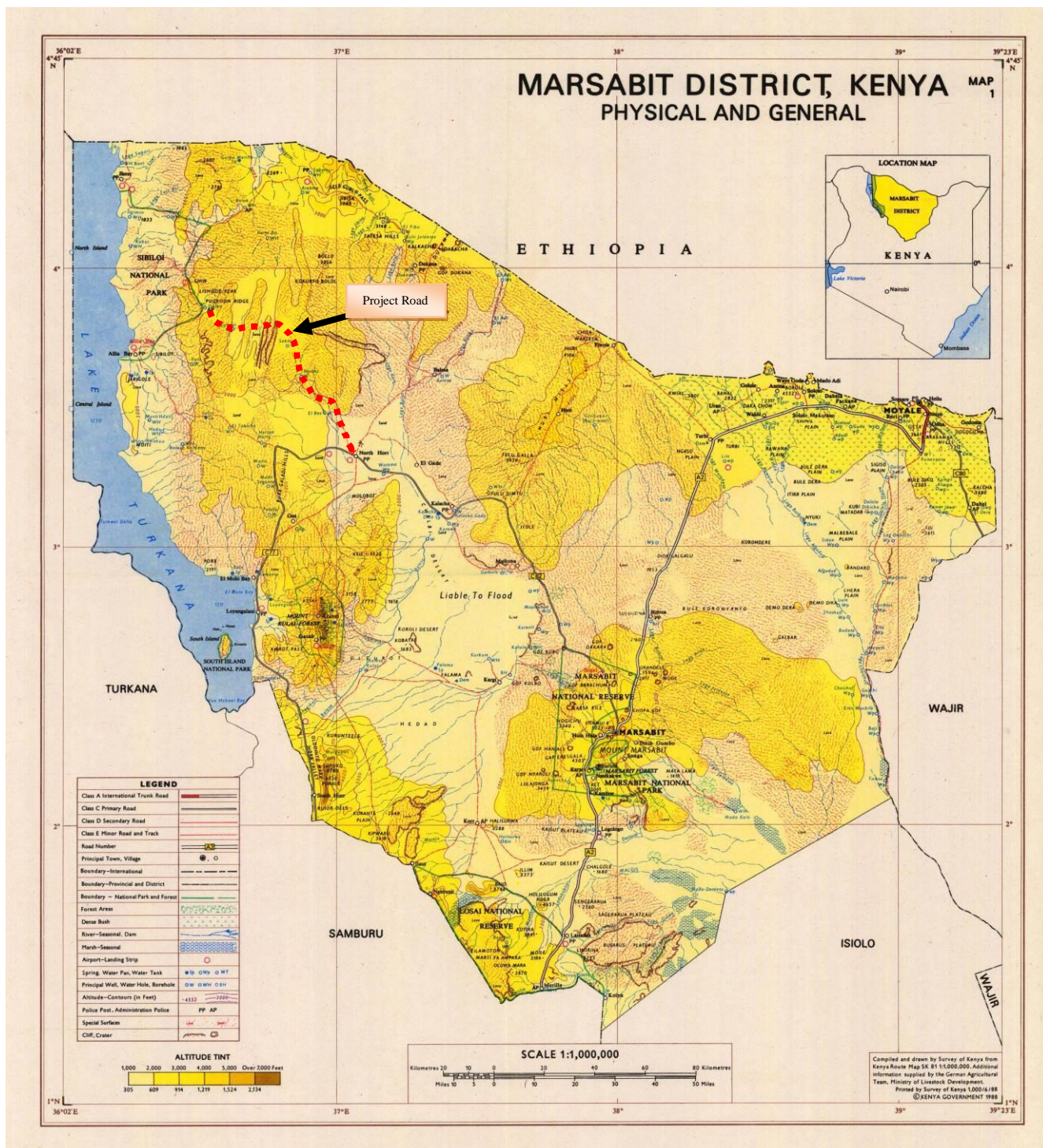
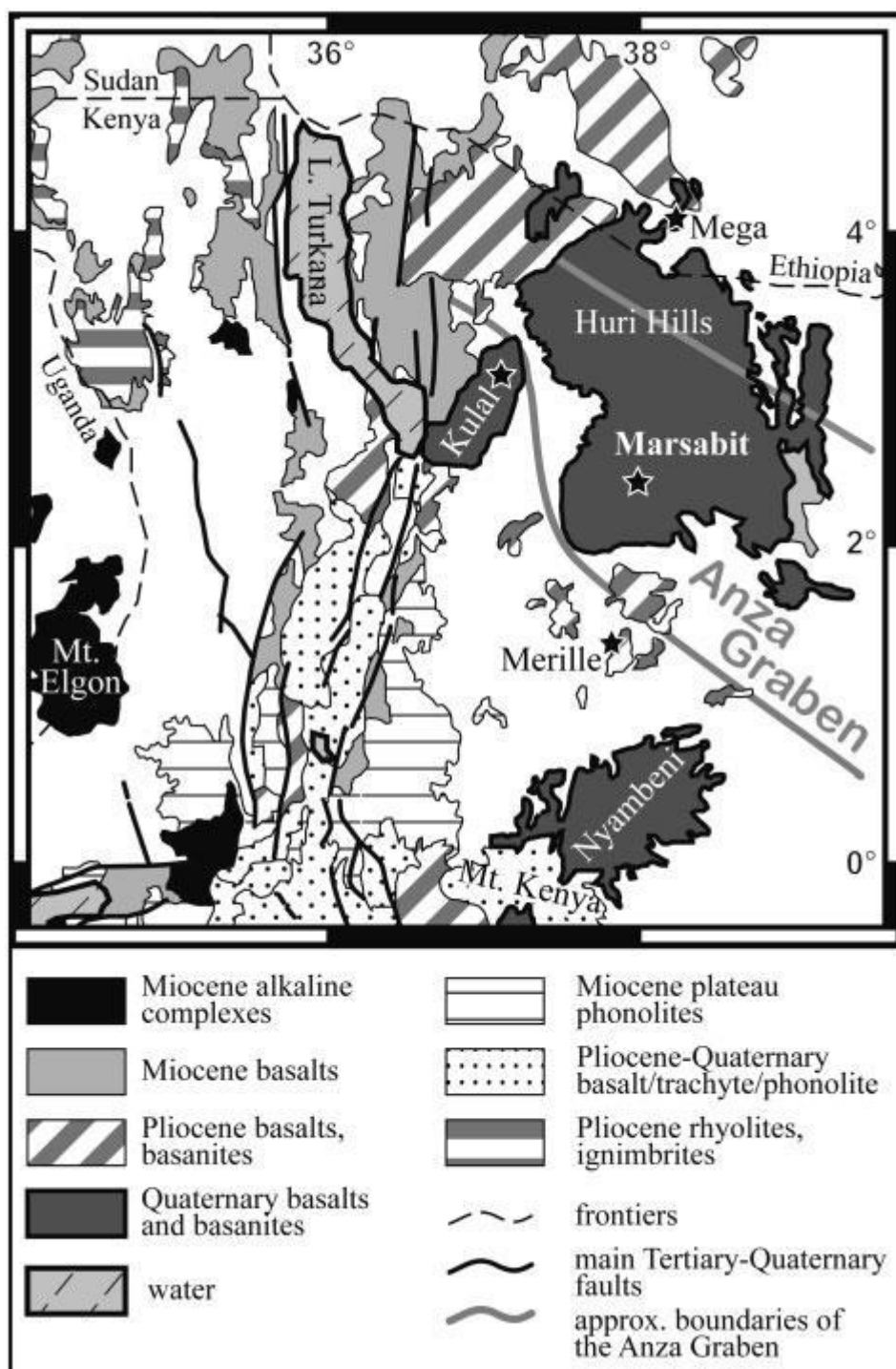


Plate 4.2: Physiographic Profile for Marsabit County and the Project Rd

4.2.3 Geology and Ecological Conditions

The most predominant geological formation in the county is volcanic rocks. They extend both westward and eastward from the eastern part of the Rift Valley to Ethiopia border. These volcanic rocks are interrupted in a few areas by pockets of quaternary sediments and the Mozambique belt. Other geological formations are associated with the old beds of lake Turkana and Lake Chalbi.



The southwestern and northeastern parts of the county are underlain by old metamorphic rock of pre-Cambrian origin. These are covered by tertiary and Pleistocene sheets and cones of volcanic rock in the Central and North Eastern parts, especially in and around central volcanic centres of Mt. Kulal, Hurri Hills and Mt. Marsabit.

The South Western plains are covered by quaternary sediments washed out from the higher areas in more recent geological times. Between the hills of Mt. Marsabit, Mt. Kulal, Hurri Hills, the bed of the seasonal lake Chalbi is also covered by recent sediments. The rest of the county is covered by rocky, stony and rugged lava plains with poor soil development. Some of these soils in the western part of the district have acidic moisture and are saline as in Chalbi Desert.



Plate 4.3: Saline sodic cracking clays of the Chalbi Ndogo Plain

The area below 700m above sea level is low potential rangeland and forms about 75 per cent of the total land area. As a result of low, unreliable rainfall and high rates of evaporation, the soils are shallow and poor. The areas at the foot of the comprise of Moyale – Sololo escarpment, the slopes of the Hurri Hills, the lower slopes of Mt. Marsabit and the Middle slope of Mt. Kulal. It also includes the plains of Dida Galgallu, Bure Dera, Kaisut and Milgis. These areas receive moderate rainfall of about 700mm annually. Livestock and crop production are the major economic activities with maize, sorghum, millet, beans, fruits and vegetables being the main crops. The highlands areas in the county include Mt. Marsabit, Mt. Kulal and Ol Donyo Mara Range, which have moderate rainfall and productive agricultural soils.

4.3 CLIMATIC CONDITIONS

4.3.1 Sources of Climatic Data

Climatic data for the North Horr to Darathe Section of Marsabit County is not readily available given the absence of KMD referenced stations. For purposes of this study, the climatic profile has been assembled based on data published by diverse sources.

4.3.2 Temperature

Given the low altitude location, the North Horr area remains generally hot throughout the year with mean temperatures averaging 29.4°C with a range from 23.9°C and 34.9°C. Temperatures remain generally high throughout the year with March recording a slightly elevated Temperature 30.3°C (Fig 4.2).

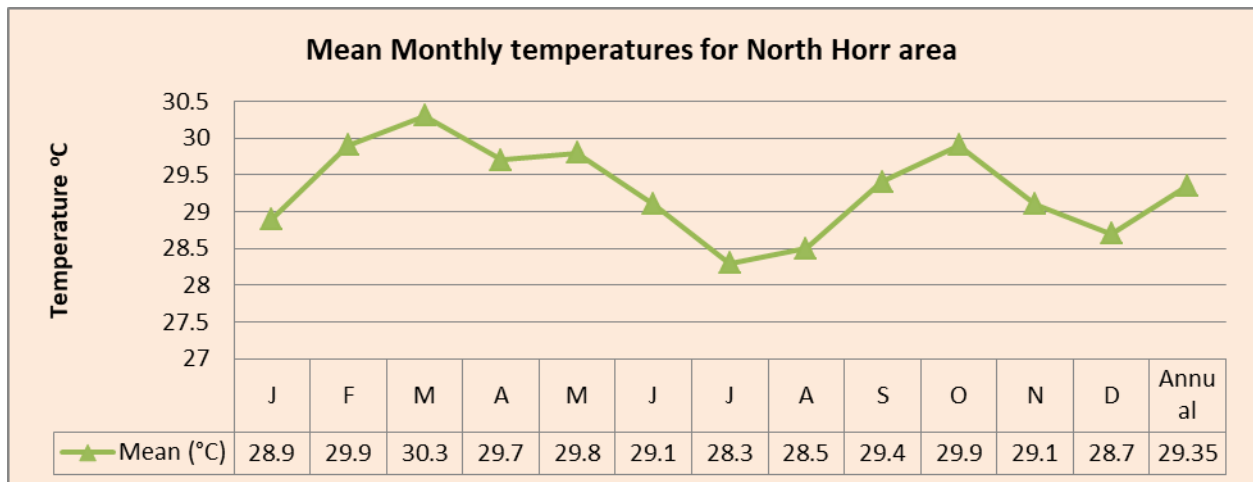


Fig 4.2: Temperature data for the Traverse area

4.3.3 Relative Humidity

Error! Reference source not found. traces the seasonal variation of relative humidity in North Horr area. The area is generally dry with a long-term (1959-1990) average of 52.9% and a range of 46% to 66%. Relative humidity does not display extreme seasonal variation with the months of April and November somewhat elevated humidity while January and September record the lowest levels, according to the Study of the National Water Master Plan in 1992.

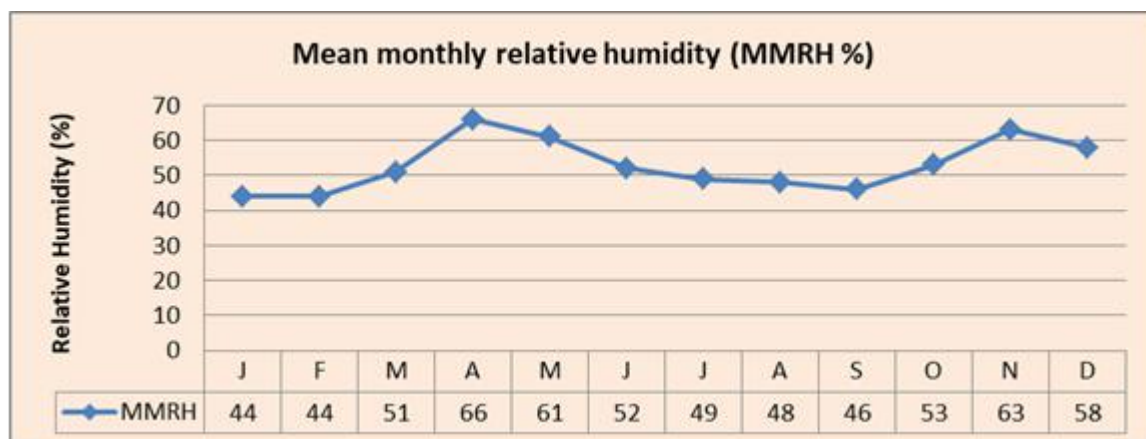
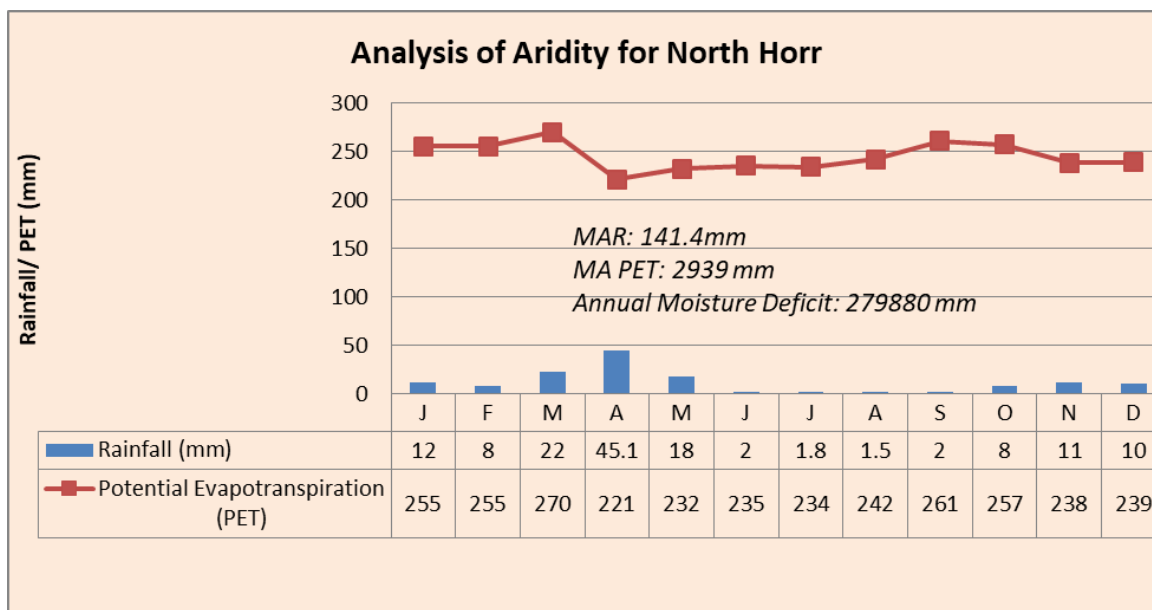


Fig 4.3: Seasonal Variation of Relative Humidity in the North Horr Area

4.3.4 Rainfall

Seasonal rainfall occurrence and distribution: Rainfall occurrence in the Marsabit area is influenced by the semi-annual passage of the inter-tropical convergence zone and the monsoons – the *North Easterly Monsoon (NEM)* from December to March and the *South Easterly Monsoon* from May to October. Most of the rainfall occurs when moisture laden monsoon winds are forced to rise over relief barriers whereby they drop the moisture load leading to orographic rainfall so common on mountainous areas. However, given the low elevation and general lack of relief barriers in the North Horr-Darathe transect, rainfall is mainly convection and thus quite low. Long-term mean annual rainfall is 141.4mm and although delivered in two maxima, there is really no wet season in the area given that May, the wettest month receives a paltry 45.1 mm on average (Figure 4.4).



Source: This Study

Fig 4.4: Seasonal Moisture Balance for North Horr

Climatic potential of rainfall: The climatic value of rainfall has been analyzed based on computation of the climatic index as determined by the ratio of rainfall (r) to potential evapo-transpiration (Eo) based on the method of Sombroek et. al, 1982.³ With a mean annual rainfall of 141.4mm and an equivalent potential evapotranspiration of 2939 mm, the North Horr area has a climatic index (r/Eo ratio) of 4.74% which translates to a Climatic Zone VII which is very arid. Monthly rainfall is way below the evaporative demand created by high levels of sunshine in which case, a moisture deficit prevails during the entire year. Moisture scarcity therefore, scarcity poses the most severe limitation to ecological productivity in the area. Rainfed crop farming is therefore strictly impossible leaving mobile pastoralism as the only viable climate supported means to livelihood.

4.3.5 Range Ecology and Productivity

Profiling of the natural ecology for the North Horr to Darathe transect has adopted the classification preferred by the Range Management Handbook Project that stratified the entire Marsabit County into homogeneous Units as presented in Plate 4.3 below. The road traverses two Range Units as described below.

Range Unit No 5 (Hurran Hurra)

3

zone	r/Eo (%)	classification	r average annual rainfall (mm)	Eo average annual potential evaporation (mm)
			excluding areas above 10,000 ft altitude	
I	> 80	humid	1100 - 2700	1200 - 2000
II	65 - 80	sub-humid	1000 - 1600	1300 - 2100
III	50 - 65	semi-humid	800 - 1400	1450 - 2200
IV	40 - 50	semi-humid to semi-arid	600 - 1100	1550 - 2200
V	25 - 40	semi-arid	450 - 900	1650 - 2300
VI	15 - 25	arid	300 - 550	1900 - 2400
VII	< 15	very arid	150 - 350	2100 - 2500

Range Unit No. 5 (Hurran Hurra) is approximately 6035 km² and is the largest single unit in both entire Marsabit County and also the traverse of the North Horr to Daratthe Road, accounting for the entire traverse between El Beso and Daratthe. The Unit sits on Lava plateaus, where soils range from very stony clay, varying depths, well drained (LV2) to cracking clay, very deep, moderately drained (LVI) and calciferous, locally stony cracking clay, very deep moderately drained (LV3). The Plateaus are broken by major valleys in parts, the most prominent of which is the Minor Chalbi Desert (Chalbi Ndogo) - a lacustrine plain filled with white saline sandy clay loamy soils.

Range Unit 5 receives a median annual rainfall of 250 to 400 mm with a risk of drought occurrence in 2 to 4 years out of 10. On account of domination by a rocky lithology and saline sodic clays soils, vegetation in the Unit is poor of which 50% is barren land with dwarf shrub/annual grassland and 30% is entirely barren land. Forage availability over the remaining 20% of the unit comprised of narrow vegetation bands of dwarf shrubs and annual grasses along drainage lines and in shallow depressions only (10% is bushed grassland; 5% is deciduous shrubland, and 5% riparian is woodland) is limited to the rainy seasons and the immediate post-rain periods. Forage quality, particularly in the herb layer, deteriorates very quickly after the rains and becomes unsuitable as ruminant feed. Small areas of bushed grassland and riparian woodlands can be used as dry season grazing reserve for a limited number of camels and goats. Approx. 10% have severe permanent restrictions to access by livestock (lava boulders) and 35 % have severe temporary restrictions due to flooding.

Permanent water sources include several wells and springs and a borehole at Sabarei. This borehole has a very high yield, but due to the remote location, it is frequently broken down. Water availability is generally better than forage availability during all seasons. Watering Points comprise of one Borehole, 10 Wells and one spring all with an estimated safe water yield of 210 m³ per day.

Range Unit No 6: North Horr

The range unit 6 (North Horr) comprises of approximately 2250 km² and is mainly traversed between North Horr and El Beso. Range Unit No 6 (North Horr) rests on Piedmont and Lacustrine Plains whereby soils are stratified sandy loam, very deep, well drained complex calciferous saline clay loams of varying depth. On account of majority of this Unit being covered by rocky lithology, 50% of the area is barren with narrow vegetation bands of dwarf shrubs and annual grasses along drainage lines and in shallow depressions only. Forage availability over the remaining 50% of the unit comprised of bush land to grass land on saline soils at 30% and riparian woodland and deciduous shrub land following at 10% each, is limited to the rainy seasons and the immediate post-rain periods. Forage quality, particularly in the herb layer, deteriorates very quickly after the rains and becomes unsuitable as ruminant feed. Small areas of riparian woodlands can be used as dry season grazing reserve for a limited number of camels and goats. A risk of drought occurs in 4 years out of 10. Approximately 10% have severe temporary restrictions to access by livestock due to flooding.

Permanent water sources include several wells and springs and 2 boreholes. The boreholes at North Horr are for domestic use only, the springs near North Horr are high yielding. Water availability is generally better than forage availability during all seasons.

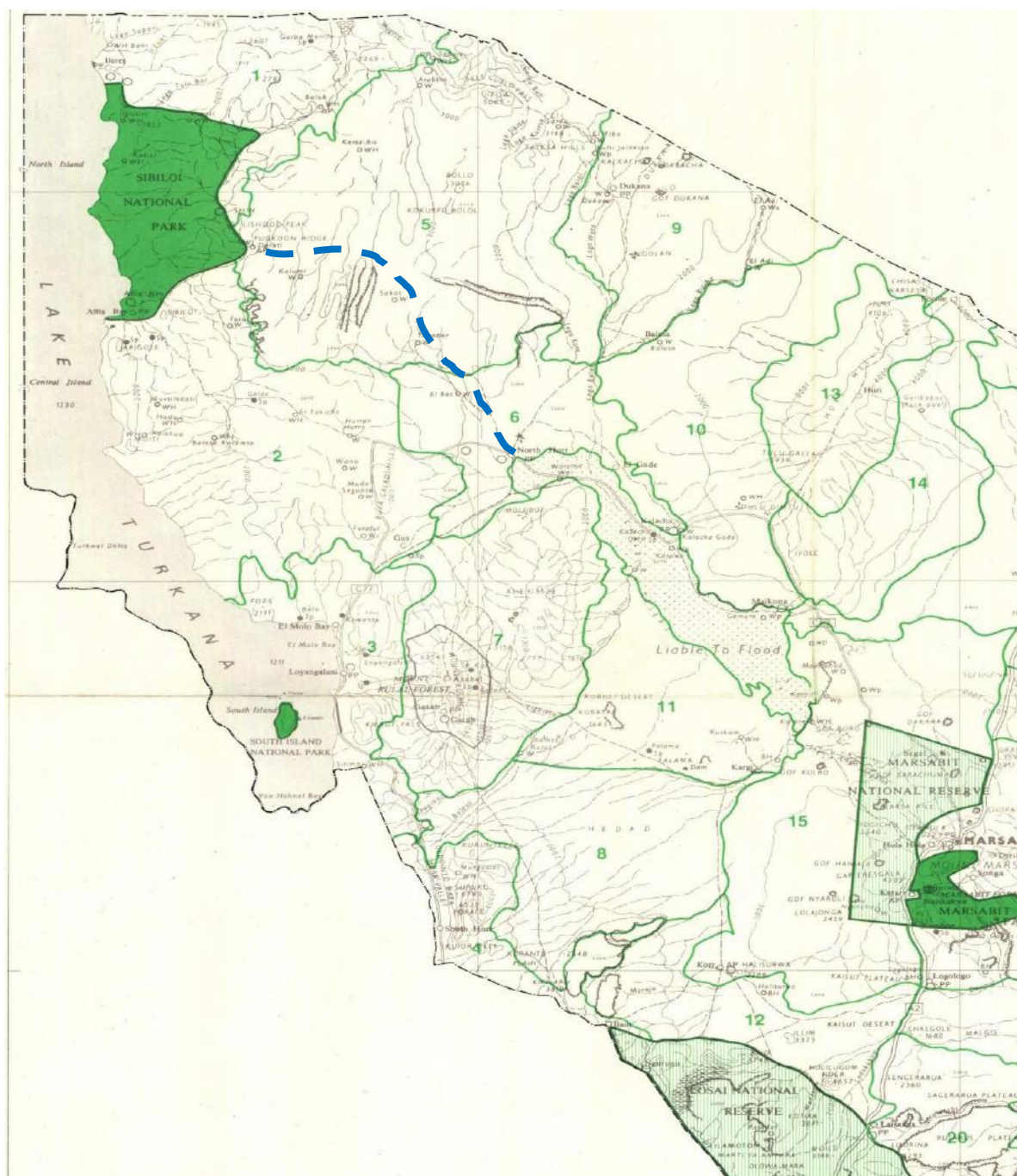


Plate 4.4: Range Units for Marsabit County

4.3.6 Hydrology and Water Resources

Surface Drainage System: Officially, the North Horr area is classified under Drainage Basin No. 5; the Ewaso Ngiro. However, there is no single drainage outlet that connects the North Horr Area to the Ewaso Ngiro System and the area comprises of several internal drainage sub-systems all ending in the local depression areas of which, the main one is the Chalbi Desert. From a review of available maps (Plate 4.2) and on the ground observations, there are no permanent surface water bodies and main drainage comprises of laggas that experience short-lived flows in the wet season and end up in the local depressions which become seasonally flooded thus possibly occasioning recharge for local perched water tables.

The factor of aridity: Analysis of aridity as undertaken in section 4.3.4 above indicated that aridity is the main characterizing feature of the North Horr area which huge implication on both ecological and economic productivity. As well, a local moisture balance dominated by a huge moisture deficit implies that there is hardly any surplus water that could be released for either groundwater recharge or river flow that the area is inherently a moisture deficit zone.



Plate 4.4: Aridity is the core defining feature of the North Horr area

Local sources of water supply: The North Horr JN-Darathe Road Project boasts of two oases at both the starting and end points of the road and these comprise the main sources of water for both domestic use and livestock water ring. With an estimated daily yield of 210 cubic metres, this source at North Horr is hardly enough to meet the local needs and it is supplemented by piped supply and a borehole. The Springs are fed by underground flow from aquifers recharged by sand filled depressions that concessionary flood during exceptionally wet years.



Plate 4.5: The Oasis at North Horr

4.3.7 Other natural resources

Sibiloi National Park and the Koobi Fora beds

The North Horr JN –Darathe Road Project is designed to end at Darathe on the eastern periphery of the Sibiloi National Park but the current earth road continues to Ileret and Ethiopia through the Park.

Sibiloi National Park is commands and area of 1570 square kilometres and was created vide Legal Notice No. 160 of 1973. Otherwise called “**The Cradle of Mankind**”, Sibiloi is located on the wild and rugged shores of Lake Turkana and is home to important archaeological sites including Koobi Fora where the fossil remains have contributed more to the understanding of human evolution than any other site in the continent. According to the National Museum of Kenya, the area is characterized by semi-desert habitat and open plains flanked by volcanic formations including Mount Sibiloi, where the remains of a petrified forest can be seen. Sibiloi serves as a stopover for migrant waterfowl and is a major breeding ground for the Nile crocodile. Terrestrial wildlife includes zebras, Grant gazelles, lions, leopards, striped hyenas, Beisa Oryx, greater kudu, cheetahs and northern topi among others. A total of over 350 species of aquatic and terrestrial bird have been recorded in Lake Turkana. Sibiloi is surrounded by the Turkana, the Gabra and the Dassanach who are communities with very rich and unpolluted traditional cultures. Other key features of this resource that will be opened to the public vide the North Horr Jn –Darathe Road include: -

Skull 1470- Homo habilis: Known as the ‘Cradle of Mankind’ Sibiloi National Park was created to protect the sites of the many remarkable hominid fossils finds revealed by its searing winds. The park yielded its most striking treasure in 1972 when a 2-million-year-old fossilized skull was discovered by eminent paleontologist Dr Richard Leaky and his team. The almost complete skull (labeled ‘1470’ by the National Museum of Kenya) confirmed the existence of a sophisticated evolutionary hominid named *Homo habilis*, the direct ancestor of *Homo sapiens*. Evidence of *Homo erectus* was also unearthed along with some 160 additional finds relating to the early hominids.

The Koobi Fora Museum: At Koobi Fora which is to the north of Allia Bay, extensive paleontological finds have been made, starting in 1969, with the discovery of *Paranthropus boisei*. The discovery of *Homo habilis* thereafter is evidence of the existence of a relatively intelligent hominid two million years ago and reflect the change in climate from moist forest grassland when the now petrified forest were growing to the present hot desert. The human and pre-human fossils include the remains of five species, *Australopithecus anamensis*, *Homo habilis/rudolfensis*, *Paranthropus boisei*, *Homo erectus* and *Homo sapiens* all found within one locality. Koobi Fora deposits, rich in mammalian, molluscan and other fossil remains, has contributed more to the understanding of human evolution than any other site in the continent. Sibiloi national park is also home to an elephant fossil dating 1.7 million years back and is one of the most magnificent archeological findings.

The Giant Tortoise: It is a 1.6-million-year-old fossil of an extinct tortoise. This is the shell and limb bones of a giant tortoise which is lying upside down and may have died by falling from a river bank on its back.

The Jade Sea: Lake Turkana is an isolated chloro-carbonate alkaline giant; Prolific Birdlife covering 6,400 sq Km. Its mercurial blue-green color has earned it the title ‘The Jade Sea’.

The Crocodile Kingdom: Survivors of an epoch long before mankind, Lake Turkana’s estimated 12,000 crocodiles have not changed in 130 million years. Despite their monstrous size and formidable appearance, they are generally inoffensive creatures living in perfect harmony with their environment and feeding on the lake’s prolific fish.

Petrified forests: The largest areas of petrified wood lying around Sibiloi are the remains of a once-great cedar forest, which covered the Lake’s shores 7 million years ago.

Prolific birdlife: Sibiloi’s avian highlights include: Somali ostrich, Kori and Heuglin’s bustard, northern carmine and Somali bee-eater, chestnut-bellied sand grouse and fox kestrel. The Park is also famous for the European migrants that sweep across its skies between March-May.

The Volcanic Basalt Rock Outcrops:

One of the least appreciated natural resource endowments of the North Horr Area and indeed the northern portion of Marsabit is the monotonous lithology of Basalt Rocks of volcanic origin that outcrop the ground surface (Plate 4.6) and second to aridity, the rock outcrop is a major contributing factor to barrenness that grossly undermines land productivity.



Plate 4.6: The rocky lithology

Wildlife:

Other resources typical of rangelands include wildlife. Ninety (90) per cent of wildlife in Kenya is found in the ASALs and with 75 per cent residing outside the designated national reserves and game parks, the expectation was that the traverse area would be teeming with diverse wildlife. However, during field surveys conducted in diverse dates and seasons, no significant wildlife; - either mammal, reptiles, birds, etc were ever encountered in both the traverse and adjoining areas. Not even the drives along Marsabit-North Horr or the North Horr-Gus-Loiyangalani-Mt. Nyiru-Mt. Kulal-Laisamis transect yielded any wildlife. Even Sibiloi National Park which was purposely established to conserve the Koobi Fora Beds; internationally renowned for research in the early origin of the Hominid Species does not boast of substantial wildlife. Yet, from verbal accounts from local communities and available reports including National Wildlife Strategy 2030 (Republic of Kenya 2018), the area used to teem with diverse game species inclusive of the Big Herbivores. As will appear in sections below, the wildlife has disappeared or is in terrible state of decline.

4.4 THE SOCIO-ECONOMIC BASELINE

Alongside Moyale, North Horr is the second northernmost administrative outpost in Marsabit County. However, North Horr, Kalacha and Loiyangalani are landlocked on account of non-connection by all-weather roads which greatly limits exploitation of their full economic potential. This, alongside aridity poses the greatest developmental challenges which condemn the local communities to untold hardships and very poor-quality life. This is the general socio-economic baseline preceding project development. Other facets of socio-economic background are unveiled below.

4.4.1 The People and population distribution

A map on the distribution of ethnic communities' resident in Marsabit County is not readily available. However, from experience and consultations on the ground, the entire traverse from North Horr to Daratthe is occupied by the Gabra Community. Beyond Daratthe towards Illeret, the Dasenatch is the predominant group who occupy the entire Illeret location. Within North Horr Town, other communities mainly Borana and Meru are common mostly engaged in trade.

As per 2019 Population Census, North Horr location has a total population of 5,177 people. With an area of 7,722.8ha, the traverse area has a population density of 0.7 persons per square kilometer/t6. The population is mainly resident within North Horr Town and other small settlements of the traverse such as El beso ha while others reside in pastoralist settlements located near water sources.



The desnsely settled section of El Beso showing the Project Road in foreground

4.4.2 Land use and economic activity

Both land-use and economic activity are ordained by the harsh ecology imposed by hyper-aridity. And though mobile pastoralism is the only land-use activity possible, it is limited by obstacles posed by hostile terrain and saline soils which limit forage activity to narrow beds located along riparian belts of season laggas. Thus, according to the Range Management Handbook of 1991, the bulk of the traverse area is classified as being of low range productivity where only 31% is available for seasonal use (Plate 4.6). Even so, the 31% available has very limited carrying capacity (Table 4.1) on account of the low productivity. An hectare of rangeland can only support 1 cow for 65 days, 8 sheep for 85 days, 8 goats for 115 days while 6.1ha is required to support one mature camel for 139 days immediately after the long rains following which, they have to migrate in search of forage and water.

Table 4.1: Carrying capacity calculation for Range Unit 5 along the Traverse

Livestock type	1st rains Stocking density Ha/TLU	Max days	2nd rains stocking density Ha/ TLU	Max days	Total stoking per ha in 1st rains
Cattle	1	65	1.9	40	1
Sheep	1,8	85	3.5	60	8
Goats	5.4	115	15.6	80	8
Camels:	6,1	139	17.5	80	0.2

TLU Equivalentents: 1 Cow = 1 TLU, a sheep or goat = 0.13 TLU, a camel =1.25 TLU

Source: Range Management Handbook (1991)

4.4.3: Fisheries and fishing based enterprise

Fish industry is not well developed in Marsabit County because of the poor connection between the source (Illeret and Loiyangalani on Lake Turkana) and the County headquarter and other potential regional markets. Lake Turkana, as the main source of fish in the county supports 1,400 fishermen and 400 families. The main species of fish are tilapia, labeo and Nile perch. Out of the 10 landing beaches in Lake Turkana, only 4 are gazetted. There are 2,000 fishing nets, 500 hooks, 10 motor boats and 20 canoes. Recently, the county constructed two cold storage facilities in Loiyangalani and Illeret and linkage of both centers by all-weather roads as proposed will impact very positively on the fish trade. These new developments will reduce post-harvest losses through improved preservation of fish products that are not instantly sold. As well, improvement of the road link to Illeret will make fish more available at North Horr and thus improve on the local dietary intake.

4.4.3: Transport and Infrastructure

Marsabit Town is served by the newly constructed Isiolo–Moyale Road A2 Road connecting the towns of Isiolo, Archers Post, Marsabit, and Moyale. The road is a component of the Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor (LAPSSET) Project and connects Kenya to Ethiopia, its neighbor to the north. North Horr Town is connected to the A2 Road by the Marsabit-Maikona-North Horr (B75) Road currently being upgraded to Bitumen Standard and is also connected to Loiyangalani to the south by the Mararal-Baragoi North Hor A4 Road which is fairly motorable though unpaved. Being located at the intersection of the two national trunk roads (B75 and the A4), North Horr has great potential to serve as a transit and passenger and goods exchange point.

As at the time of this study, there is no functional public transport linkage between North Horr and Marsabit. Passengers normally rely on hiking lifts or the occasional matatu. The situation is worse between North Horr and Ndarathe where the only means of transport is lorryies ferrying goods and animals either to or from Illeret.



Fig. 4.5: The Road Network connecting North Horr

4.4.4: Access to basic Health

North Horr is the largest Subcounty in Marsabit County in terms of geographical size bordering the republic of Ethiopia to the North, Laisamis Sub County to the Southern Side and Turkana County to the West where it shares Lake Turkana. It also borders Moyale Sub County as well as Wajir County to the Eastern Side. Administratively, North Horr Sub County is further sub divided in to five Wards namely;- Illeret, Dukana, North Horr, Maikona and Turbi wards. The Sub County has 17 health facilities including one at North Horr Center which alongside the Dispensary at El Beso are the main health facilities within the traverse. Cases requiring specialized treatment are referred to the Level 5 Hospital at Marsabit Town.

Overall HIV/AIDS prevalence:- North Horr Sub County has a population of 132,675, comprising of 51% males and 49% females. HIV prevalence in the Sub County is (1.4%) lower than the national prevalence of 5.9% (Kenya HIV Estimates 2020). The uptake of counseling and testing is low, at only 16%.

Waterborne diseases:- North Horr Location (Ward) is one among the five that make the N. Horr sub-County and, on pro lata basis, the location should account for no more that 20% share of diseases

recorded. However, going by Table 4.2 below, the Location accounts for over 30% of the main waterborne diseases-Typhoid, Amoebic Dysentery, Escherichia coli among others recorded at the North Horr Health Center. This points at a worrisome state of lack of sanitation which, coupled with the fact that North Horr is perched on a shallow water table that forms the Oasis explains the highly contaminated nature of local water supply. It has also been pointed out that the combination of inadequate sanitation (poor disposal of human waste) and frequent flooding facilitates easy injection of contaminants including nitrates into river beds and shallow groundwater resources thus aggravating prevalence of water borne diseases.

Table 4.2: Preference of water Borne Diseases in North Horr Location

SNo	Waterborne diseases	Records for February 2022 to February 2023		Contribution by North Horr Ward alone (%)	Remarks
		North Horr Sub County	North Horr location		
1	Diarrhea	6,502	1003	15.4	Lab Diagnosis
2	Typhoid	258	91	35.3	
3	Amoebic and Bacilli Dysentery	879	259	29.5	
4	E-Coli	165	54	32.7	
5	Giardiasis	40	11	27.5	
6	Others	305	118	38.7	

Airborne diseases: From records availed by the MOH for North Horr Health Center, apparently North Horr location is highly prone to airborne diseases (Table 4.3) accounting for 100%, 89.4 and 42.9% of all Anthrax, Measles and Tuberculosis cases recorded in the Subcounty. This possibly is on account of dust, so highly prevalent in the Center.

Table 4.3: Prevalence of Airborne diseases in North Horr Center

S No	Airborne diseases	Records for February 2022 to February 2023		% Share	Remarks
		North Horr Sub County	North Horr Location		
1	Anthrax	8	8	100	Clinical/ Laboratory diagnosis
2	Rotavirus	124	33	26.6	
3	Influenza	212	72	34.0	
4	Streptococcus pneumonia	677	209	30.9	
5	Measles	349	312	89.4	
6	Mumps	98	12	12.2	
7	Tuberculosis	56	24	42.9	

4.4.5: Access to food and nutrition

North Horr Sub County has an estimated population of 82,109 people, among them, 12,891 are children aged below 5 years representing 15.7% of the population. North Horr Sub County was the second with the highest prevalence of acute malnutrition in Marsabit County during the June 2019, classifying the Sub County in the critical (IPC phase 4) with an overall wasting prevalence of children aged 6 to 59 months being 25.1% with 3.1% of children being severely malnourished. The prevalence of acute malnutrition based on MUAC was 4.5% while severe acute malnutrition was 0.5%. Based on October 2019, NDMA early warning bulletin, Marsabit County drought situation was at alarm with deteriorating trend. In response to this, all 17 health Centers including the one at North Horr Center offer full Integrated Management of Malnutrition (IMAM) services and implement surge model to

monitor the performance of both outpatient therapeutic Program (OTP) as well as the supplementary feeding program (SFP).

North Horr is inhabited by the Gabra, who practice expansive mobile livestock production and specialize in camel husbandry. During the dry season, the men migrate with the majority of the animals to dry season grazing areas in search of pasture. The women and children remain behind with a few animals. These pastoral communities live in seminomadic settlements in which livestock, the main source of livelihood, is moved across vast distances in search of grazing pasture, especially during the dry season. Largely dependent on milk from livestock (mainly camels or cattle) for home consumption, these communities also trade or sell animals (primarily goats and sheep) to purchase food and other commodities (Fratkin et al. 2005). The results show that malnutrition increases during the dry season and improves during the wet season. In North Horr, peaks are experienced in January and then to a slightly lesser extent in July. Malnutrition is attributed to the absence of livestock products such as milk and meat for consumption. The availability of these products closely corresponds with local rainfall patterns and the availability of pasture. Although camel milk is available during the dry season, in North Horr the majority of animals move to distant grazing areas (fora) during this period, and women and children therefore don't have access to the milk.

In addition to the seasonal lack of livestock products, lack of income is identified as a major factor contributing to both maternal and child malnutrition as it causes inability to purchase nutritious foods, specifically high-quality proteins and fats, during the dry season. Food and cash aid support in these drought prone areas also enables them to cope with the challenge of food shortage. The remoteness of the area along with limited infrastructure means that the cost of basic foods is considerably higher than in more connected parts of the country. There are very few meaningful income-earning opportunities, particularly for women, many of whom depend on selling firewood and charcoal during the dry season in order to make ends meet. Although the lack of income is largely associated with food purchases, other costs such as schooling and health care are often prioritized over purchasing more nutritious foods. Whereas households primarily consume livestock products like milk or slaughter animals for meat, they also frequently sell livestock to provide income for other household needs such as food, school fees, and other necessities. Women therefore have to make difficult decisions on how best to spend the little money they have, and this often comes at the expense of a balanced diet.

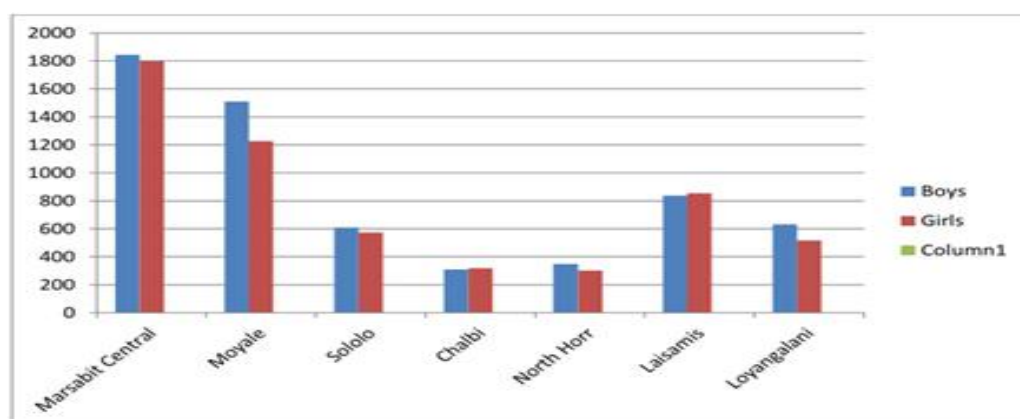
4.4.6: Access to Education

A total of seven education institutions, four primary, two secondary and one Tertiary are found in the traverse of the North Horr –Jn Ndarathe AP camp road (Table 4.4). Total enrolment in primary schools is about 762 for the entire Ward which is an improvement compared to the 652 recorded in 2013 (Fig 4.6 below). This notwithstanding, North Horr has among the lowest enrolment rates for primary schools in entire Marsabit County (Fig 4.6) possibly on account of the low and sparse population, the nomadic nature of livelihoods which keeps children from attending school and cultural factors such as early marriage and goat herding culture all of which keep children away from school. Transition rates from primary to secondary school and on to tertiary institutions have improved since 2010 with boys showing a slightly higher enrolment compared to girls.

Table 4.4: Education Institutions along the traverse

SN	Name of School	Description
1.	North Horr Primary School	North Horr Pry School is a public primary school in North Horr. This school is run by religious organization. It is a day and boarding school. This educational institution is an ordinary and mixed type of institution. The pupil to classroom ratio in this school is 41.9:1 and the pupil to toilet ratio is 31.4:1. There are total 15 classrooms, 16 boys toilets, 4 girls toilets and 2 teachers toilets. The total numbers of students enrolled in this school are 628. There are 6 non-teaching staff, 5 males and 1 female non-teaching staff in North Horr Pry School.
2.	Malabot Primary	Malabot Pry School is a public primary school run by religious

	School	organization. It is a day school. This educational institution is an ordinary and mixed type of institution. The pupil to classroom ratio in this school is 21.5:1 and the pupil to toilet ratio is 64.5:1. There are total 6 classrooms, 1 boys toilet, 1 girls toilet and 1 teachers toilet. The total numbers of students enrolled in this school are 129.
3.	El Beso Primary School	El Beso Pry School is a public day primary school in North Horr. This school is run by religious organization and admits both boys and girls. The pupil to classroom ratio in this school is 15:1 There are total 1 classroom The total numbers of students enrolled in this school are 15.
4.	Russo Primary School	Russo Pry School is a public primary school in North Horr. This school is run by religious organization. It is a day school. This educational institution is an ordinary and mixed type of institution. The pupil to classroom ratio in this school is 25.1:1 and the pupil to toilet ratio is 33.4:1. There are total 16 classrooms, 4 boys toilets, 8 girls toilets and 2 teachers toilets. The total numbers of students enrolled in this school are 401. PTA (Parent Teachers Association) BOG (Board of Governors) male and female number is 5 and respectively. There are 2 non-teaching staff males and 1 female non-teaching staff in Russo Pry School, North Horr.
5.	North Horr Boys Secondary School	North Horr Secondary School is a Public (County) school registered by Kenya National Examinations Council to conduct all secondary education examination's matters. North Horr Secondary School is a boys boarding secondary school.
6.	North Horr Girls Secondary School	Is a catholic sponsored school which started in the year 2011, with population of 170 students and 11 teachers.
7.	North Horr Technical Training Institute	North Horr Technical and Vocational College is a Public College located at North Horr town accredited by Technical and Vocational Education and Training Authority (TVETA) since 2019. It is a Centre of Excellence in Food Science & Preservation Technology with State-of-the-Art Technology.



Source: <https://erepository.mku.ac.ke/handle/1234567789/5557>

4.4.7: The overall Human Development Index (HDI)

One of the main objectives under the Kenya's economic blueprint, Vision 2030, is to provide a high quality of life for all Kenyans. A major goal of Kenya Vision 2030 is to raise Kenya's HDI from its current level of 0.520 to 0.750 by the year 2015. Achieving this goal requires sustained economic growth, strengthened competitiveness, and continued investments in human capital. In Marsabit County, the HDI stands at 0.438. This is below the national average of 0.520 and also below that for neighbouring Isiolo County, which stands at 0.451. However, Marsabit's HDI is above those of

Mandera and Wajir, which both stand at 0.421. Recognizing that HDI in the county has to be improved to reflect improved welfare of the people, the county government has put in place several initiatives especially on health, education and income generation. The HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a county and not economic growth alone, since two counties/regions with the same level of GNP per capita can end up with different human development outcomes.

4.4.8: Gender Inequality Index (GII)

Gender Inequality Index reflects gender-based disadvantage in three dimensions namely:- reproductive health, empowerment and the labour market. The health dimension is measured by two indicators - mortality ratio and adolescent fertility rate. The empowerment dimension is also measured by two indicators - share of parliamentary seats held by each gender and by secondary and higher education attainment levels. The labour dimension is measured by women's participation in the work force. The GII is designed to reveal the extent to which national achievements in these aspects of human development are eroded by gender inequality, and to provide empirical foundations for policy analysis and advocacy efforts. The index shows the loss in potential human development due to inequality between female and male achievements in these dimensions. It varies between 0 when women and men fare equally and 1, where one gender fares as poorly as possible in all measured dimensions.

Marsabit County has a GII of 0.693 compared to the national average of 0.622. Of the neighbouring counties, only Wajir ranks behind Marsabit at 0.732 while Isiolo has a GII of 0.640 and Mandera 0.686. Although Marsabit County GII is low, it is noted that the same trend is witnessed in all the counties in Kenya. Despite the fact that women represent 51 per cent of the Kenyan population, their representation in post-primary education, wage employment, enterprise ownership, and decision making is limited. They are adversely affected by such factors as traditional and social practices, as well as poverty and domestic violence, among other challenges. Improving women's profiles in all sectors and reducing gender disparities will not only benefit women but also men, children, the poor, and the rich. This will also enhance women's empowerment and contribute to sustainable economic growth and reduce poverty and social injustices.

4.5 EMERGING CONCERNS AND TRENDS

4.5.1 Low economic productivity and vulnerability to poverty

On account of the harsh ecology imposed by both aridity and rocky stratum, mobile pastoralism is the only means to livelihood currently supportable by the local ecology. However, going by analysis in Table 4.1 below, this harsh ecology imposes huge limitations to the productivity of this livelihood system. Thus, the carrying capacity (Table 4.2) limits the entire North Horr Location of 7,723ha to a paltry pa capita livestock holding of 1.38 TLU⁴ for the 5177 people resident and only for between 65 to 139 days for diverse stock in the 1st rains.

⁴ The TLUs help to quantify the different livestock types in a standardized manner. Under resource driven grazing conditions, the average feed intake among species is quite similar, about 1.25 times the maintenance requirements (1 for maintenance, and 0.25 for production; i.e., growth, reproduction, milk). Metabolic weight is thus considered the best unit for aggregating animals from different species, whether for the total amount of feed consumed, manure produced, or product produced. The standard used for one tropical livestock unit is one cow with a body weight of 250 kg (Heady 1975), so that 1 TLU = 1 head of cattle, 0.7 of a camel, or 10 sheep or goats

Table 4.2: Analysis of pa capita livestock holding for North Horr Location

Livestock type	Ist rains stocking density Ha/TLU	Max days	Total stocking per ha in 1st rains	Equivalent population for 2239 ha (31% available)	Pa capita stocking (pop of 5177)	Pa capital TLU
Cattle	1	65	1	2239	0.43	0.43
Sheep	1,8	85	8	17912	3.46	0.45
Goats	5.4	115	8	17912	3.46	0.45
Camels:	6.1	139	0.2	447.8	0.09	0.05
Total holdings (TLU)						1.38

Towards better understanding of the dimensions of poverty amongst pastoral households, and towards providing a basis for targeting interventions, poverty occurrence has been disaggregated based on application of an asset poverty line^{5,6} whereby, a pa capita asset threshold of 4.5+TLU is applied to delineate between better-off and poor pastoral households (Fig 4.5). Here, the asset poverty line is simply the level of assets that predicts a level of well-being equal to the poverty line. Assuming that the livelihood function does not change overtime, a household is stochastically poor if it records income below the poverty line in spite of commanding assets that can marshal the same. Conversely, the household is structurally poor if its stock of assets and corresponding income fall below both the asset poverty line. Combining both asset and income poverty measures produces four classifications: (i) the structurally poor (income poor and asset poor), (ii) the stochastically poor (income poor but asset nonpoor), (iii) the stochastically nonpoor (income nonpoor but asset poor), and (iv) the structurally nonpoor (income nonpoor and asset nonpoor) (Paxton 2013).

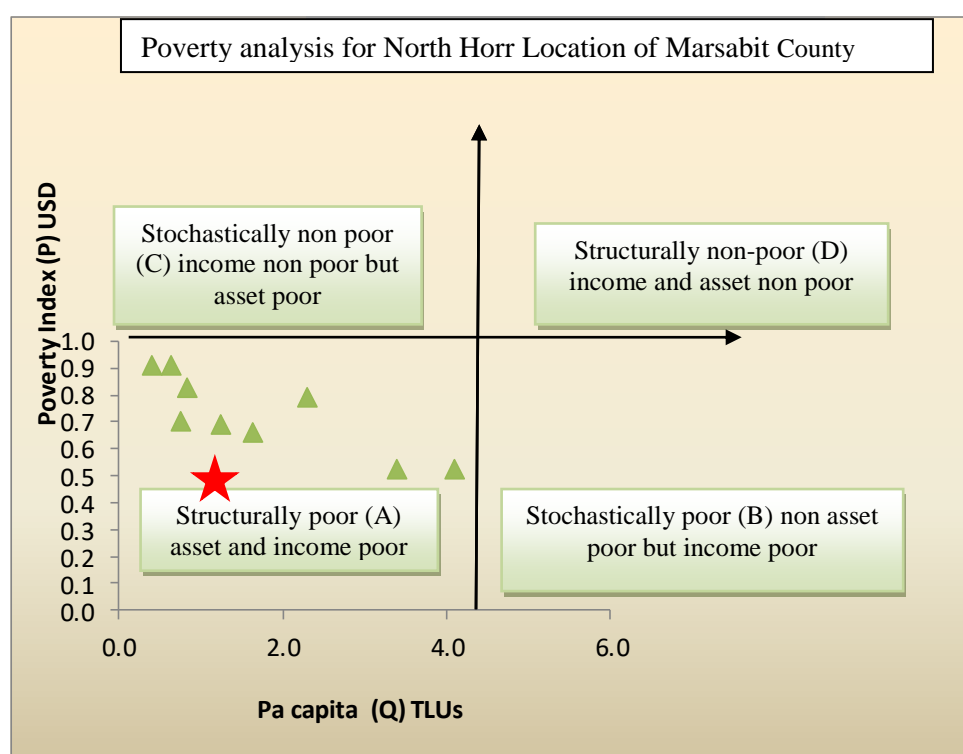


Fig 4.5: Disaggregated Poverty for North Horr Pastoralists showing the high level of structural and income poverty.

⁵ Carter, M.R. & Barrett, C.B. (2006). The economics of poverty traps and persistent poverty: An asset-based approach. *Journal of Development Studies*, 42(2), pp. 178–199.

⁶ Little, P., McPeak, J., Barrett, C. & Kristjanson, P. (2008). Challenging orthodoxies: Understanding pastoral poverty in East Africa. *Development and Change*, 39(4), pp. 585– 609

Movement from **D** to **A** reflects a structural transition to below the poverty line because of a loss of or decreased returns on assets that causes income to fall this low. In general, movement in the opposite direction (from **A** to **D**) represents a structural shift out of poverty, possibly because of either an accumulation of assets or improved returns on the household's existing assets (Carter and Barrett, 2006; Barrett et al., 2006). More specifically, households with livestock below the 4.5+TLU level are unable to escape poverty even during good times when grazing pastures are adequate.

Application of this analysis to the North Horr area based on per capita TLUs alone (Fig 4.5), reveals that, pastoral income levels and livestock holdings are below both the Income Poverty Line (1 US dollar per day) and the Asset Poverty Threshold of 4.5TLU. Essentially, households within the Project Road traverse are both asset and income poor. This agrees with recent findings in Marsabit County which documented majority of households surveyed to be structurally poor with the proportion rising from 66.8% in 2009 to 69.3% in 2013 primarily through loss of assets thus supporting the general observation that, within the pastoral belt of Kenya poverty is on the increase.



Plate 4.8: The fragile ASAL ecology has finite production capacity

Alongside other ASALs, the North Horr road transect has some of the lowest development indicators and the highest incidence of poverty in Kenya; poverty levels of more than 60 per cent for the general population are not unusual, and can be as high as 90 per cent. Livelihoods are undermined by unfavorable market conditions, inadequate infrastructure, limited access to services such as animal health, and a poorly developed financial sector. Ongoing and proposed projects to open up the area up to Darathe and link the same to the Great North Road through Marsabit will be strategic in underpinning economic production.

4.5.2 Vulnerability to drought, famines and escalating poverty

Drought is the single most important natural hazard in Kenya. It shatters livelihoods and causes hunger, nutrition-related disease, and even death. Droughts may lead to a decline in food production, affect the migratory patterns of pastoralists, exacerbate resource-based conflict, and cause substantial loss of assets, triggering acute food insecurity among vulnerable households and placing a heavy strain on both the local and national economies. Drought emergencies also have significant social impacts – on gender roles, on young people's prospects (when children are withdrawn from school, for example), on customary support systems, on the incidence of conflict, and on inequality (since the poorest have least capacity to recover, leading to a downward spiral of vulnerability).

Between 1975 and 2011 there were at least ten serious droughts, three of them in the last seven years (2005-6, 2008-9 and 2010-11). The number of people affected by repeated drought emergencies appears to be rising. According to the inter-agency Kenya Food Security Steering Group (KFSSG) an estimated 4.5 million people were affected in 2011, 3.8 million in arid and semi-arid lands (ASALs) and 700,000 in non-ASAL areas. Droughts are a national concern and affect the whole of Kenya, either directly or indirectly. As well as their direct impacts on the economy, they affect the linkages between different sub-economies, ecologies and communities. For example, there may be structural problems of overproduction in one area which could compensate for under-production in another if infrastructure were improved.

Drought is recognized as one of the biggest threats to the achievement of Kenya Vision 2030 (a long-term road map which elaborates pathway to transformation), causing substantial losses and suffering in drought-prone areas and undermining economic growth. The most vulnerable people in the ASALs have been dependent on relief assistance from the World Food Programme and the Government of Kenya for several decades. The government recognises that emergency food aid is needed to save lives in times of crisis. Of late, the focus has been on building community resilience for sustainability, and improving the enabling environment in order to attract investment and promote sustainable growth and development. Moreover, humanitarian assistance, when required, can be provided in ways that support the local economy, for example by substituting food with cash vouchers channelled through financial institutions.

4.5.3 Distressing trends in wildlife numbers

Following observations that wildlife is no longer frequent within the traverse of the North Horr JN – Daratthe Road, an attempt was made to explain this scenario mainly through review of available reports and documents (The National Wildlife Conservation Status Report 2015-2017; The Wildlife Migratory and Dispersal Areas Ojwang, G. et. al, 2017)). It soon emerged that recent studies have confirmed drastic declines in both wildlife populations and dispersal ranges including those specific to the North Horr JN-Daratthe Road traverse area. Two cases namely that of the Gravy's Zebra and Giraffe best illustrate this scenario. While both species used to frequent the traverse area either as an important area, dispersal area of core area, the same is not the case in the year 2000s where none of the species was cited in the area (Plates 4.8 a,b.c. and d).

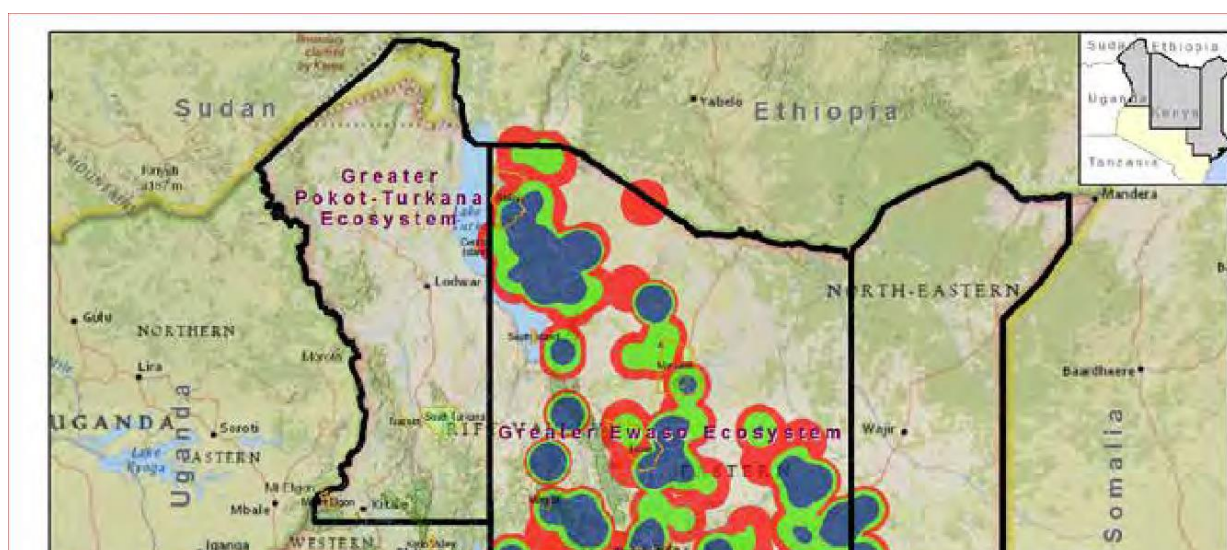




Plate 4.8 (a): The natural range of Gravvy Zebra in 1970

Among the reasons cited for the disappearing wildlife is poaching from across the northern international boundary and conflict with livestock over watering and forage resources. Resource-based conflict between people and wildlife is common in Kenya where 90 per cent of wildlife is found in the ASALs, with 75 per cent residing outside the designated national reserves and game parks.

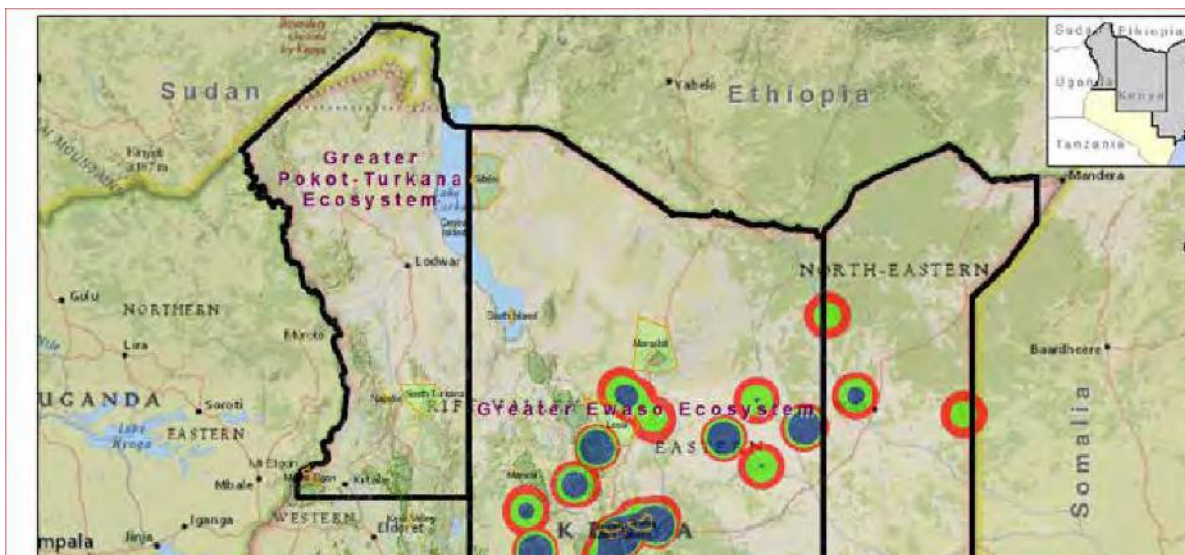


Plate 4.8 (b): The dissappeared range of Gravvy Zebra in year 2000.

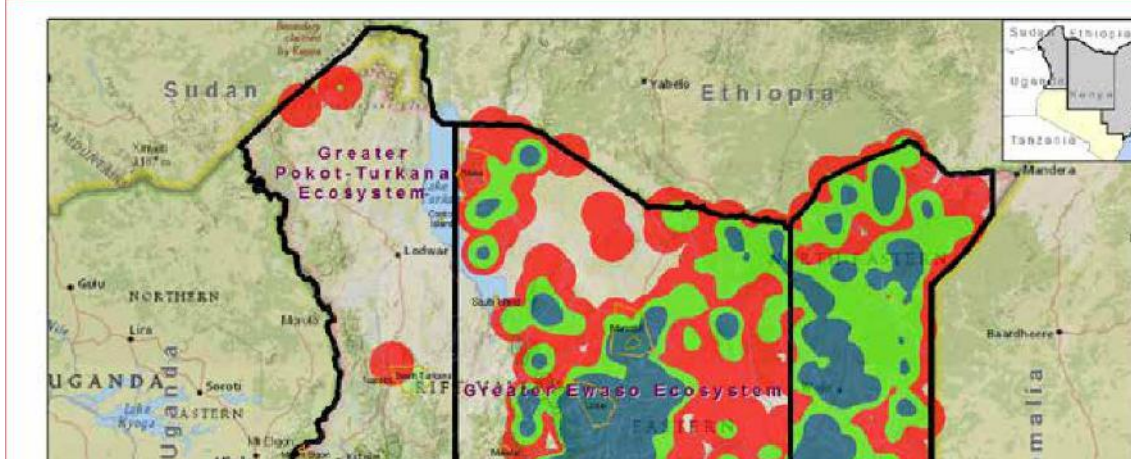


Plate 4.8 (c): The natural range of the Giraffe in 1970

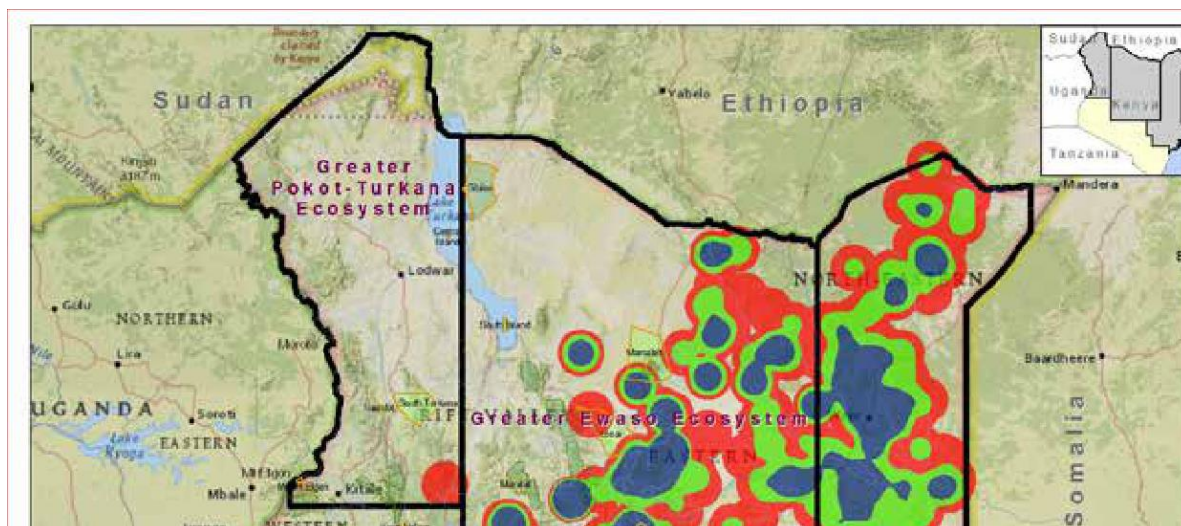


Plate 4.8(d): The disappeared range of the Giraffe in year 2000.

4.5.4 The factor of insecurity

From discussion with local administration, it emerged that areas adjacent to the transect are occasionally prone conflict centered on boundaries and control of resources; mainly water and pastures for livestock. Within that perspective construction a road within the domicile area for one of the protagonist groups may be viewed as favoritism and thus lead to heightening of tensions.

4.6 THE FACTOR OF CLIMATE CHANGE

4.6.1: The Concern and Trends

Climate Change is currently appreciated as critical threat to national economies and human survival itself with the most at risk population being the poor populations. Kenya experiences various climate and weather extremes including prolonged droughts; frost in some of the productive agricultural areas; hailstorms; extreme flooding leading to fluctuating lake levels; and drying of rivers and wetlands. These extremes can lead to large economic losses and adversely impact food security. A review of historical climate trends shows that the East African region is highly vulnerable to the impacts of climate change. The region has suffered prolonged droughts in 1983/84, 1991/92, 1995/96, 2004/2005 and the La Nina-related drought of 1999/2001, with major impacts on the economy and food security. The severe occurrence of drought experienced in the region in 2009-11 had extreme effects on approximately 12.4 million people, and resulted to degradation of dryland ecosystems. Similarly, the El Niño-related floods of 1997/98 had devastating effects on road infrastructure, human settlements, agricultural production and health impacts related to cholera and highland malaria among 21 others.

Notably, Kenya experiences major droughts every decade and minor ones every three to four years, which have led to significant crop failures and higher food prices.

At the other extreme, Kenya also experiences severe riverine and flash flooding, particularly during the rainy seasons. Both lead to devastating impacts on lives, livelihoods and infrastructure. Year to year variability of Kenya's climate is notably driven by the cyclical nature of ocean phenomena such as the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). El Niño years are generally wetter than average in Kenya, bringing more flooding, while La Niña years are drier and can prolong drought events. The positive IOD has been linked to increased rainfall and severe flooding, such as occurred in 2019 while a negative IOD leads to drier than usual conditions.

Climate change impacts are predicted to be particularly pronounced in ASALs which, in spite of hosting 38% of the population, and produce 12% of GDP, the economy and livelihoods are highly dependent on climate-sensitive activities, such as pastoralism and rainfed cultivation. Analysis of climate trends in Kenya's Arid and Semi-Arid (ASAL) areas shows an increase in temperature and a decrease in rainfall between 1977 and 2014. Droughts, floods, livestock diseases and armed conflicts are wiping out livelihoods of ASAL Communities, and poverty rates remain above 80%, despite overall decreasing national poverty rates, thus underscoring the need for Kenya to help its poorest population adapt by developing sustainable ways of making a living in the drylands.

Impact of Climate Change on Food Security: Kenya's Global Hunger Index Score is 23.7 which places it in the lower end of the 'serious' category (GHI 2020). The risk of food insecurity, and under-nutrition, is highly likely to increase due to higher temperatures, land and water scarcity, flooding, drought and displacement, which combined will negatively impact agricultural. Since 2015, there has been an increase in the percentage of the population who lack the adequate consumption of calories, which has coincided with the 2016–2017 drought that affected the Horn of Africa and caused significant drops in agricultural production and subsequent spikes in food prices. Food security Kenya – in which 80 per cent of the land is either arid or semi-arid – is one of the most drought-prone countries in the world. During droughts, agriculture is the first sector to be affected and is also the one that absorbs the greatest impact as 95 per cent of crops are rainfed. A decrease in agricultural production has ramifications on food prices, and can exacerbate food insecurity and under-nutrition for both rural and urban populations (especially the urban poor). Projected future climate change scenarios show up to a 69 per cent decline in crop yields by the year 2100 (affecting maize production most acutely), which will significantly affect food security. More than 50 per cent of smallholder rural producers in Kenya also have to buy staple food such as grains and, as such, they are sensitive to food spikes. The following groups are most vulnerable to under nutrition due to climate change:

- Pastoralist communities in arid or semi-arid northern counties who have high rates of poverty face some of the highest prevalence of wasting (a sign of acute malnutrition). Nationwide, the prevalence of wasting is currently at 26 per cent and stunting at 4 per cent.
- Women face an increased risk of micronutrient deficiency during pregnancy. Female-headed households, in particular, are highly vulnerable to the loss of subsistence crops and food spikes as they tend to have fewer.
- Poor communities: those living in both rural and urban settings are vulnerable to food price spikes as well as illnesses and diseases due to a lack of adequate water, sanitation and hygiene, leading to a high prevalence of stunting (a sign of chronic undernutrition).
- Children under five years old: Under-nutrition and its lifelong consequences (reduced mental and physical development) disproportionately impact children under the age of five. In addition: the educational attainment of children's mothers is associated with the prevalence of stunting; the "stunting rate of children whose mothers have had no formal education was 31 per cent, while that of children whose mothers have had secondary education or higher was just 17 per cent" (KNBS et al. 2015).
- Children's nutrition is also associated with mothers' nutritional status – there is a positive correlation between the mother's nutritional status and that of her child.

Impact of Climate Change on Water supply and sanitation, Water borne diseases: Climate change exacerbates the challenges of accessing safe drinking water for most people in rural areas, and especially those in arid and semi-arid regions. A health survey in 2014 indicated that only 59 per cent of households in rural Kenya have access to improved water sources, and only 10 per cent have a place to wash their hands with soap. Groundwater sources are being depleted as a result of urbanization and population growth. The lack of a sufficient and consistent water supply by service providers in Kenya has forced Kenyans to resort to private groundwater supplies in many urban and

rural areas. Diarrhoeal diseases account for 15 per cent of morbidity in children under five years old and is a compound risk as it is linked with malnutrition and potentially lifelong consequences. Climate change is projected to contribute to 9.1 per cent of 13,800 diarrhoeal deaths in children under 15 years old in 2030 and, by 2050, to contribute to 13 per cent of diarrhoeal deaths (WHO 2015). Communities living in coastal regions have historically been particularly affected by diarrhoeal cases after massive flooding (e.g. during the 1997/98 El Niño, more than 15,000 cases were reported in the coastal region that experienced massive flooding compared to Nairobi which recorded only 250 cases. Cholera is a specific type of acute and deadly diarrhoeal disease. Outbreaks in Kenya have been increasing since 2007 and are significantly associated with floods events linked to El Niño.

Increased propensity to ethnic strives: Cross-border and cross-county conflict can be exacerbated by climate change. As temperatures rise and rainfall patterns change, some areas become less conducive for livestock, particularly cattle, leading to a reduction in herd numbers. Those counties with favourable conditions, such as Laikipia, could enter into resource use conflicts as pastoralists from other counties move their animals to water and better pasture conditions. Cross border conflicts could increase with other countries, such as Ethiopia and Tanzania, as pastoralists compete for food, water and grazing lands. There is evidence of migration linked to climate change in Kenya, mainly because vulnerable groups are reliant on resource-based livelihoods. Reduced agricultural productivity is a main force behind rural-urban migration and settling in risk-prone areas and informal settlements. Resource scarcity, which often intermingles with historical land conflicts, can lead to displacement. Floods, droughts, and landslides also contribute to movement of people. Vulnerable groups include remote and pastoralist communities, hunters and gatherers, and fisher communities that are affected by climate change because of environmental degradation and growing competition for land and water. Persons with disabilities, children and the elderly are vulnerable because of potential impacts on health and their more limited mobility. Women are vulnerable to climate change. Their role as primary caregivers and providers of food and fuel makes them more vulnerable when flooding and drought occur. Drought compromises hygiene for girls and women as the little water available is used for drinking and cooking, and has a negative effect on women's time management in the household. When nearby wells and waters sources run dry, women have to travel long distances to search for water. Longer dry seasons mean that women work harder to feed and care for their families. In both urban and rural areas, women have multiple demands in the home, workplace and community that leave less time for political involvement and active participation in decision making processes. Women in traditional communities may be subject to cultural beliefs that deny equal opportunities and rights. Women are more likely to experience poverty, less likely to own land and have less socioeconomic power than men. This makes it difficult to recover from climate disasters that affect infrastructure, jobs and housing.

4.6.2: The National Adaptation Strategies

In November 2015, Kenya adopted a National Adaptation Plan (NAP 2015-2030) to guide adaptation and demonstrates a strong commitment to operationalize the National Climate Change Action Plan (NCCAP 2013-2017). The NAP identifies and prioritizes actions in 20 planning sectors for the short, medium and long term.

The Plan NAP 2018-2023 sets out initiatives that foster movement towards the achievement of Kenya's Nationally Determined Contribution (NDC), under the Paris Agreement, aiming at (i) greenhouse gas emission reductions of 30% by 2030; (ii) mainstreaming of climate change adaptation into the Government's planning processes; and (iii) implementation of adaptation actions.

Main objectives of the Plan for each area are (i) reduce risks that result from climate-related disasters, such as droughts and floods, to communities and infrastructure; (ii) increase food and nutrition security through enhanced productivity and resilience of the agricultural systems, in as low-carbon a manner as possible; (iii) enhance the resilience of the water sector by ensuring access to, and efficient

use of water for agriculture, manufacturing, domestic, wildlife, and other uses; (iv) increase forest cover to 10% of total land area, increase the resilience of the wildlife and tourism sectors, and rehabilitate degraded lands, including range lands; (v) reduce incidences of malaria and other diseases that are projected to increase because of climate change, encourage climate-resilient solid waste management, and promote climate resilient buildings and settlements; (vi) improve energy and resource efficiency in the manufacturing sector; and (vii) climate-proof energy and transport infrastructure, promote renewable energy development, increase the uptake of clean cooking solutions, and develop sustainable transport systems.

To help eliminate hunger and food insecurity, the Plan focuses on (i) implementation of Climate Smart Agriculture to improve crop productivity - together with an improved irrigation system - productivity in the livestock sector, and productivity in the fisheries; and (ii) food and nutritional supplements, such as school feeding programs.

To achieve resilience of livelihoods to disasters the Government needs to (i) improve ability to cope with droughts and floods through early warning systems, and water harvesting and storage; (ii) increase expertise to customize and manage satellite-generated vegetation condition index used for drought early warning and response; (iii) implement integrated flood management plans, for example, water storage, drainage networks, reforestation and rehabilitation of riparian areas, construction of dams, and land use restrictions; (iv) diversify livelihoods to adjust to a changing climate; (v) improve resilience of coastal communities; (vi) promote climate proof landfill sites; (vii) increase generation capacity for captive renewable energy and climate proofed energy infrastructure; (viii) develop an affordable, safe and efficient public transport; (ix) encourage low-carbon technologies in the aviation and maritime sectors; and (x) a climate proof transportation infrastructure.

As such, the National Adaptation Plan (NAP) reiterates a commitment to low carbon and climate resilient development which mitigates the impacts of climate change on “climate sensitive sectors” such as agriculture, tourism, energy and health (Ministry of Environment and Natural Resources 2016). The aim of this NAP is to consolidate the country’s vision on adaptation supported by macro-level adaptation actions that relate with the economic sectors and county level vulnerabilities to enhance long term resilience and adaptive capacity. This NAP presents adaptation actions that cover the time frame 2015-2030.

Impact of Climate Change on Infrastructure:

4.7: THE SYNOPSIS

The baseline characterization provided in sections above served to map the scenario pre-existing the proposed upgrading of the 108 Km long North Horr JN-Darathe Road project as a background against which impact prediction will be undertaken. Going forward, major concerns have emerged as follows:

-

- h) Incidence of high levels of poverty occasioned by low economic production imposed by both aridity and barrenness of the soil
- i) Huge paucity of surface and groundwater resources
- j) Lack of viable alternative means to livelihood
- k) High vulnerability to droughts and escalation of poverty
- l) Occurrence of sensitive natural resources mainly the Sibiloi National Park and its Koobi Fora beds.
- m) The factor of insecurity
- n) The disappearing Wildlife

CHAPTER FIVE: STAKEHOLDER CONSULTATIONS

5.1 APPROACH TO STAKEHOLDER CONSULTATIONS

It is a mandatory requirement under Legal Notice of 101 of EMCA 1999 for all environmental assessment process in Kenya to incorporate Public Consultation. The aim is to ensure that all stakeholder interests are identified and incorporated in project development, implementation and operation. Of necessity, stakeholder consultations should take place alongside project design and implementation to ensure that the project puts in place measures to cater for stakeholder concerns in all project phases. In case of the proposed upgrading of the North Horr Jn Ndarathe (A4), public consultations followed several steps as follows: -

5.1.1 Briefing by the Client

The Consultants received the Terms of Reference (ToR) from the Client. The ToR contains the various stages of design and the Consultants obligations. The Consultants is expected to keep a close liaison with the General Manager (Design & Construction) for all deliverables.

5.1.2 Identification of other stakeholders

The proposed road upgrading project will require land acquisition. Of necessity, numerous people are likely to be affected by the project and are therefore bonafide stakeholders demarcated by the decision to follow the proposed route of traverse. The same were identified and approached for discussion of their concerns, apprehension and wishes in respect of the proposed road project.

This study also identified a second category of stakeholders comprised of GoK officers in charge of diverse sectors, which are likely to be impacted by the project. This category was also consulted as key informants on sectoral policy and to advise this EIA study on mitigation measures to be put in place so as to minimize adverse impacts in respective sectors.

5.2 MODALITIES FOR STAKEHOLDER CONSULTATION

Each category of stakeholders called for a different approach to consultation.

5.2.1 Consultation with Project Affected People

Consultation with roadside neighbours and other primary stakeholders mainly took the form of public barazas arranged by respective chief. The primary stakeholders were mostly residents of the North Horr, El Beso and Darathe settlements within and around the neighbourhood along the proposed road. These are the stakeholders who by virtue of their proximity/ association with the project site are likely to be directly affected, positively or negatively, by the project. Effort was made to access and collate their views/ concerns regarding the proposed development. A total of 3 barazas were held with residents in various settlements giving their opinions on the proposed project. These being largely a low population density rural traverse, the discussions with some of the residents centred on the environmental, social and economic impacts of the proposed project to the area and the surroundings too.

5.2.2 Consultations with Secondary Stakeholders

Under this category, a cross section of stakeholders was met and these included; civil servants, local government officials and the local residents. Consultations took place in respective offices and in the field where possible. Consultations were made either with individual officers or in Focus Group Discussions involving several officers in a group. For this category of stakeholders, a semi-structured questionnaire providing for the Institution, name and designation of officer consulted, issues raised and signed feedback was used to guide the discussions. Discussions started with the consultant team

explaining the project to the target officer following which, they were asked to identify their fundamental concerns on the same. After discussion, the officers were requested to fill and sign the form administered by the consultant in a system that was deemed useful and as a strategy to cut down on paperwork while capturing and documenting for future reference-the signed comments of target informants. In this category, stakeholders were identified and approached as summarized in table 5.1 below. -

Table 5.1: List of Secondary stakeholders consulted

Stakeholder	Stake in the project	Remarks
Ministry of Interior and Coordination of Government Business	DCC and his staff have administrative mandate over the traverse area	See Table 5.3 below
Kenya Wildlife Service	Presence and status of wildlife in the corridor	Interviews were held over the phone
Turkana Basin Institute-Dr. Richard Leakey	Presence or otherwise of Koobi Fora beds within the traverse	A visit was made to Late Dr Leakey at Karen. He advised that though Koobi Fora do not occur along traverse, his team should be contacted before any major excavations.
National Museums of Kenya	Presence or otherwise of Koobi Fora beds within the traverse	A visit was made to the NMK offices in Nairobi with phone calls to the Curator of Sibiloi National Park
NEMA	To link the study to the NEMA County Office and obtain information on pre-existing environmental concerns	One meeting was held at Marsabit NEMA Office.
County Government of Marsabit	Have planning Jurisdiction over traverse area	A meeting was held with the County Surveyor
WRA	Have regulatory authority over water resources in the County	One meeting held in Marsabit Town
Kenya Forest Service	Have control over flora within the country	The Ecosystem Conservator at Marsabit was met.

5.2.3 Indirect consultations

Numerous individuals and institutions previously played diverse roles in the formulation and design of the power road and though it was not possible to make direct contacts with them, the same was achieved through study and review of outputs left behind in form of reports. Thus, considerable time input was devoted to review of project documents towards preparation of this Environmental and Social Impact Assessment report.

5.3 OUTCOME OF THE STAKEHOLDER CONSULTATIONS

5.3.1 General outcomes

In total, 14 meetings were held in which, 194 people were met. Through liaison with the local Provincial Administration, times and venues were selected for which to hold a public baraza. This was to enable as many local residents as possible to participate in the discussions involving the roads project. Attendance lists and minutes of the proceedings of the public barazas are provided in Appendix 5.1 with summary of the key issues being highlighted below.

5.3.2 Specific concerns from local residents:

The key findings were as follows: -

- (i) Role of Project in Supporting GoK Policies: Though discussions with stakeholders in Government, it was clarified that GoK is committed to creating an environment favourable for attaining sustainable development in line with Vision 2030 and County Development Goals.
- (ii) Potential to trigger conflict: The proposed road is starting and ending within the territory of one community and not extending to Ileret occupied by a protagonist community. Caution is needed in explain the project formulation to tone down incidence of conflict.
- (iii) Courtesy and Public support for the project: In all the public barazas and public consultations held, the project enjoys overwhelming public support. No opposition ever was encountered during the field survey. There was a general consensus that this project has been longed for in many years.
- (iv) Potential for increased economic activities: Improvement of the road to Ndarathe will be a great boost especially for the livestock market. The construction of the road will also assist the local community to access to cheaper commodities and also access to government services.
- (v) Land Acquisition and compensation: Matters pertaining to land acquisition and compensation were a major focus and of great concern to the local residents, and hence considered to be very critical. The whole community should be involved in discussions for acquisition of community land for the road construction not hand picking few individuals to be involved in the discussions.

Local expectations are that, adequate compensation for land and property that are likely to be taken up in event that the roads reserves encroach or diverts into property. The fear from the community is that if adequate compensation is not granted, then this would leave them poorer against the wishes of poverty eradication. The awareness was brought to the fact that valuation will be done based on current market rates, and that KeNHA is committed to making payments in order to fulfil its obligations. However, on close observation, the proposed development is on designated road reserve, hence there will be almost nil land acquisition, save for the areas where some few individuals have encroached in the road reserve and especially in market centres. As for the width of the road, the residents were keen to physically see how this would impact on their property. In a number of instances, this was demonstrated during the public barazas.

Table 5.2: Summary record of meetings

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
1.	Leaders Meeting	1 st Dec ,2021 Down Town Hall, North-Horr	Community Leaders from North Horr Town	33	9	42	<ul style="list-style-type: none"> The land within North Horr Division is communally owned apart from land within the town centres i.e. North Horr and the Elbeso Market. The whole community should be involved in discussions for acquisition of community land for the road construction not hand picking few individuals to be involved in the discussions. Water pans and burrow pits dug during road construction will be a safety hazard if left unsecured after road has been completed.
2.	Public Consultation Meeting	Elbeso Market 30 th November,2021	Community Members from the Elbeso Area.	38	22	60	<ul style="list-style-type: none"> The community would prefer in kind compensation for communally owned land such as construction of schools, hospitals, dispensaries and wells.
3.	Public Participation Meeting	Ndarathe Watering Hole 2 nd December 2021	Community Members from Darade Area.	26	0	26	<ul style="list-style-type: none"> Improvement of the road to Darade will be a great boost especially for the livestock market. The construction of the road will also assist the local community to access to cheaper commodities and also access to government services.
4.	Focus Group Discussion	Elbeso Market 3 rd December, 2021	Women from the Elbeso Community	54	0	54	<ul style="list-style-type: none"> Women should also be involved in the

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
	Meeting						construction of the road.
5.	Key Informant Interview	5 th November 2022, ACC's Office-North Horr	Interior Omingo Oluoch ACC North Horr Franco Kazungu D/OCS North Horr	2	0	2	<ul style="list-style-type: none"> • North Horr Sub County has 2 divisions, North Horr and Ileret. North Horr division has three locations include:- North Horr, Malabot and Balesa. The road traverses only through North Horr location. • North Horr is mainly occupied by the Gabra community with some few Borana and Somali communities while Darade to Ileret is occupied by the Dasanach community all the way to the Ethiopian border. • The land traversed by the project is mostly communally owned. • Inter community conflict between Gabra and the Dasanach community often arises due to seizing of grazing land and watering points • Ileret is a division / location with four sub-locations and has a higher population growth rates as compared to North Horr. • Conflict along the Ileret Darade border caused by water, pasture and community borders. • Building the road up to Darade excluding Ileret will escalate the already existing tension.

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
							<ul style="list-style-type: none"> • High consignment of fish from Ileret to Busia and extending the road up to Ndarathe will not assist the fish trade. • The road should extend to Ileret at the Kenya-Ethiopia border. • The road will improve security as Law enforcers will move faster to respond to emergencies and restore peace.
6.	Key Informant Interview	29th November 2022 County Commissioners Office- Marsabit County	Martin Buluma ASS. County Commissioner	1	0	1	<ul style="list-style-type: none"> • Security: The highly insecure area is from North Horr to Ndarathe where most incidents originate from the urban centres trickling down to the rural areas. • Mostly the clashes are between the local communities and rarely interfere with on-going projects. • Will the upgrading of the road help to reduce the clashes?
7.	Key Informant Interview	29th November 2022 County Surveyors Office- Marsabit County	Abdullahi County Surveyor	1	0	1	<ul style="list-style-type: none"> • Land is communally owned by the community in the rural areas. Land in urban areas like North Horr and Maikona is privately owned by individuals • Valuation of land was done by the lands ministry and value index is available in Nairobi
8.	Key Informant Interview	29th November 2022 Kenya Wildlife Services-	John Wambua Assistant Director Northern	1	0	1	<ul style="list-style-type: none"> • Replacement of trees affected during construction. • Riverine forests are

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
		Marsabit County	Region				<p>ecologically rich areas for birds and wildlife</p> <ul style="list-style-type: none"> The road will help response to medical emergencies especially at Sibiloi national park.
9.	Key Informant Interview	29th November 2022 NEMA Marsabit County	Vincent Oloo County Director of Environment	1	0	1	<ul style="list-style-type: none"> Hold public meetings chaired by the DCC for Public disclosure and participation. The site camp, Burrow pits and Boreholes should also have an EIA undertaken and licences submitted NEMA county office. EIA report to be submitted to County office.
10.	Key Informant Interview	29th November 2022 Water Resources Authority Office	Hussein Guyo Sub Regional Manager Benard Simba-Water Right Officer	2	0	2	<ul style="list-style-type: none"> Pollution is high in North Horr since shallow wells and pit latrines are located in the same vicinity. Water quality is good for construction but not fit for human consumption. Bore hole drilled for the purpose of construction should be reverted to the community after the construction. This will encourage settlement. conflicts brought about by water sources are not eminent in the project area but might be a problem past Ndarathe
11.	Key Informant Interview	29th November 2022 Kenya Forest Service, Marsabit Conservancy Office	Abraham Kipchumba. Forest Officer	1	0	1	<ul style="list-style-type: none"> When collecting soils for construction purposes, to avoid areas with invasive tree species like 'Mathenge' so as to

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
							<p>avoid its spread.</p> <ul style="list-style-type: none"> -According to forest conservation Act of 2016 Santalum album (Sandal wood) is an endangered species. The species might be found within the corridor during construction.
12.	Key Informant Interview	1 st December 2021 VSF Veterinaries Sans Frontiers (NGO)	James Nakulo-Field Officer, Marsabit County	1	0	1	<ul style="list-style-type: none"> Construction of the road will improve livestock trade in the county and even inter-country animal trade Road construction will be of great help in quick delivery of veterinary services. Measures to reduce motorists speed should be put in place.
13.	Key Informant Interview	03rd December 2021 Concern Worldwide	Adam Bagajo-North Horr Office Manager	1	0	1	<ul style="list-style-type: none"> The current murram road is used by the communities which trek for long distances to access water watering holes and once it's improved it may interfere with their paths. Provide a reserve on the side of the road to be used by the animals The construction should continue to Limerick to enable to enable concern worldwide give their services there.
14.	Key Informant Interview	03 rd December 2021 Catholic Mission Centre	Father Peter	1	0	1	<ul style="list-style-type: none"> It will improve delivery of government services to the locals. Interaction between communities will improve co-existing

No	Type of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary of Core Issues
				M	F	T	
							and promote peace <ul style="list-style-type: none"> The road will lead to improved amenities schools which will help to reduce level of illiteracy
15.	Focus Group Discussion	Dec 2021	The Turkana Basin Initiative and Leaky family			3	<ul style="list-style-type: none"> Koobi Fore beds are not found within the traverse of proposed road. NMK should however be involved during construction in case of chance finds.

- (vi) Employment: It was the wish of the stakeholders that priority of employment opportunities for skilled, semi-skilled and unskilled labour, be given to the local residents. However, if the local residents do not have adequate or none at all of the skilled labour, then these can be sourced from outside the region. It was agreed that the modalities and quotas for employment for different locations be agreed upon by the local residents, local administration and the contractor.
- (vii) Compatibility with future and existing development: Most areas where the project road passes have existing infrastructure for utilities mainly water and electricity lining up the road. The proposed road project should therefore not undermine the existing infrastructure. Measures of preventing damages will be undertaken during the designing stage in liaison between the surveyor and the design engineers who will identify both on the ground and the plan the points at which electricity poles may need to be relocated. In event that existing infrastructure is damaged, then, the costs of repair will be borne by the contractor.
- (viii) Considerations should also be given on the effects of future extension e.g., water pipeline and any other infrastructure development on the new roads. The designing of the roads should be done so as to provision for extension of utilities in a way that the road will not be damaged.
- (ix) Survey Works: Firstly, the mode of surveying and placement of reference points and beacons was explained to the residents. Effects of survey works being carried out in the area was explained to the local residents. Secondly, survey works will involve mapping out the route for run-off water, where the surveyors have to identify existing utilities and routes through which run-off water will be diverted.
- (x) Long-term sustainability: Many stakeholders are quite clear that the proposed project should not lead to environmental degradation and require that comprehensive assessment of potential impact areas be carried out on material borrow areas, civil works sites, fuel storage/maintenance camps all of which should be reported in standalone reports.
- (xi) Impacts on water resources: The amounts required for the construction of the roads will be substantial. The water to be used will be drawn directly from river sources if the quality allows. However, in all cases, diverse stakeholders under the MW&I have specific requirements pertaining to activities in riparian areas: -

The Water Resource Authority requires that an authorization be procured for any activity including drilling and bridge and roads construction near river channels and banks. WRMA also requires that a Water Permit be obtained before water is abstracted from a natural source.

5.3.3 Way forward with Stakeholder Engagements:

From all consultations, the following can be concluded: -

- i) The proposed upgrading of the road has overwhelming public support and will address long-term felt needs in line with GOK policies for opening up Northern Kenya to economic development.
- ii) Entire location of the road project within North Horr Location which is occupied solely by the Gabra community is likely to send long signals to the community resident in Ileret.
- iii) Environmental impacts of road construction and operation especially when sourcing water for construction remain a major concern. The whole development requires to be sensitized to concerns relating to sensitive resources including possible presence of Koobi For a material.
- iv) Though land is entirely communally owned, whole community should be involved in making decisions towards the same.
- v) Darathe AP camp in current situation presents a hostile working environment for officers serving there. There is need to consider providing more favorable facilities for both accommodation and recreation.

These are the concerns to take forward in Detail Design. However further stakeholder engagement will be undertaken as the project enters the Public Review Period.

CHAPTER SIX: ANALYSIS OF ALTERNATIVES

6.1 OVERVIEW

In sections below, we provide some background to the process that informed formulation of the project in its current design. Notably, the project was subjected to detailed feasibility studies where diverse options were considered leading to identification of the project and choice of technological options as currently proposed. Project alternatives were considered at diverse levels namely; technological options and route of coverage etc out of which, a bitumen class road following the current alignment was selected.

The TOR requires that at most two alternative competing routes with the existing alignment be studied in a bid to come up with the most desirable and the most cost-effective route.

6.2: ALTERNATIVE ROUTES

6.2.1: The Three alternative Routes

The existing road currently linking North Horr and Darathe AP camp junction takes a near direct route but detours to the north from Km 59 to Km 90. This is within a section characterized by a series of rocky ridges and wide valleys. The existing alignment attempts to avoid this undesirable terrain and subsequently substantial quantities of earthworks.

Two possible alternatives were however identified within this section. The identified routes forms more direct and shorter links. This was achieved by applying infraworks route optimization tool from Autodesk usually applied to plan a road's optimal horizontal path based on defined parameters. Thereafter, a physical ground verification exercise on the selected routes was conducted in the month of December 2021.

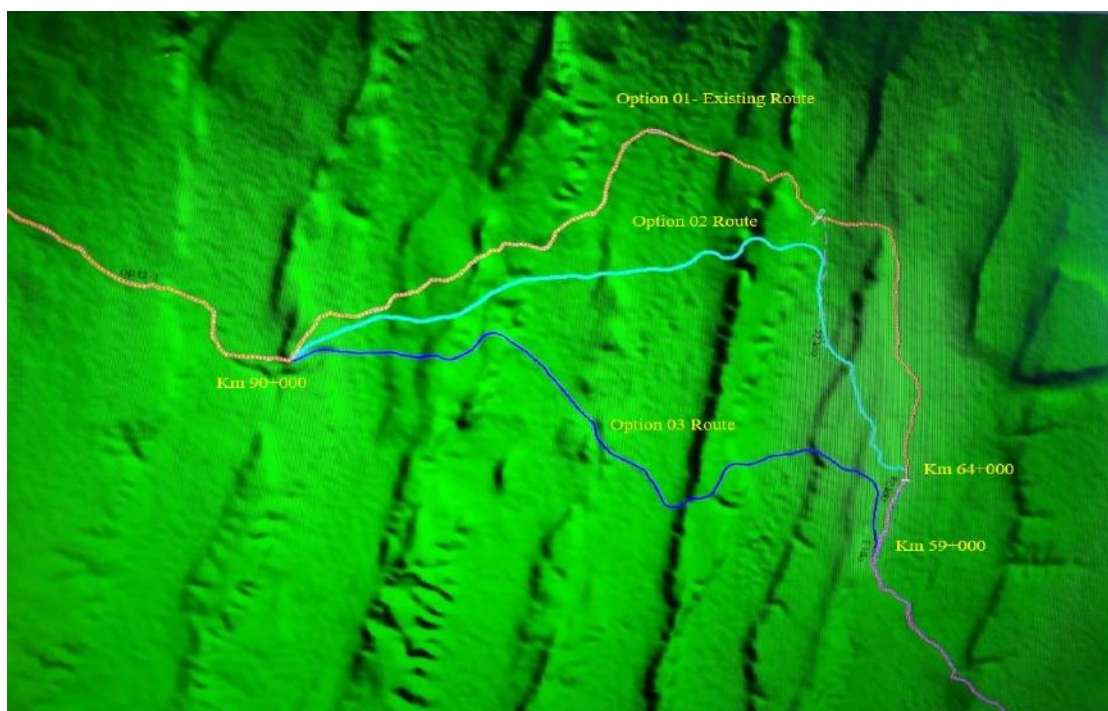


Fig 6-2: Possible Alternative Routes Map

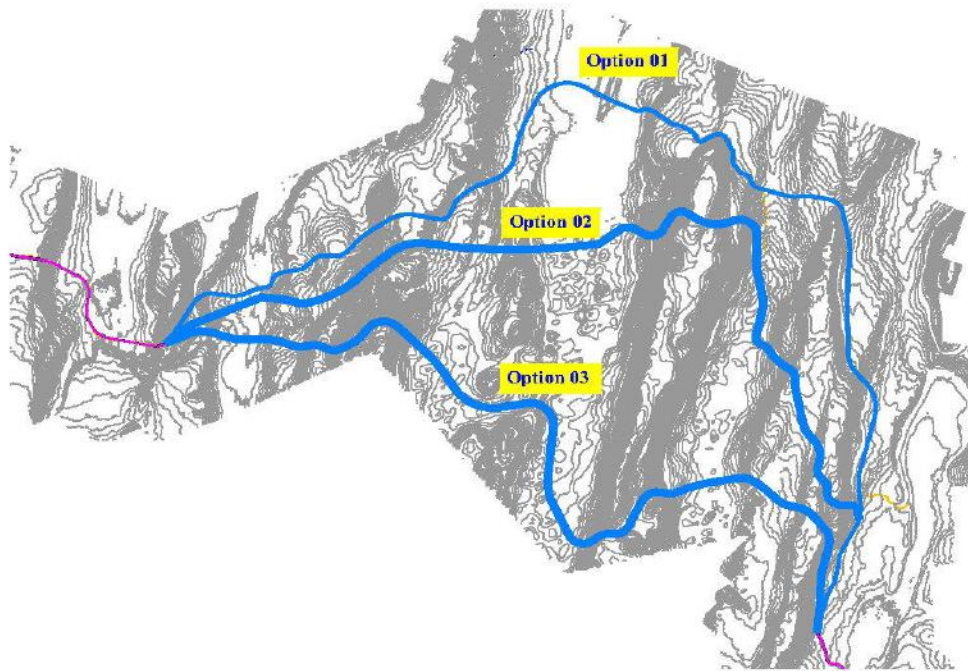


Fig 6-3: Possible Alternative Routes Contours Map

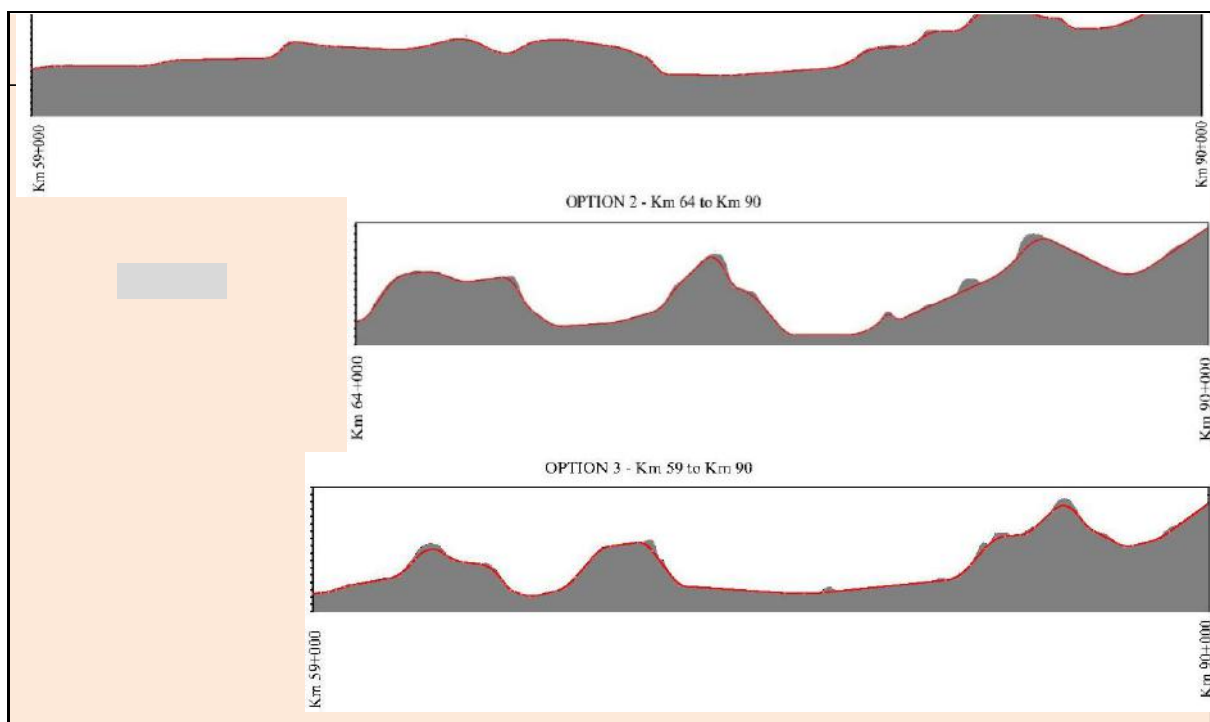


Fig 6-4: Profiles of identified competing routes between Km 59 and Km 90



Fig 6-5: Route Verification Exercise - Part of the proposed Option 02 alignment



Fig 6-6: Route verification exercise along option 3 alignment

For purposes of comparisons, the following parameters were checked and assisted in the prioritization process.

Table 6.5: Tabulation of Route Selection Results

Comparison Matrix-Km 59+000 to Km 90+000 Section															January 2022
Option	Description	Approx. Length(m)	Estimated Earthworks Raw Qties (m³)		Approximated Pavement Raw Qties (m³)			Approx. cost of major work items Kshs.	Geometry at section considered		Climbing Lanes requirement for the section under consideration (m)	Extra Major structures Requirement	Land Acquisition	Environmental and Safety Issues	Comment
			Cut	Fill	AC	Base	Subbase		Hor.	Vert.					
Option 1 Vs Option 2															
1	Follows the the existing Alignment with minor adjustment on the geometry	107	529,824	683,587	15,035	73,224	80,017	1,224,404,580		Max 6.62% Gradient.Satisfie s requirements for rolling terrain pf 7% max. grade	3,220	Control section	Minimal. The road is within KeNHA ROW	Moderate cuts. Maximum of 5.6m deep cut.	Km 64 - Km 90
2	Follows the the existing Alignment from Km 0+000 to Km 64+000 and then detours to take a more direct route through the ridges and reconnects the existing alignment at Km 90+000.	104.21	1,333,716	437,837	13,268	65,265	72,450	1,652,284,850	Satisfies requirement s for rolling terrain	Gradients of 8.94,% and 9.02%, fails to satisfy requirements for rolling terrain	7,178	1No. additional Box	Full acquisition within the section under cosideration	Significant depth of cuts noted of upto 15.0m. Deep cuts are environmentally unfriendly besides being hazardous to people and animals.	
Option 1 Vs Option 3															
1	Follows the the existing Alignment with minor adjustment on the geometry	107	568,132	724,674	17,829	87,040	95,346	1,376,702,440	Satisfies requirement s for rolling terrain	Max 6.62% Gradient.Satisfie s requirements for rolling terrain pf 7% max. grade	3,220	Control section	Minimal. The road is within KeNHA ROW	Moderate cuts. Maximum of 5.6m deep cut.	Km 59 - Km 90
3	Follows the the existing Alignment from Km 0+000 to Km 59+000 and then detours to take a more direct route through the ridges and reconnects the existing alignment at Km 90+000.	98.94	1,131,219	559,030	13,266	64,796	71,290	1,563,307,100	Satisfies requirement s for rolling terrain	Max. gradient of 7.11 % fails to satisfy requirements for rolling terrain	6,885	2No. Additional Boxes	Full acquisition within the section under cosideration	Significant depth of cuts noted of upto 13.2m. Deep cuts are environmentally unfriendly besides being hazardous to people and animals.	

6.2.2: Design parameters applied in contrasting alternative routes

Length:

Length for each route has been determined from developed chainages on individual alignments. The current option is the longest at 103.51 followed by option three while option two tails at 98.24 kilometres. Though these are small differences, maximum being 5.27 Km, they make a difference in terms of cost. Length has a direct link on vehicle operating costs and travelling times.

Earthworks and Pavement quantities

Estimates on the quantities of earthworks as well as pavement materials were determined following a preliminary design conducted on all routes as outlined in Table 6.5 above and summarised below. While option one- the current alignment will require spoil to be borrowed to top up the available fill, the other two options will generate huge spoils that require to be disposed outside of the construction area. This is likely to pose environmental challenges. The huge volume of cut in options 2 and 3 imply that both alignments will traverse very rugged terrain whose cutting is likely to leave behind huge bare surfaces exposed to erosion.

Option	Length (Km)	Volume of Cut (m ³)	Volume of Fill (m ³)	Balances (m ³)	Status
1	107	529,824	683,587	91,987	Deficit to be filled by additional borrowing
2	104.21	1,333,716	437,837	895,879	Has surplus spoil to be disposed elsewhere
3	98.94	1,131,219	559,030	572,189	Has surplus spoil to be disposed elsewhere

Sourcing for construction water: Water consumption in construction is likely to vary with scope of the road. However, given the lack of surface water resources in all traverse routes, the contractor will be required to establish own water sources that will ultimately revert to community use. In that respect, all options stand to benefit the community through provision of water supply and promotion of permanent settlements.

Major Structures required : Catchment characteristics determines the number and sizes of major structures. The characteristics varies from one alignment to the other. These have a direct effect on the cost of each alternative.

Environmental and Safety issues: Based on the terrain, the depth of cuts on some routes was significant with adverse effect on the environment. These high cuts also pose danger to people and livestock. It is worth noting that the communities residing in this area are mainly pastoralists.

Land Acquisition

The two competing routes (options 2 and 3) will require land acquisition in their entirety for the section under consideration while the existing road will only require partial acquisition. Land acquisition can at times attract significant cost escalation on a project.

6.3: Analysis of the No Project Scenario

The No Project Scenario was analysed using both engineering and social criteria as a basis for enhancing justification or otherwise for the proposed intervention. Results are tabulated below.

Table 6.6: Analysis of options

SN	Parameter	Option One	Option Two	Option Three	No Project Option	Reasons
1	Alignment to GOK Policy	Aligned	Aligned	Aligned	Non aligned	No Project Option Contradicts the GOK Agenda for Social integration, Economic Empowerment and Human Development
2	Alignment to Regional Development Agenda	Aligned	Aligned	Aligned	Non aligned	As above for the Region
3	Pressure on Public Finances	Heavy in short term	Heavy in short term	Heavy in short-term	None in short term, heavy long-term costs	Though public resources will not be invested in construction, heavy costs will continually be incurred through loss of lives that don't access necessary services and emergence assistance, continued wastage of national manpower base through non access to education among others.
4	Short-term Impact on water resources	High	High	High	Low	Water will not be consumed in construction
5	Long-term impact on community water supply	High	High	High	None	Boreholes drilled by contractors will revert to community use hence augment local community water supply
6	Short-term pressure on natural resources in road construction	Low	High	Medium	Minimal	Road construction consume huge quantities of stone which will be mined locally
7	Long-term Impacts on natural resources	High	High	High	Low	Road construction will open up the area to development and settlement with attendant huge pressure on the local ecosystem to supply building wood, firewood, charcoal water etc for the settlers.
8	Length of construction (Km)	106.3	104.21	98.94	None	Last option will involve no construction

From analysis tabulated above, it emerges that though the No Project Option entails none investment of public resources and thus saves on both financial and environmental costs, it is very heavy on long-term costs in terms of continued human suffering, failure to meet GOK and International Goals for human development. In so agar as it goes contra to GOK Policy and constitutional obligations, then it merits no further analysis.

6.2.3: Comparison Matrix

The results of the above studies have been tabulated here below.

1.4.14 Conclusion

From the foregoing, the three options were prioritized as follows: -

Table 6.6 - Routes Prioritization

Route	Approximate Length (Km)	Prioritization
Option 01 (Existing Route)	106.30	First
Option 03	98.24	Second
Option 02	103.51	Third

Option 01 route that closely follows the existing road but with minor adjustments on the geometrics is preferred for the following reasons.

1. Most cost effective;
2. Minimum Environmental effects;
3. Safest due to high geometric standards at low cost;
4. Minimal land acquisition and
5. Fewer major drainage structures.

This preliminary design and the report thereto are therefore based on option 01 alignment.

CHAPTER SEVEN: POTENTIAL IMPACTS FROM THE PROJECT

7.1 BACKGROUND

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.

The impacts of the road project during its life cycle stages (construction, operation and decommissioning) can be categorized into: impacts on the biophysical environment; health and safety impacts; and socio-economic impacts. Construction of the proposed road project development is likely to present several environmental impacts. These can be either positive or negative.

7.2 Key Impacts

c) Positive Impacts

The significant positive impacts expected from the design, construction and operation phases include the following and are discussed in the subsequent section:

- Improved local socio-economy
- Improvement to public transport
- Creation of employment
- Increased business opportunities:
- Faster means of transport:
- Cheap / affordable fares
- Easy and fast movement of goods and people
- Interaction of people from different communities
- Growth of towns
- Potential for increased economic activities
- Transfer of skills
- Improved security
- Improved response to emergency services

d) Negative impacts

- Dust generation
- Noise pollution
- Increased Accidents – human and livestock, especially at materials borrow sites
- Impact on water resources
- Waste disposal and spoils
- Loss of vegetation cover
- Road accidents
- Disruption and loss of businesses
- Cultural erosion
- Increase in the spread of STD, HIV and AIDS

Concerns emergent from Baseline documentation and engagement with stakeholders

These were enumerated in chapters four and five above. Basically, concerns centred on: -

- Incidence of high levels of poverty occasioned by low economic production imposed by both aridity and barrenness of the soil
- Huge paucity of surface and groundwater resources
- Lack of viable alternative means to livelihood
- High vulnerability to droughts and escalation of poverty
- Occurrence of sensitive natural resources mainly the Sibiloi National Park and associated Koobi Fora beds.
- The question of degradation of wildlife resources
- The factor of insecurity
- Impacts of land acquisition, among others.

7.3 Summary of Mitigation measures

Construction phase

Environmental effect	Mitigation measure
Legal Compliance	Preparation of a detailed legal register.
Air Quality: Exhaust Emissions	<ul style="list-style-type: none">• Use (where appropriate) catalytic converters;• Use low Sulphur fuel;• ☐ Regular maintenance of engines;• Turn off engines to reduce idling.
Air Quality: Dust Emissions	<ul style="list-style-type: none">• Minimize bare earth;• Minimize movement and speed of vehicles on unsealed surfaces;• Cover vehicle loads of soil / aggregate;• Cover or treat bare earth and stock piles in dry and windy conditions.• Regular cleaning of site access points to prevent build-up of dirt and mud on roads to reduce dust;
Soil Erosion	<ul style="list-style-type: none">• The staging of site clearance activities to minimize the area of exposed ground and the duration of disturbance;• Installation of cut-off ditches or geotextile silt-fences around excavations sites, exposed ground and stockpiles to collect turbid surface water run-off;• Suitable siting and covering or surface treating of stockpiles that are required to stand in place for extended periods of time;• Areas that need to be cleared of vegetation to accommodate construction and roadway development will be minimized and any slopes will be stabilized to prevent erosion - cleared areas will be promptly re-vegetated with native grass and shrubs as soon possible;• Overland drainage will be controlled to prevent channeling and sediment transport by diverting flows away from areas that are exposed;• ☐ Fully contained vehicle wheel wash facilities, where required, to reduce the amount of dirt / mud that may be transported off-site onto the surrounding road network

Water Quality: Spills	<ul style="list-style-type: none"> • The collection, retention and testing of any groundwater resulting from dewatering activities within potential contaminated sites; • Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, including the siting of the storage area away from surface water drains and on an impermeable base with an impermeable containment that has no outflow and is of adequate capacity to contain 100% of the contents; • Secure and separate service bays for machinery with oil and water separators; • Plant and machinery will be kept away from surface waters and will have drip trays installed beneath oil tanks / engines / gearboxes / hydraulics which will be checked and emptied regularly via a licensed waste disposal operator; • Re-fueling and delivery areas will be located away from surface water drains and natural water bodies and courses; • Provision of booms, containment and absorbent material response equipment to respond to contain and clean-up spills; • Provision of spill response training to all relevant construction workforce personnel
Water Quality: Concrete / Cement Products	<ul style="list-style-type: none"> • Mixing and handling of wet concrete will be undertaken in designated areas; • A designated and contained area will be used for washing down plant and /or equipment associated with concrete or cementing processes;
Contaminated Sites	<ul style="list-style-type: none"> • Develop a Contaminated Sites Control Plan for work in any areas that are known to have existing contamination; • The collection, retention and testing of any groundwater resulting from dewatering activities within potential contaminated sites; • Immediate inspection by the environmental monitor of all areas where construction activities disturb new ground to determine whether or not contaminated land is encountered and if there is a potential for contaminants to be mobilized; • In the event that additional contamination is discovered, immediately stop work and implement measures to prevent further disturbance and potential mobilization of contaminants, until the contamination can be treated or removed; • Remediate contaminated soils and groundwater in accordance with the Contaminated Sites Control Plan.
Construction Waste	<ul style="list-style-type: none"> • A minimization / collection / storage / treatment / re-use / disposal strategy for each waste stream in accordance with local requirements; • Develop, under the guidance of a qualified professional, a soil management and disposal program; • Include a strategy for returning packaging waste (containers, plastic wrapping, pallets etc. to their point of origin, if practical) or recycled; • Identify potential third-party re-users and recyclers as per NEMA requirements; • Methods for properly managing (e.g. storing, containerizing, labelling, transporting and disposing) wastes;

	<ul style="list-style-type: none"> • Maintain records of hazardous waste generated/disposed. • <input type="checkbox"/> Minimize the creation of hazardous wastes and must be properly handled/transported and properly disposal off. • Develop safe on-site storage facility that is locked, contained, away from site drainage; • Liaise with the local authorities on suitable dumping site for generated waste. • Maintain detailed records of hazardous wastes material in storage; • Secure legal disposal options and keep chain of custody records; • Provide on-site temporary sanitary facilities; • Arrange for contractors to empty holding tanks on a regular basis and dispose of in local treatment facilities. • Re-use some of the excavated soil wastes for backfilling while the rest to be disposed-off at designated areas. • Dispose of waste in accordance with the NEMA guidelines.
Noise	<ul style="list-style-type: none"> • Hydraulic construction to be used in preference to percussive techniques where practical; • All plant and equipment will be properly maintained, silenced where appropriate and operated to prevent excessive noise and switched off when not in use; • Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the site will be conducted as far as practicable during day time hours; • <input type="checkbox"/> Noise complaints will be immediately investigated.
Public and Employee Safety	<ul style="list-style-type: none"> • Mechanisms for making public announcements (e.g. newspaper / radio) about the construction programme and in particular when public roads will be used by heavy transport vehicles; • Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health and safety due to the construction operation; • Incident recording and reporting protocols; • Emergency contact details in the event of an accident; • Develop and implement an emergency plan including spill response • Train all contractor staff in emergency planning and spill response; • Develop a detailed health and safety plan; • Train all contractor staff on the plan.
HIV/AIDS	<ul style="list-style-type: none"> • Institute prevention programs such as education awareness campaigns, videos, t-shirts showing preventive logos and provision of condoms at affordable prices to local people and workers at large; • Collaboration with the existing NGOs in the area with the local community to alleviate the problem.
Damage to existing infrastructure	<ul style="list-style-type: none"> • Detailed design needs to consult relevant telephone, electricity and water authorities to identify exact paths so as to avoid damage.

7.4 Construction Phase impacts

7.4.1 Positive impacts

7.4.1.1 Employment opportunities

One of the main positive impacts during road construction phase is the availability of employment opportunities especially to casual workers and several other skilled workers such as building and construction engineers. Employment opportunities are of benefit both economically and socially.

Several workers including casual labourers, masons, carpenters, joiners, electricians, and plumbers are expected to work on the site during the construction phase. Apart from casual labour, semi-skilled, unskilled labour and formal employees are also expected to obtain gainful employment during the period of construction. Generally, employment during the construction phase will lead to multidimensional development in the area and in region at large and improve several people's living standards.

Enhancement Measures

- Require the contractor have an employment policy that covers local communities as an affirmative action that ensures marginalized communities, disability groups and gender sensitive groups are not side-lined. The policy should also have security screening measures to confirm originality and conduct of potential employees during recruitment;
- Mixed communication strategies and instruments should be used to effectively relay information on employment opportunities to the community such as local public administration officers' desks, public notice boards as well as public address platforms and gatherings in churches and mosques;
- Furnish relevant authorities (police and other security organs) with details and number individuals working and living at the camp especially immigrant workers; and
- As part of induction, immigrant workers should be encouraged to adhere to the code of conduct, as well as respecting traditions and managing relations with host communities.

7.4.1.2 Provision of market supply for building materials

The project will require supply of large quantities of building materials most, of which will be sourced locally. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

Enhancement Measures

- Local sources of supplies and services should be prioritized, as far as feasible, as a way of boosting local economy and building capacity of local businesses.

7.4.1.3 Knowledge and Skills transfer

Through labour recruitment locally the workers will have an opportunity to learn an array of skills that relate to road construction.

Enhancement Measures

- KeNHA should make deliberate requirements on both appointed contractors and construction supervising consultants to employ and accommodate local people during construction works
- Training of local people (including women and persons with disability) should be designed as part of the project for technology and knowledge/skills transfer. Local institutions such as TVETs and Polytechnics where the project is located should be used for training local workers to be integrated into the project activities.

7.4.1.4 Increased business opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.

7.4.1.5 Improved infrastructure

Project activities will lead to improvement of transport, sewerage, water supply and telecommunication networks. Such services are a prerequisite to development in any region.

7.4.2 Negative impacts

7.4.2.1 Vegetation loss

The project road has been designed to upgrading to bitumen standards. 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. Additional vegetation clearance at quarries and borrow pits, and camping sites will also contribute to overall vegetation loss.

Mitigation Measures

- Restrict vegetation clearing to project sites by clear demarcation of areas to be used;
- Thickets and bush shrubs should be preserved wherever possible through selective clearing, especially along the seasonal riverine areas;
- Siting of camp sites should be done away from densely vegetated areas;
- Compensate for the valuable trees to be felled within the settlements as per the project RAP recommendations;
- Consultations with the local people should be done to ensure that trees with historical, cultural or ornamental values are preserved.
- Beautification using trees that will not damage the infrastructure to maintain the beauty of the trees to be done as part of the project

7.4.2.2 Excessive noise and vibration

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.

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.

Mitigation Measures

- Monitor environmental and occupational noise levels as per the NEMA Environmental Management and Coordination Act (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 & OSHA, 2007 requirements respectively;
- The noise emission characteristics should be considered during selection and mobilization of construction equipment;
- Where feasible, fit equipment with mufflers, sound insulations, silencers to lower the levels of noise emission;
- Sensitize construction workers to switch off machinery and vehicles when not in use;
- Staff on active project sites with continuous exposure should be provided and encouraged to fit in their Personal Protective Equipment (PPEs);
- Locate noisy operations like batching plant away from the densely settled areas;
- Where noisy activities must be undertaken near sensitive receptors, the neighboring occupants must be informed in advance and works limited to day time only.

7.4.2.3 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. 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. Longer term effects on air quality would occur as a result of significantly increased traffic in the area. Increase in road traffic would result in increased daily emissions of carbon monoxide, hydrocarbons, and nitrous oxide.

The adverse effect on regional air quality could thus be substantial when the projected increase in traffic materializes.

Mitigation Measures

- Unnecessary vegetation clearance to be avoided through clear demarcation of construction areas;
- Where practicable, re-vegetate disturbed areas to minimize ground exposure;
- Sprinkling water (at least twice a day) on the accesses and excavated surfaces during the construction period to suppress dust generation within settled areas;
- Limit the speed of construction vehicles (maximum speed limit 40 kph/25 mph) on earth road;
- Provision of appropriate protective personal equipment (PPEs) including respirators and dustcoats to exposed workers;
- Ensuring the location of material stockpiles are away from human settlements and business premises;
- Covering loaded trucks during the transportation of material;
- Maintenance of vehicles and machinery in accordance with the equipment specifications and manufacturer's standards;
- Sensitize workers on best practice on management of air pollution from vehicles and machinery;
- All records on dust-related complaints should be submitted to Resident Engineer for appropriate action;
- Demolition of existing structures shall be done in a manner that the dust from demolitions can be controlled;
- Undertake regular air quality (dust level) monitoring and conduct corrective adjustments where necessary based on the baseline data collected before project commencement

7.4.2.4 Solid waste generation

A range of solid waste, both hazardous and non-hazardous, are likely to be generated during road project implementation. Wastes emanating from construction phase will mainly come from:

- Site clearance (vegetation) and excavation works (cut-to-spoil);
- Construction support activities and machinery maintenance and repair works such as used lubricant cans, packaging wrapper, worn-out tyres, and replaced equipment parts;
- Consumables (such as wood formwork, metal cuttings);
- Material testing and trial laboratories such as lab material rejects, test specimens for disposal, excess lab sample materials and grounded equipment or spares;
- Discarded material from handling losses;
- Residential camp sites, wastes such as leftovers/food scraps, bottles, cans, clothing, food packaging, newspapers and magazines.

Mitigation Measures

- Waste shall be managed as per Environmental Management and Coordination (Waste Management) Regulations 2006, e.g. No waste shall be buried underground or burned on open air

- Contractor to develop a waste management plan;
- Manage and control waste generation at the various project sites and stations through standard operating procedures (SOPs) and Solid Waste Management Plan;
- Reduce generation of solid waste at the source through proper planning and procurement of construction materials;
- Segregation of solid wastes and provision of suitable and well labelled waste receptacles within the camp and at other active construction sites;
- Reuse excavated top soil for landscaping of the site as far as practical;
- Disposal of solid waste at designated sites through licensed waste handlers;
- Prioritize options of waste reduction, reuse and recycling, particularly papers, polyethene plastic wrappers and containers as well as other materials that can possibly be recycled; and
- Sensitize resident workers and visitors (especially those operating food catering services) at project sites on proper waste management practices especially hazardous materials and risks of contaminations.

7.4.2.5 Impacts on Material Borrow sites

During the construction phase, the contractor will have to source construction materials from various material sources. While potential material sites have been identified in the project design report, the actual sites to be exploited will be decided by the appointed contractor. Cases of over extracting these materials from few sites beyond their regenerative capacity may arise if not done in a sustainable manner. The contractor will thus be expected to undertake detailed environmental and social impact assessment before commissioning the selected individual material sites.

Mitigation measures

- The contractor shall prepare and seek approval from NEMA all proposed material sites to be used for construction works; all borrow sites must have approved environmental and social impact assessment (ESIA) reports, incorporating rehabilitation procedures upon decommissioning;
- Construction materials including sand, stones and borrow materials must be sourced from duly approved sources only;
- Materials haulage routes must be pre-determined to avoid unnecessary off-road driving;
- Contractor to develop a system of tracking materials received viz a vis utilization to ensure proper materials management to avoid wastage;
- The contractor shall endeavor to locate material sites away from settlements if possible;
- Where material sites are located near settlements, the contractor shall carry out baseline studies of structural integrity assessments of nearby structures;
- The contractor shall develop safety management plans for any blasting which shall require the blasting to be done by qualified experts, sensitization and notification to locals on blasting times;
- All material sites shall be fenced with controlled entry.

7.4.2.6 Visual intrusion

Baseline

Quarries and borrow pits, limited cut slopes 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.

Construction phase

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

- *Spoil materials including solid waste produced at camping sites for road construction crews should be properly disposed.*
- *Rehabilitate quarries and borrow areas as suggested in the ESMP*

7.4.2.7 Liquid waste contamination

Previous experience has shown poor management of liquid waste at camp sites, oil spills at garages, and poor maintenance of construction equipment by road contractors in Kenya (See figure below). Construction activities will require assembling several machinery and equipment (including excavators, graders, excavators and tippers). This will require a maintenance and repair area as well as some on site storage of fuel. Routine cleaning and maintenance will generate washdown water containing sediment (soil, clay, gravel, sand, concrete, etc), detergents and automotive fluids, all of which are pollutants.

Mitigation Measures

- Machinery maintenance should be done only on purpose-built garages that meet hydrocarbon containment measures and controlled drainage, including banding all areas prone to spills;
- Contractor will be required to have an emergency spill containment and response plan;
- Minor service and washing areas placed/ constructed with containment basins to ensure that the surrounding areas (including groundwater) are not polluted;
- All grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to any water courses shall be contained, treated and properly channelled;

- Flash toilets at camp sites should be connected to septic tanks or other treatment facilities approved by the county government and NEMA;
- Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site.

Social Impacts

7.4.2.8 Spread of HIV and other STDs

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. The HIV/AIDS prevalence rate in Marsabit County stands at 1.4 % which is lower than the national average of 5.9% percent. (National Aids Control centre, 2018)

Mitigation Measures

- KeNHA/Contractor should, in liaison with approved local non-governmental organizations (NGOs) or approved HIV/AIDS service providers, conduct awareness training to staff and the locals and monitor the efficacy of the awareness created during the project implementation period;
- Sensitize workers on the need to refrain from risky behaviors;
- Provision of condoms both male and female in the sanitary facilities;
- Encourage workers and local communities to go for regular HIV voluntary screening/testing, counseling and referral services; Contractor should arrange for quarterly medical camps to benefit workers and local communities through cooperation with county government health departments and local medical facilities;

7.4.2.9 Disruption of public utilities

There will be some requirements for relocation of public utilities in some sections of the road away from the construction zones, thereby affecting supply for the local residents. There were water pipes noted along the road, that might be affected during construction. In addition, fibre optic cables running along the road could affect communication networks if construction activities interfere with the underground cables. Trucks with heavy loads of construction

materials may also damage roads and footpaths, and other public utilities during the construction process.

Mitigation Measures

- Liaise with KPLC, fibre optic providers, and regional water companies to identify affected sections of alignment that affect utilities and provide cost to cover the relocation of the existing infrastructure;
- Relocation plans shall include adequate notification of affected customers and residents whose access foot paths might get disrupted.

7.4.2.10 Complaints and Grievances

During construction, the local communities and workers may have complaints and grievances regarding the ongoing activities. There is also potential for social unrest among the local population if they are not considered for employment. This can bring negative publicity during construction including stoppage of work and can delay the projects progress. Against the background of this knowledge and expectation, there is a risk of dissatisfaction if procedures of allocation of workforce are not adequately applied, or if they are seen to be applied in an inequitable manner, especially due to local clan political dynamics

Mitigation Measures

- Provide grievance redress mechanism for the local communities and workers;
- Advice the public and workers on where to report grievances;
- Consider prioritizing the local manpower for both skilled and unskilled labour.
- Implement proposed grievance resolution mechanism
- Grievance redress mechanisms especially for workers should incorporate non-retaliation policies

7.4.2.11 Impacts on Cultural resources and archaeological sites

While the realignment has been proposed to avoid any cultural resources and Archaeological sites, there is potential that new sites may be discovered during the construction works.

OCCUPATIONAL HEALTH AND SAFETY

7.4.2.12 Occupational Health and Safety Hazards

Construction activities will expose staff to risks of accidents and incidents while undertaking excavations and trenching, installation of contractor facilities, operating mobile machinery, electrically powered equipment and materials delivery vehicles. Occupational health and safety measures should be undertaken to avoid falling from heights, heavy lifting activities and electrical shock, exposure to excessive body vibrations and noise, fire hazards, hot bitumen, wildlife attack and snake bite etc. which can result in injures or even fatalities. Adherence to WBG EHS Guidelines, and OSHA and its regulations will significantly reduce occupational safety and health risks associated with the project implementation.

Mitigation Measures

- Contractors' selection criteria should include ability to demonstrate having some defined minimum requirements for Safety and Health Management System.
- Comply with the OSHA 2007 requirements can be used as minimum requirements and WBG EHS Guidelines;
- Contractor will prepare a site-specific Health and Safety Plan and implement it throughout the construction period;
- Contractor must obtain a registration of workplace certificate from DOSHS and comply with the subsequent requirements of the Health and Safety Committee Rules 2004 of the OSHA Act;
- Enforce use of defined standard operating procedures for handling various activities, depending on risks levels;
- Ensure adherence to Health and Safety Policy during construction activities;
- Establish an Emergency Response Procedure and display on all work areas;
- Provision of a standard first aid kit at active construction sites at all times;
- Designate qualified first-aider as per the OSHA requirements;
- Regular trainings to workers on OHS and first aid administration;
- Contractor to provide for ambulance vehicle for emergency evacuations
- Contractor (s) to maintain an accident register; carry out accident and incidents investigations and implement corrective actions;
- Undertake staff and visitor safety induction;
- Establish a Health and Safety Committee for the project construction team as per the Health and Safety Committee Rules 2004 of the OSHA Act
- Contractor to have a full time Health and Safety advisor on site;
- Have a stocked clinic with fulltime nurse on the main campsite;
- Engage a qualified Health and Safety auditor to conduct routine and annual Health and Safety (H&S) audits; Fire Safety Audit, and a Risk Assessment
- Provide appropriate and adequate Personal Protective Equipment (PPE) to workers;
- Abide by standard best practice health and safety provisions in the construction contract;
- Establish and enforce a strict code of conduct for all project drivers including outside suppliers delivering materials. The code shall focus on safety, especially speed, and loading, especially banning all carriage of staff, workers and passengers except in seats;

7.4.2.13 High temperature and Humidity levels

Working in high temperatures and humidity may have health impacts on construction workers such as dehydration, heat stroke, and other heat related illnesses.

Mitigation Measures

- Contractor must ensure Project staff have access to adequate potable water;
- Provisions should be made for adequate ventilation and air conditioning for in-house work spaces and campsites;

- Sensitize staff on health concerns and avoiding heatstroke, dehydration and fatigue;
- Work schedules should be such that workers are allowed adequate break durations in between working sessions; and
- Ensure adherence to OSHA, 2007.

7.4.2.14 Road Safety

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. 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.

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*

7.5 Operation phase Impacts

7.5.1 Positive Impacts

7.5.1.1 Reduced travel time and cost

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 centres, places of worship and educational facilities.

Enhancement measures

- Regular maintenance of the road

7.5.1.2 Reduced vehicle maintenance costs

The reduced vehicle operating and maintenance costs due to improvement of the riding quality and surface of the road compared to the current road situation greatly enhances accessibility to basic facilities, for the local communities and others served the road corridor. Therefore, the development of the road will also be an opportunity for the area to be opened up for other opportunities and development in other commercial sectors by outside investors, since more investors will deploy their vehicles along the road due to reduced costs of maintenance and operations.

7.5.1.3 Reduced dust pollution

Vehicle traffic plying along the existing road cause fugitive dust because of the failed sections of the road and prolonged dry weather conditions, which may cause respiratory complications and discoloration of surrounding vegetation. In an improved paved state, the problem of fugitive dust associated with the road will be mitigated.

7.5.1.4 Improved emergency response

An improved road will allow quicker response by medical and security personnel to the areas served by the road, thereby improving service delivery of the area.

7.5.2 Negative impacts

7.5.2.1 Solid waste

During operation period, road users spilling materials (oils, foodstuffs, plastic materials, and other wastes), tends to leave pollutants on the road reserve, bus stops and the adjacent lands compromising the natural resources and people's health.

Mitigation measures

- Enforcement of laws and by-laws for buses and other motorists on improper disposal of solid waste from vehicles;
- No vehicles should be serviced along the roads or at bus stops – all should be in a licensed garages or service stations;
- Road signage prohibiting disposal of waste;
- Regular cleaning, collection and disposal of solid waste by the local authorities (at bus stops), and performance-based contractor that will be assigned on the road for maintenance (along the roads)

7.5.2.2 Accidents

Improved road infrastructure with high level of service will attract more traffic volume and increase incidences of vehicle over speeding considering the road has a maximum design speed of 100km/hr. Under these circumstances, a combination of reckless driving and ignorance of local communities of road safety requirements and basic rules may result in accidents. Vehicle accidents may also contribute to oil spills that may contaminate soil and local water resources. In Kenya, road accidents are a safety concern causing disability and death of victims.

Mitigation measures

- *The public should be sensitized on safety measures to observe while using the road;*
- *KeNHA to liaise with NTSA for close monitoring of the road usage and impose penalties on those going against the set roads usage rules;*
- *KeNHA should ensure maintenance of installed road furniture and safety signages along the road;*
- *Undertake periodic roadside bush clearance that may reduce visibility clearance or obstruct critical signages.*
- *Accident scenes should be cleared and any oil spills cleaned to minimize contaminating soil and local water resources.*

7.5.2.3 Drainage and storm water management

During the operation of the road, storm water will be generated as a result of an increase in paved sections of the roads, meaning that there will be more runoff than normal, which will affect the drainage systems, hydrological regimes and storm drains of the project area.

There will be also be an increase in drainage speed which in turn will create heavy outfalls and worsen soil erosion cases along the drainage systems and area of project influence.

Mitigation measures

- *Design should ensure efficient drainage structures (culverts, mitre drains, scour checks etc) to take care of the increased drainage;*
- *Proper construction of erosion protection measures such as cascading gabions and distribution channels to protect soil erosion along the road;*
- *Regular maintenance of structures is required to ensure the drainage structures are functioning properly*

7.6 Cumulative Impacts of the road project

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 North Horr-Ndarathe Road (A4) 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 A4 road.

7.6.1 Identification of potential cumulative impacts

Table below 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

Summary of the Likely Potential Cumulative Impacts

Environmental and Social Item	Potential Cumulative Impacts	
	Construction Phase	Operation Phase
Landscape and visual	There will be some cumulative visual impacts for areas overlooking the construction Providing adequate mitigation is provided no significant adverse cumulative impacts are anticipated.	The new road and future infrastructure developments may contribute to a potential future cumulative urbanising impact, along with the future development
Soil Degradation, site related oil spills	Although not so significant, risks of oil spills increase as more projects are being undertaken in the region.	Increase in vehicles and potential accidents, and improper servicing of vehicles increase chances of soil and water sources degradation from poor management of oil wastes
Loss of flora, proliferation of invasive species	This may happen during the construction phase if the construction of other nearby projects coincides with that of the proposed project.	Vehicles and passengers plying along the roads may carry invasive species that may spread in the region Proposed measures include monitoring composition of species regenerating along road reserves and taking prompt actions in case of emergence of invasive species.
Solid waste	There will be a large amount of solid waste generated by all projects from various sources during construction such as at camp sites, soil spoil, cement bags, among others	Regional growth and increase in population as a result of easy access to the region will increase solid waste generated in towns and centres. Passengers and travelers using the roads also tend to throw waste on the roads which increase the amount of waste generated in the region.

Environmental and Social Item	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	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.
Noise and Vibration	There is the potential for cumulative noise impacts of the proposed development in conjunction with other concurrent projects in the vicinity arising from simultaneous demolition and construction works.	Increase in traffic in the region will translate to increase in noise levels as more traffic use the roads.
Increased Traffic	There will be increased traffic in the region from construction activities of all the projects. The potential risks include cumulative increase in traffic accidents. Mitigation measures have been proposed to be implemented during construction	Traffic volumes will increase in the project area due to improved road conditions. More vigilance needed with installation of speed measure in high-risk areas along the projects. However, the proposed mitigations need to be strictly adhered to.
Strain in water resources	There is potential strain of water resources in the area during the construction phase if the construction of other nearby projects coincides with that of the proposed project.	Social unrest due to usage of water resources may occur as a result of easier access by other communities.
Social Impacts including: Labour influx, Crime, disruption of services, increased conflicts, impacts on children, GBV sexual exploitation and abuse	Influx of immigrant workers will impact the region through increase of local population. The Cumulative impacts will only occur during the construction phase if the construction of other nearby projects coincides with that of the proposed project. The proposed mitigations need to be strictly adhered to.	Given that traffic volumes will increase in the project area due to improved road conditions, changes in social setting of the communities in the region is bound to change in one way or another which could bring negative impacts such as social conflicts, intermarriages, prostitution, child abuse and sexual exploitation of underage girls. Continuous community awareness and sensitization of such negative issues will need to be done continuously using Community-Based Organizations (CBOs)

Environmental and Social Item	Potential Cumulative Impacts	
	Construction Phase	Operation Phase
		and NGOs operating in the region with the support of the local county governments
Strain on Natural resources due to construction materials requirements - sand, stone and gravel.	With the concurrent implementation of development projects in the region, sand and gravel demand is on the rise. The sources of such resources face habitat disturbances, deformation and unsustainability	The road project will induce economic growth in the region leading to physical developments that will demand the use of sand, stone and gravel for construction

CHAPTER EIGHT: THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 OVERVIEW

This chapter outlines the environmental and social management strategy to be pursued in the development and operation of proposed power road. The strategy comprises of the following: -

- An impact Mitigation Plan
- An Environmental and Social Monitoring Plan

Before unveiling the Impact Mitigation plan for observed potential impacts there is a need to address the prevailing baseline through a Strategic Mitigation Plan.

8.2 THE STRATEGIC MITIGATION PLAN

8.2.1 The need for a Strategic Mitigation Plan

The baseline pre-project profile documented in Chapter Four above unearthed a receiving environment largely buried by prevailing harsh aridity which imposes severe limitations on both ecological and economic productivity. This has led to chronic poverty with local residents being both income and resource poor and left at the mercy of the weather. Drought emergencies and famines including loss of livestock are routine events in the area. Thus, as the project for road upgrading moves towards implementation, the reality is that, a road is basically an economic enabler and should be complemented by other economic enablers towards supporting Economic drivers. Without Economic Drivers as anticipated in Kenya Vision 2030, the road is likely to suffer low economic return. In the sections below, interventions required stabilizing the road economy and thus secure gains anticipated from the road project are highlighted.

1.4.2 Requisite Strategic Intervention

(i) The need for other economic enablers:

For the road to effect an economic transformation in the target area, it required to be complemented by other Economic Enablers namely Water and connection to Grid Power Supply both of which are critical any investment. Probably, some of the Grid Power locally generated in the Lake Turkana Wind Farm can be diverted northwards through Loiyangalani to North Horr. As well, probably the Cross-boundary water transfer from the Omo basin in Ethiopia could be routed through Ileret, Darathe and North Horr.

(ii) The need to climate-proof the local economy

Although mobile pastoralism is an adaptation to high climate variability and aridity, traditional patterns of mobility are proving inadequate as key resource areas are degraded through over-use or lost to other uses, and pastoralists are forced to migrate to new areas. Changing climate patterns are also modifying the rangeland landscape, contributing to localized land degradation and affecting the balance between pasture and water sources, particularly in the key drought reserve areas. Land degradation in ASAL which is driven by climate change as well as other factors (e.g. economic and demographic drivers) reduces capacity for climate change adaptation by undermining established strategies, reducing overall rangeland productivity and disrupting hydrology and water availability.

Productivity of the current livestock industry is currently low as to form a basis for economic transformation. Expansion of the sector is greatly limited to the carrying capacity whose execution is strictly supervised by droughts whose frequency is increasing. A possible way out is to make water available which would enable operation of village level feedlots using locally grown feeds. By so doing, the local carrying capacity will be expanded to the benefit of local producers, traders and the national economy. That would be a starting point towards building pastoral resilience.

- (iii) **Identify and invest in Alternative Economic Drivers:** With its limitations, livestock keeping is currently the only Economic Driver Possible in the traverse area. Yet, investment in the road and other economic enablers will widen the scope for investment in the area. Other possible economic drivers would include Development of a Tourist Circuit targeting Lake Turkana, Sibiloi National Park, The Mt Kulal/ Mt Nyilu Biosphere Area, Lake Turkana Wind Farm, among others.
- (iv) **Market Marsabit County as a global Centre for Paleo-research**

Reading stories available in common Literature, one would be forgiven to believe that Turkana County is the focal area for paleo-research. What with names such as discovery of the Turkana Boy, among others. Yet, the reality on the ground is that, with its Koobi Fora beds sitting within Sibiloi National Parks on the Eastern Shoreline of Lake Turkana (Plate 8.1), Marsabit County is the global focal point for research in the early origins of the Hominid Species with the Turkana Basin Initiative being hosted in Ileret. Marsabit County should take lead and position itself as the focal point for such research and possibly develop the concept of Research Tourism along the lines of medical tourism developed in India and Religious Pilgrimages to Mecca and the Holy Land.

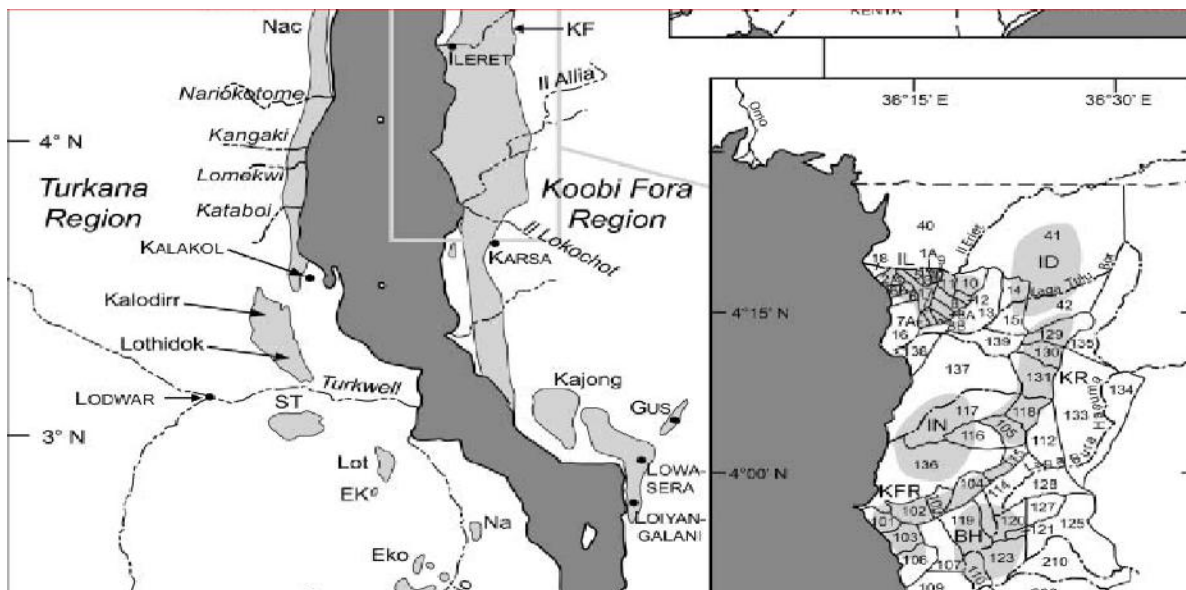


Plate 8.1: Map of Northern Kenya showing stratified focal areas for paleo-research

Source: Bert Van Bocxlaer, 2011

- (i) **The ‘Rocky’ Economy:**

Alongside the hot arid climatology, basalt rock seems to be the natural endowment for Marsabit County where tons over tons of basalt rock covering thousands of square Kilometres will be found to the north and west of the County Headquarters. At national level, efforts should be made to explore viability and feasibility of utilizing this material to feed the national construction industry either in housing or road infrastructure development. A policy decision gazetted Marsabit as the sole national source for building stone is probably the starting point towards creating a market for this resource and developing a viable product line for the County. In the process, an economically viable way of utilizing the currently idle land will have been developed with immense benefits to the local pastoralist land owners.



Plate 8.2: Massive formation of Basalt rocks so common in Marsabit County.

(ii) The need to climate-proof the North Horr Jn- Daratthe Road:

Discussions in this section (8.2.2) have been informed by appreciation of the huge developmental challenges posed by aridity prevailing in the project area. Given that, the proposed road, that is targeted to be an economic and social game-changer is also vulnerable to the same hostile climate, design should aim at in-building measures to climate proof the road to ensure realization of its economic design life. In particular, the section through the Minor Chalbi Desert requires full attention in this regard.

8.3 Mitigation of Construction Stage Impacts

Preparation of this Environmental and Social Impact Assessment has preceded the detailed design in which case, recommendations made here-in have a fair chance of being incorporated into and influence final outcome of the project design process in which case, the latter process also becomes part of the mitigation programme. This study recommends that findings be incorporated into project design as a core mitigation strategy. Towards mitigation of specific impacts, action will be taken as allowed for in table 8.1 below.

Resolution of Displacement Impact: Road will traverse low density settlements which mitigates displacement impact. All displaced persons to be compensated for all development and allocated new land by community.

Table 8.1: Recommended Impact Mitigation Measures

Project Phase	Activity	Potential Impacts	Severity pre mitigation	Mitigation	Severity post mitigation	Cumulative tendency
Design Stage	Activities in design of the roads	Creation of temporary opportunities for gainful employment	P			
		Generation of additional site-specific data during design	P			
		Capacity building and sensitization	P			
Construction stage	Displacement due to creation of ROW	Income from compensation	P			
	Moving of construction equipment	Inconvenience to other road users, noise and trampling	N	Contractor to prepare approved construction Plan		Minor impact
	Possible disturbance to yet to be discovered Fossil material	Could undermine ongoing globally acclaimed research on origins of the Hominid Species	N	Cross Check with TBI Chance find procedures to be invoked	N	Globally sensitive concern
	Pressure on water resources	Could pose great danger to people and their livestock	N	Contractor to develop own water source and hand over to community	2P	Severe local concern
	Recruitment of construction labour	Creation of employment opportunities	P			
		Conflict over sharing of opportunities	N	All sourcing to involve local community		Potentially explosive
	Influx of job seekers	Possible proliferation of social vices	N	Local labour sourcing where possible		Social vices are a national concern
		Increased business opportunities for locals in food kiosks, accommodation, etc.	P			

Project Phase	Activity	Potential Impacts	Severity pre mitigation	Mitigation	Severity post mitigation	Cumulative tendency
		Exploitation of resources including bush lands for wood fuel	N	Strict surveillance		Ecosystems are already fragile
	Construction and operation of Labour Camps along the road	Increased trade with local people	2P			Will temporarily ease poverty
		Possible introduction of alien cultures and social ills	N	Aggressive stakeholder sensitization	N	The receiving Community is currently not exposed to modern world.
		Provision of amenities and social life at Darathe	P			Darathe AP Camp is currently very lonely and hostile as a working place
	Procurement of materials for roads construction	Business opportunities in supply of materials	2P			
	Quarrying to generate gravel and stone	Land degradation through creation of quarry spoils	N	Rehabilitate quarries for water pans	P	Could provide a market for the local basalt rock outcrops
		Income from sale of building stone and marram	2P			
	Activities in roads construction	Threat of introducing alien species in protected areas	N	Sourcing materials from NEMA approved suppliers	N	Mathenge tree is already a problem in neighboring Turkana
		Noise and vibrations from plant and equipment	N	Approved construction Plan		None
		OHS Hazards e.g. injury/fatalities from plant, equipment and working tools	N			Possible
		Sanitation concerns from concentration of people in the construction site	N			Possible as there are few toilets in the route of traverse
		Possible accumulation of solid waste e.g. empty cement bags, gunny bags, drums, polythene tubes.	N			Solid waste a common problem

Project Phase	Activity	Potential Impacts	Severity pre mitigation	Mitigation	Severity post mitigation	Cumulative tendency
		Possible pollution from waste oils and spares parts	N			
		Displacement of settlements through land acquisition for road construction in case of road realignment	N	Compensation at Replacement Cost	P	
		Loss of below ground biodiversity	N	All top soil under woodlands to be recovered for ground leveling		A big concern
		Erosion along cut and fill areas	N	Apply suitable conservation measures		
		Interference with wildlife habitat and movement	2N	Provide underpasses	N	Wildlife habitat already degraded
		Dust impact on vegetation	N	Develop a construction plan		Cumulative but short-term
Operation Phase	Demobilization of contractor's and RE's Camps	Handing over of Contractor and RE camp facilities to community/ other stakeholders for conversion to public utilities	2P	Long-term	Reversible	The traverse area is badly indeed of accommodation infrastructure
	Opening of the road to public use	Enhanced travel and delivery of services associated with providing an upgraded road	2P	Long-term		
		Reduced hardship in travel once road is paved	P	Long-term		
		Opening up Lake Turkana and Sibiloi National Park for Tourism	2P	Long-term		A major affront against local poverty
		Potential to tap into the Ethiopian market	2P	Long-term		

Project Phase	Activity	Potential Impacts	Severity pre mitigation	Mitigation	Severity post mitigation	Cumulative tendency
		Reduced costs associated with material borrowing for road grading.	P	Long-term		
		Possible resentment by neighboring communities	N	Aggressive SH engagement to explain wider Picture		Project will soon benefit them
		Safety concerns (injuries, fatalities, damages) of motorists, pedestrians, wildlife, livestock, properties etc due to speed of vehicular traffic	N	Erect speed dampening measures		Road safety remains a concern
	Increased pressure on local resources	Increased demand for resources due to influx of new settlements along the road	N	Long-term	Irreversible	Huge concern
		Market for local goods	2P	Long-term	Irreversible	A major planning goal
		Accelerated exploitation of local resources-range, trees, wildlife among others	2N	Planning for conservation	N	A hug concern
	Introduction of Change	Introduction of new cultures and new ways of doing things	2P	Long-term	Irreversible	A major planning goal
Net impact	31P (31 positive outputs, mainly long-term), 4N (4 adverse outputs post mitigation), Net score=27P (Overwhelmingly net positive impact after mitigation)					

P=Positive Impact; N=Negative Impact; O=Neutral Impact

Contractor to prepare a Construction Management Plan: The said CMP to explicitly provide for Staff Management, Environmental Management, Mitigation of Occupation Health and Safety, Camp Management and Code of Conduct, among others. The CMP will be reviewed and approved by KENHA and routinely screened for efficacy.

Mitigation of inconvenience and hazards to other road users in Contractor Mobilization: All movement of heavy plant and equipment to follow reigning traffic code and rules as per the Approved Construction Plan.

Potential destruction of Koobi Fora beds during construction and material sourcing: This matter was raised with the late Dr Richard Leakey during a meeting in Dec of 20221 who confirmed that Koobi Fora beds are mainly restricted to the Sibiloi National Park and do not occur outside. However, he

instructed that coordinate of potential material sites be shared with the TBI for purposes of cross checking before exploitation. Additionally, Chance Find Procedures to be applied during all excavation works.

Mitigation of threats posed to wildlife and their habitat: All construction staff will be sensitised on criminal aspects and consequences of harassing wildlife and handling bushmeat. Construction will be restricted to daylight hours to enable wildlife free access to their habitat. All animal sighted will be reported and logged so as to allow for dealing with any threats.

Mitigating potential pressure on water resources in construction: The Contractor will propose a programme to develop own sources to meet construction water needs while giving access to adjacent communities. The sources will ultimately revert to communities, thus converting a potential concern into an economic enabler and life safer.

Need to put in place a Grievance Redress Mechanism: Towards ensuring timely and effective resolution of all grievance's incidental to road construction, the Contractor in coordination with the Local Administration will put in place a Grievance Redress Committee and will hire a Community Liaison Officer to collate and resolve all grievances in a timely manner. A Grievance Log will be maintained for different sections of the road.

Mitigation of overexploitation of woody resources: As a policy, woody resources will not be exploited in the curing of bitumen. The liaison and environmental officers will strictly oversee this rule.

Mitigation of erosion and loss of soil germplasm: All cut and fill sites will be stabilised mainly through use of rip rap. All stripped top soil will be spread within locality.

Mitigating threat of introducing alien species: This will be mitigated through sourcing of sand from certified sources. All local collections will be examined stripped of the top organic layer before transport to site.

Management of quarrying and quarry spoils: All potential quarries to undergo screening by NEMA before exploitation. All quarry spoils to be rehabilitated into water pans for community water supply

Management of Occupational Health and Safety Hazards

a) Mitigation of impacts in General Health and Safety:

The Contractor shall comply with all standard and legally required health and safety regulations as promulgated by Occupational Health and Safety Act and the Factories and Other Places of Work Regulations: -

- The Contractor shall provide a standard first aid kit to field staff;
- The Contractor shall ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases, particularly HIV/AIDS and how to prevent or minimize such risks;
- 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 pedestrians and traffic in areas affected by the construction activities;
- 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;

- Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads. Operators and drivers are to ensure that they limit their potential to endanger humans and animals at all times by observing strict safety precautions;
 - No unauthorized firearms are permitted on site;
 - The Contractor shall provide the appropriate Personal Protective Equipment for staff.
- b) **Fire Prevention and control:** The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site;
- i) The Contractor shall ensure that there is basic fire-fighting equipment available on site;
 - ii) Within the Simba Hills Nature Reserve, the Contractor will follow all requirements of the Kenya Forest Service in fire protection and will observe the Fire Danger Rating precautions.
 - iii) Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires;
 - iv) 'Hot' work activities shall be restricted to a site approved by the RE;
 - v) Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include any areas (e.g. park/forest areas) where vegetation or other material is such as to make liable the rapid spread of an initial flame.
 - vi) 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 regular fire prevention talks and drills and, posting of regular reminders to staff.
 - vii) Any fires that occur shall be reported to the RE immediately and then to the relevant authorities;
 - viii) In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring the fire under control;
 - ix) Costs incurred through fire damage will be the responsibility of the Contractor, should the Contractor's staff be proven responsible for such a fire.
- c) **Emergency Procedures:** The Contractor shall submit Method Statements covering the procedures for the main activities which could generate emergency situations through accidents or neglect of responsibilities. These situations include, but are not limited to: accidents at the work place including wildlife invested areas, accidental fires; accidental leaks and spillages and vehicle and plant accidents. Specific to accidents at work place:
- The Contractor shall ensure that his employees are drilled in the procedure for working in protected areas as provided for in Cap 376 and Forests Act of 2005.
 - He shall make arrangements for KWS to provide armed rangers to accompany employees working in wildlife invested areas,
 - The Contractor shall also ensure that the necessary equipment for work in hazardous area – protective boots, PPEs, helmets, etc., are provided.
- d) **Mitigation of HIV/AIDS:** The contractor in consultation with implementing agencies responsible for HIV/AIDS will mount educational campaigns to keep workers sensitized on the reality of this pandemic. He 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 be supported by qualitative information from observations on workers behavior.

- e) **Mitigation of Solid Waste:** All storage and construction sites are to be kept clean, neat and tidy at all times. No burying or dumping of any waste materials, metallic waste, litter or refuse shall be permitted. The Contractor must adhere to Environmental Management and Co-ordination (Waste Management) Regulations 2006. The Contractor shall implement measures to minimize waste and develop a waste management plan to include the following: -

All personnel shall be instructed to dispose of all waste in a proper manner: -

- i) At all places of work the contractor shall provide litter collection facilities;
 - ii) The final disposal of the site waste shall be done at the location that shall be approved by the RE, after consultation with local administration and local leaders;
 - iii) The provision of sufficient bins (preferably vermin and weatherproof) at the camp and work sites to store the solid waste produced on a daily basis;
 - iv) Wherever possible, materials used or generated by construction shall be recovered at the conclusion of each task for safe disposal including recycling.
 - v) Provision for responsible management of any hazardous waste generated during the construction works.
- f) **Wastewater and contaminated water management:** No grey water runoff or uncontrolled discharges from any site or working areas (including wash-down areas) to adjacent watercourses and/or water bodies shall be permitted;
- Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. This particularly applies to water emanating from concrete batching plants and concrete swills;
 - The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or water bodies;
 - 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;
 - Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;
 - The Contractor shall notify the RE of any pollution incidents on site.
- g) **General materials handling, use and storage:** All materials shall be stored within the Contractor's camp unless otherwise approved by the RE;
- Stockpile areas shall be approved by the RE;
 - All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants. Sources of imported materials shall be listed and approved by the RE;

- The Contractor shall ensure that delivery drivers are informed of all procedures and restrictions (including ‘No go’ areas) required;
- Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product;
- Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure no contamination from any leaks is reduced;
- Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is identified and replaced in timely manner;
- Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

8.4 Mitigation of Impacts at Operation Stage

Proposed mitigation activities at this stage are focused on minimizing hazards associated with presence of a modern road. Hazards of increased accidents to people and wildlife, escalating crime, etc. can be managed only through enforcement of relevant laws and public sensitization. Other impacts will be mitigated as follows; -

Mitigation of demand driven exploitation of Natural resources: It is already anticipated that the road will trigger an influx of people tapping into emerging opportunities with the probability that many will settle and thus escalate demand for products and services-water, sanitation, food, medicare, schools among others. The County Government of Marsabit should plan to put in place the basic services otherwise, a new front of environmental degradation from emerging shanty towns will ensue.

Management of Community expectations and perceptions: Towards managing public and stakeholder expectations, targeted sensitization campaigns should continue so as to build community awareness on the greater planning picture.

8.5 Effectiveness of the Mitigation Programme

8.5.1 Viability of Mitigation

Effectiveness of the proposed mitigation programme has been assessed based on analysis of impact prevalence before and after mitigation (Table 8.3). Based on this analysis, this Environmental and Social Impact Assessment Study observes that, there is a great potential to mitigate adverse impacts and hence improve the net worth of the proposed road. From Table 8.3, it is apparent that application of mitigation measures as identified and recommended has potential to reduce tally of adverse impacts (Ns) from 26 to 4 while simultaneously increasing the positive ones (Ps) from 27 to 31. Thus, subtracting the Ns from the Ps gives an overall net tally of 27P implying a very positive net impact after mitigation. Additionally, the mitigation programme has potential to reduce long-term hazards introduced by the project from 15 to 6 after mitigation, in acknowledgment of the fact that some impacts are irreversible and still persist even after mitigation.

Table 8.3: Analysis of impacts scenario before and after mitigation

Nature of impact	Pre-mitigation tally	Post-mitigation tally
Positives	27P	31P
Negatives	26N	4N
Net	N	27P
Residue impacts		4N
Irreversible adverse impacts	4	4

8.5.2 Prevalence of residue impacts

This study observes that 4 of the 26 adverse impacts associated with the project will persist even after mitigation. These are the impacts whose probability can be reduced substantially through mitigation but cannot be eliminated entirely. Their management requires implementation of a strict monitoring programme as outlined elsewhere below.

8.5.3 Prevalence of residue impacts

Overall, the proposed project enjoys a highly positive benefits profile as it will strongly support initiatives towards poverty alleviation and reversal of environmental-degradation both of which are critically important policy aspirations of the Kenya Government. This Study recommends that project development should proceed but factor in the mitigation measures recommended herein. Implementation of this EMP will however require close follow-up and scrutiny to ensure achievement and substance of this esteemed net positive profile of the project. Requirements for monitoring are explored below.

8.8 Management of Decommissioning

Several levels of decommissioning are anticipated; -

8.8.1 Decommissioning of Contractor/ Resident Engineer's Camps

This will take place upon completion and hand over of the road to KeNHA. The proposal here is for all facilities to revert to the County Government for allocation.

8.8.2 Decommissioning of the Road

Design of roads assumes an economic life of 15 to 20 years which imply that, at some point, the system will require to be decommissioned either in whole or by components. Concerns associated with decommissioning would include occupational health and safety hazards, accumulation of scrap metal waste, which apart from taking up productive space would also pose diverse hazards (health and safety, harbouring of vermin, etc) to local inhabitants and their property. Other impacts would emanate from failure to rehabilitate the concrete foundations of concrete bases back to economic use. The ESSMP unveiled in chapter eight has explicit requirements for management of decommissioning phase impacts.

CHAPTER NINE: ENVIRONMENTAL/ SOCIAL MANAGEMENT AND MONITORING PLAN

9.1 Overview of the ESMMP

Modalities for mitigation of impacts and their phasing are presented in the Environmental Mitigation and Management Plan provided in Table 9.1 below. From Table 9.1, it is apparent that most of the mitigation activity will take place during the construction phase. However, planning for the mitigation will take place at design stage (this stage) to ensure that such mitigation is incorporated and allocated for in the project design. Thus, the first action in mitigation will be a thorough scrutiny of the Design Report to ensure that the ESMMP provided in this report has been fully incorporated and allocated for. Further, all mitigation to be implemented during civil works will be allocated for in the Bills of Quantities and captured in the Contract for Construction. The General Manager (Design & Construction) will hire a qualified Resident Engineer to ensure full implementation of contractual tasks in mitigation.

9.2 Feasibility of Impact Mitigation

Majority of impacts have readily available means for mitigation while some of the negative impacts will acquire positive effects after mitigation. Thus, upon application of the Impact Mitigation Programme, majority of the impacts are dispensed with and the project is likely to achieve an overwhelming net positive effect. It is expected that there will be no land acquisition within the scope of the proposed work.

9.3 Phasing of Mitigation Action

Mitigation of impacts associated with civil works has been planned in the design and allowance has been made in the Bills of Quantities. Also, the contract for civil works bears several relevant clauses binding the contractor to implement environmental and social mitigation as outlined in Table 9.1.

9.4 Responsibility for Mitigation

As per the ESMMP below, responsibility for mitigating impacts of civil works falls on the contractor under the supervision of the General Manager (Design & Construction) or his appointed representative.

9.5 Environmental and Social Monitoring Requirements:

9.5.1 Terminologies

Environmental monitoring refers to the systematic collection, analysis and interpretation of data on environmental parameters through periodic measurements. Accruing information would facilitate tracking of levels of anticipated impacts and to monitor compliance in implementation of mitigation measures. Through periodic observations, it is possible to detect and remedy previously non-anticipated impacts before they turn catastrophic. Further, through continuous assessment of both the negative and positive benefits of a project, it is possible to determine the net impact (change) emanating from a project and thus determine its worth. Environmental monitoring falls in three categories as follows: -

- Baseline studies to document local environmental conditions of the project site. Since project impacts are generated by interaction between local environmental conditions and project activities, a study of baseline conditions facilitates prediction of impacts as already undertaken in Chapter Seven of this EA study. The documented baseline environment also provides a permanent benchmark against which long-term changes due to project activities can be monitored.
- Routine measurement of effects through measurements on environmental parameters is undertaken during project implementation and operation so as to detect changes attributed to the project.
- Compliance monitoring is effected through regular review of monitoring returns coupled with independent periodic sampling of environmental parameters and indicators. By evaluating the

level of parameters against previously agreed standards, the supervising authority is able to monitor compliance with regulatory requirements. Surveillance and routine inspections also form part of compliance monitoring.

To be successful, monitoring and evaluation begins with clear project design followed by identification and elaboration of appropriate criteria and indicators. This document provides guidance about incorporating monitoring and evaluation elements in each stage of the project cycle.

9.5.2 Requirements of the 'Impacts monitoring' programme

Impact monitoring is currently a common feature for most projects and mainly involves the making of periodic observations and measurements at the project site which are compiled into monthly, quarterly or annual returns submitted to the supervising authorities. It is such returns that stimulate the compliance of monitoring activities from head office and other stakeholders. To facilitate rapid compilation of reports, the practice of making returns on specified formats is being widely adopted as a way of inculcating delivery of simplified management information systems.

A major finding of this study (Chapter Seven) is that, adverse impacts are anticipated mainly at the Construction Stage. However, the impacts are of low to moderate severity ranking and will cease once civil works is ended. The only potentially adverse impacts are also essentially manageable to total elimination without occasioning secondary impacts. What is however essential is the implementation of an effective compliance monitoring scheme in order to ensure adherence to the mitigation program so as to maintain impacts at the low severity level. This calls for a comprehensive compliance monitoring programme as discussed below.

9.5.3 The Compliance Monitoring Strategy

This activity is essential to ensure implementation of recommended mitigation measures and to thus secure the overall environmental quality of any project. The monitoring activities should primarily target implementation of recommended mitigation measures in addition to surveillance for new impacts. Table 9.1 provides an M&E matrix for the Project with a full complement of criteria and indicators. In addition to specification of impacts and required mitigation activities, the plan also identifies key players in each activity and the recommended timing of interventions. The Environmental and Social Action Plan for the Roads Project also essentially constitutes its compliance monitoring program. Key features of the compliance monitoring programme are as follows: -

Table 9.1: The Environmental / Social Management and Monitoring Plan (ESMP) for the proposed road

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
Construction Phase						
31.	Construction material sourcing	<ul style="list-style-type: none"> 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) 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; Carry out inspection of each of the site's soil stability before excavation; All borrow pits sites shall be clearly indicated on a plan and approved by the RE; Borrow pits and quarries shall be located more than 20 meters from watercourses to minimise storm water runoff into watercourse; The Contractor shall give 14 days' notice to nearby communities of his intention to begin excavation in the borrow pits or quarries; Prepare health and safety plan before any work on the quarries is commenced; 	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> • Cordon off the quarry and borrow areas to keep livestock and children off; • The Contractor shall rehabilitate and decommission all borrow pits and quarries • Stockpile top soil on site and use during rehabilitation of the borrow site and quarries; • Plant suitable saplings where it is deemed feasible; • In case of blasting: <ul style="list-style-type: none"> iv. The Contractor will obtain a current and valid authorization from the Department of Mines and Geology prior to any blasting activity. v. A qualified and registered blaster shall supervise all blasting and rock-splitting operations; vi. The contractor shall develop a safety policy on site. • 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. • ALL QUARRIES SHOULD BE SUBJECTED TO AN ESIA STUDY BY THE CONTRACTOR 				
32.	Air Pollution	<ul style="list-style-type: none"> • Sensitize workers on air pollution. Maintained all construction machinery serviced in accordance with the owner's manual; 	<ul style="list-style-type: none"> • To reduce pollution of 	Supervising Engineer and	Construction	Apply Best Practices.

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> Workers shall be trained on dust minimization techniques; 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; 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 To minimize further generation of dust, vehicles delivering soil materials shall be covered to reduce spills and wind-blown dust; Any complaints received by the Contractor regarding dust should be recorded and communicated to the RE; Comply with all legal and statutory requirements as contained in EMAC air quality regulations. Project-specific design improvements to limit motor vehicle air pollution impacts should be prepared and implemented. Crusher plants to be installed with dust suppressants. 	ambient air	the Contractor.		Sh. 2,500,000 for dust suppression at main centres only. Sh. 750,000 for provision of dust masks.
33.	Noise pollution	<ul style="list-style-type: none"> The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours across North Horr-Ndarathe Schools, hospitals and other noise sensitive areas which lie 	<ul style="list-style-type: none"> To avoid exposure of the community living around 	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
		<p>within 200m of the road shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity</p> <ul style="list-style-type: none"> • Construction workers will be required to use PPE appropriately • Equipment should be maintained regularly to reduce noise resulting from friction; • No unnecessary hooting by project vehicles within 200 m of noise sensitive receptors. • Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE. 	the project area and workers to noise nuisance			
34.	Vegetation loss	<ul style="list-style-type: none"> • To avoid conflicts on trees within the Road reserve, a clear understanding of ownership should be reached with the immediate neighbours before any tree is felled. • 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; • 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; • Areas to be cleared should be agreed and demarcated before 	<ul style="list-style-type: none"> • 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
		<p>the start of the clearing operations;</p> <ul style="list-style-type: none"> • 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; • 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; • Trees should be trimmed rather than removed wherever possible; • The use of fuel wood by construction workers should be discouraged. Workers should be encouraged to use clean energy sources. • The contractors to ensure suppliers are legally compliant and environmentally sensitive. 				
35.	Impacts on soils and drainage including landslides	<ul style="list-style-type: none"> • As far as possible earthworks should avoid the wet seasons that are always intense to prevent soil erosion and landslides; • Excavated materials and excess earth should be kept at appropriate sites approved by the Supervising Engineer; • Wherever possible, the earth dumping sites will be designed in such a manner as to facilitate natural water discharge; • 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 	<ul style="list-style-type: none"> • To conserve soil and avoid stripping of top soil 	Contractor	Construction	<p>To be included in drainage structures cost</p> <p>Set aside Sh. 5,500,000 for off-road environme</p>

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>embankments. Areas cleared for improving sight distance should be planted with grass to reduce erosion (where possible);</p> <ul style="list-style-type: none"> • The Contractor shall protect areas susceptible to severe erosion such as across steep slopes by installing necessary temporary and permanent drainage works. • Areas affected by construction related activities and/or susceptible to erosion or landslides must be monitored regularly. • On areas where the risk of erosion is evident, stabilize the areas and prevent erosion. These may include, but not be limited to: <ul style="list-style-type: none"> viii. Confining construction activities; ix. Using cut off drains; x. Using mechanical cover or packing structures such as geofabric to stabilize steep slopes or gabions, mattress and retaining walls; xi. Mulch or chip cover; xii. Constructing anti-erosion berms; xiii. The erosion prevention measures must be implemented to the satisfaction of the RE; xiv. Where erosion does occur on any completed 				ntal measures

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>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.</p> <ul style="list-style-type: none"> Cut areas susceptible to landslides should be protected immediately after the works, and works should not be prolonged at such sites unnecessarily 				
36.	Water resources	<ul style="list-style-type: none"> The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006. Ensure community complaints related to water abstraction activities are promptly mitigated 	<ul style="list-style-type: none"> To ensure the community's right to access water is not infringed continued supply of water 	Contractor	Construction	No additional cost required
37.	Contractors camp	<ul style="list-style-type: none"> The site for the Contractor's Camp shall be determined in collaboration with the RE taking into consideration the following: <ul style="list-style-type: none"> xi. The security situation in the area (expressed authority must be given by the Officer Commanding Police Division) xii. Involve local community and administration in site selection. xiii. Decommission the camps and reinstate the land to its 	<ul style="list-style-type: none"> To ensure proper siting of contractor's camp 	Contractor	Construction	To be specified in the BoQ

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>natural</p> <ul style="list-style-type: none"> The Contractor shall implement the following as required with the approval by the RE: <p>xiv. The contractor shall prepare a waste management plan.</p> <p>xv. A suitable water drainage system to prevent soil erosion.</p> <p>xvi. A suitable potable water supply;</p> <p>xvii. Suitable ablution facilities.</p> <p>xviii. Facilities for cooking;</p> <p>xix. Facilities for solid waste collection;</p> <p>xx. Facilities for waste water management.</p>				
38.	<ul style="list-style-type: none"> Sanitation 	<ul style="list-style-type: none"> The Contractor shall comply with laws and by-laws relating to public health and sanitation; All temporary/ portable toilets or pit latrines shall be secured to the ground. The type and exact location of the toilets/septic tanks shall be approved by the RE. All toilets shall be maintained by the Contractor in a clean sanitary condition. A wash basin with adequate clean water and soap shall be provided alongside each toilet. Ensure that solid/liquid exhausts are disposed by licensed 	<ul style="list-style-type: none"> To ensure proper sanitation 	Supervising Engineer and Contractor	Construction	To be specified in construction contract

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		agents or through approval by the local Public Health Office.				
39.	<ul style="list-style-type: none"> Workshops 	<ul style="list-style-type: none"> All maintenance of equipment and vehicles shall be performed in the workshop. 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; The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water. The workshop shall be kept tidy at all times and shall have the following as a minimum: <ul style="list-style-type: none"> vi. An impermeable floor either constructed of concrete or suitable plastic fabric vii. The floor shall be bunded and sloped towards an oil trap or sump. viii. Drip trays shall be used to collect the waste oil and lubricants. ix. The drip trays shall be inspected and emptied daily; x. Drip trays shall be closely monitored during wet weather 	<ul style="list-style-type: none"> To ensure proper maintenance of equipment and machinery and cleanliness in the workshop 	Contractor	Construction	Best Engineering Practices
40.	Solid wastes	<ul style="list-style-type: none"> The contractor should develop a waste management plan; All personnel shall be instructed to dispose of all waste in a proper manner; 	<ul style="list-style-type: none"> To maintain sound waste management 	Supervising Engineer and the Contractor.	Construction	Sh. 2,500,000 for waste disposal site and its

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<ul style="list-style-type: none"> • Contractor shall provide litter collection facilities; • The final disposal of the site waste shall be done by approved waste disposal agents; • Wherever possible, materials used or generated by construction shall be recycled; • Provision for responsible management of any hazardous waste generated according to NEMA regulations on waste management. • Dispose of surplus material ("spoil") only at designated sites and by approved methods. • The spoil designated area needs to be more than 20 meters from watercourses. • The development and rehabilitation of spoil areas shall include the following activities; <ul style="list-style-type: none"> vi. Stripping and stockpiling of topsoil; vii. Contouring of spoil site to approximate natural topography and drainage and/or reduce erosion impacts on the site; viii. Placement of excavated subsoil and then topsoil over spoil material; ix. Contouring and re-vegetation; x. The Contractor shall ensure that the placement of spoil is 	practice.			<p>management.</p> <p>The operational costs to be contained in BoQ</p>

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		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.				
41.	Liquid wastes	<ul style="list-style-type: none"> No grey water runoff or uncontrolled discharges from the site/working areas; Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas. 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; Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted; The Contractor shall notify the RE of any pollution incidents on site. 	<ul style="list-style-type: none"> To maintain properly dispose wastewater 	Supervising Engineer and the Contractor.	Construction	As contained in Item No. 11
42.	Fuels, Oils, Hazardous Substances and other Liquid Pollutants	<ul style="list-style-type: none"> Hazardous materials shall be stored above flood level and at least 20 metres from any watercourse; Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations; 	<ul style="list-style-type: none"> To ensure proper handling of fuels and hazardous 	Supervising Engineer and the 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
		<ul style="list-style-type: none"> 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); 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; Pipe-work carrying product from the tank to facilities outside the containment shall be provided with secondary containment; Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment; Fence of the tank compound with locks or other adequate security controls at the site; Appropriate training for the handling and uses of fuels and hazardous material is to be provided by the Contractor as necessary. This includes providing spill response and contingency plans; 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 	substances			

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>from the perimeter bund to a containment pit.</p> <ul style="list-style-type: none"> • All chemicals stored within the bunded areas shall be clearly labelled detailing the nature and quantity of chemicals within individual containers; • 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; • 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. 				
43.	Asphalt, Bitumen and Paving	<ul style="list-style-type: none"> • The plant should be situated on flat ground; • Topsoil shall be removed prior to site establishment and stockpiled for later rehabilitation of the site; • 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; • The area shall be covered to prevent rainwater from contacting the areas containing fuels, oils, bitumen etc and potentially generating contaminated runoff; 	<ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> The plant shall be secured from trespassers and animals through the provision of fencing and a lockable gate to the satisfaction of the RE; Well-trained staff shall be responsible for plant workings. Within the bitumen plant site, areas shall be demarcated/marked for plant materials, wastewater and contaminated water; An area should be clearly marked for vehicle access; Drums/tanks shall be safely and securely stored; Materials requiring disposal shall be disposed off by a licensed waste disposal agent 				
44.	Cement / Concrete Batching	<ul style="list-style-type: none"> Concrete batching plant shall be located more than 20 m from the nearest stream/river channel; Topsoil shall be removed from the batching plant site and stockpiled; Concrete shall not be mixed directly on the ground; The concrete batching works shall be kept neat and clean at all times; 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; 	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Unused cement bags are to be stored so as not to be effected by rain or runoff events; Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via wind-blown dust); Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment; Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching; Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site; 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; All excess aggregate and sand shall also be removed; 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. 				
45.	Diversion and	<ul style="list-style-type: none"> The Contractor should adhere to the road reserve as much as 	<ul style="list-style-type: none"> Use of 	Supervising	Construction	Cost of

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
	access roads	<p>possible in locating the diversion if required. If diversion routes go beyond the road reserve, necessary permission should be sought;</p> <ul style="list-style-type: none"> Where possible the diversion must be limited to already connecting routes in the area; The Contractor shall comply with all applicable laws and by-laws in Kenya with regard to road safety and transport; Access to the construction site and works area shall utilize existing roads and tracks where possible; Upgrading of the access roads shall be undertaken within the existing confines of the road, unless otherwise agreed with the RE; All diversion and temporary access routes shall be rehabilitated at the end of the contract to the satisfaction of the RE; 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; To avoid dusts and air pollution, the Contractor must sprinkle water in the diversion route, as necessary, this must be supervised by RE. 	existing roads and proper use of diversion and access roads	Engineer and the Contractor.		watering as contained in item 2
46.	Disruption of	<ul style="list-style-type: none"> Disruption of access to property must be kept to a minimum at 	<ul style="list-style-type: none"> Minimise 	Supervising	Construction	Standard

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
	Access to Property	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.	disruption of access to property	Engineer and the Contractor.		procedures to be followed
47.	Relocation of public utilities	<ul style="list-style-type: none"> Undertake inventory of existing utilities in the project area before beginning construction; Relocation of services is provided for in the BOQs Notice should be given to the utility users prior to any interruption in supply; Liaise with relevant parties 	<ul style="list-style-type: none"> Minimum disruption of access to public utilities 	Supervising Engineer, Contractor, Kenya Power	Construction	To be contained in RAP and BoQ
48.	Delays in transportation	<ul style="list-style-type: none"> 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; Temporary road signs that are visible both during the day and at night indicating road works and restrictions will be required; The contractor should also set aside parking bays for heavy goods vehicles and public transport vehicles; Areas where construction is taking place should have clearly marked speed reduction signage. 	<ul style="list-style-type: none"> Traffic management plan 	Supervising Engineer, and Contractor	Construction	Standard procedures to be followed
49.	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	<ul style="list-style-type: none"> To curb against unplanned 	County Administration	Construction	No cost at construction stage

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
		<p>surveillance around the work sites;</p> <p>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.</p>	settlements			
50.	Discrimination on employment opportunities	<ul style="list-style-type: none"> 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; To promote the livelihood of vulnerable groups such as the women-headed households, the Contractor should make deliberate efforts to include and retain women in construction Make deliberate efforts to include at least 33% of women to be included as employees within the road construction project Contractor to put in place a code of conduct to prevent sexual harassment / exploitation of women employees 	<ul style="list-style-type: none"> Employment of local communities 	Contractor and local administration	Construction	Prudent hiring practices
51.	Occupational Health and Safety	<ul style="list-style-type: none"> 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; 	<ul style="list-style-type: none"> To reduce chances of accidents 	Supervising Engineer and Contractor.	Construction	PPEs 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
		<ul style="list-style-type: none"> The Contractor shall provide a standard first aid kit at the site office; There should be a Safety Officer on site who has first aid training and knowledge of safety procedures; Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads; No unauthorized firearms are permitted on site; The Contractor shall provide the appropriate Personal Protective Equipment for staff; The contractor must have insurance cover for the workmen. 				
52.	Public Health	<ol style="list-style-type: none"> 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 pedestrians and traffic in areas affected by the construction activities; 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; 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 	<ul style="list-style-type: none"> To reduce transmission of diseases; To create awareness of the HIV/AIDS. 	Supervising Engineer, Contractor, NGOS, Provincial and District HIV/AIDS control councils, and health officers	Construction	HIV/AIDS awareness costs 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
		<p>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;</p> <p>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;</p> <p>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 behaviour change. The assessment will be supported by qualitative information from focus group discussions.</p> <p>6. The contractor should follow the recommendations of the Kenya National Aids Strategic Plan in communicating prevention measures</p>				
53.	Disruption of Community	1. Are adequately addressed in the Resettlement Action Plan	<ul style="list-style-type: none"> To minimize disruptions 	KENHA	Pre-construction	

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
54.	Site Security	<ol style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> • To improve site security and avoid cases of theft 	Supervising Engineer and Contractor.	Construction	
55.	Fire Prevention and Control	<ol style="list-style-type: none"> 1. The Contractor shall take all reasonable and precautionary 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; 	<ul style="list-style-type: none"> • Fire prevention and control 	Supervising Engineer and Contractor.	Construction	Fire 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
		<p>4. 'Hot' work activities shall be restricted to a site approved by the RE;</p> <p>5. Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include:</p> <ul style="list-style-type: none"> iv. Workshop; v. Fuel storage areas; vi. Any areas where vegetation or other material is such as to make liable the rapid spread of an initial flame; <p>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:</p> <ul style="list-style-type: none"> vi. Regular fire prevention talks and drills; vii. Posting of regular reminders to staff; viii. Any fires that occur shall be reported to the RE immediately and then to the relevant authorities; ix. In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring the fire under control; x. Costs incurred through fire damage will be the responsibility of the Contractor, should the Contractor's staff be proven responsible for such a fire. 				

Item No.	Environmental / social aspect	Recommended mitigation, monitoring and/ or management measure	Goals	Responsibility for implementation	Time frame	Indicative Cost Estimate
56.		Operation Phase				
57.	Erosion and water quality	<ol style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> • To ensure drainage systems are in good condition 	KeNHA	Operation	Included in design
58.	Road Accidents	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> xi. 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; xii. Require that road design audits be done, at final design stages, by specialists in road safety and traffic operations; and xiii. Draft 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; xiv. Painting of edge lines in order to separate shoulders; 	<ul style="list-style-type: none"> • 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
		xv. Establishment of non-motorised vehicle waiting area; xvi. Improvement of visibility; xvii. Provision of speed limit signs; xviii. Construction of bumps to reduce speeds; xix. Improvement of crossing sites paintings of zebra crossings; xx. 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.				
59.	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.	<ul style="list-style-type: none"> To reduce prevalence 	Contractor and National Aids Control	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
		2. Prevention measures to include access to free condoms to all workers within the project	rates	Councils		
60.	Urbanization	3. Proactive planning by all the Counties traversed by the project road	<ul style="list-style-type: none"> To forestall unplanned urban development 	County Governments	Operation	-

The Monitoring Authority: The burden of implementing impact mitigation will fall on the Project Contractor under supervision by KeNHA in the capacity of Employer. Through the Supervisor of Works (SOW), KeNHA will monitor activities of the Contractor to ensure compliance with contractual requirements including implementation of this EMP. Where issues not anticipated in this report do arise, the SOW will notify KeNHA for action.

Need for NEMA to participate in Monthly Site Meetings: NEMA is the body charged under EMCA 1999 with overall coordination of environmental management in Kenya. While NEMA coordinates this by regulating the EIA process for projects, there is need for NEMA to follow-up further on implementations of ESMMPs as prepared for this project. This ESMMP therefore, recommends that the County Environmental Officer for Marsabit County be invited to all monthly site meetings on this project and is facilitated to attend the same under the project. By being represented in site meetings, NEMA will enjoy an excellent opportunity to monitor implementation of the ESMMP and to keep track on any emerging issues.

9.5.4 Monitoring Reports

A number of monitoring reports will be developed as follows:

- (i) *Project Report under EMCA 1999:* This Project Report as currently prepared provides a documentation of the baseline environment of the area traversed by the proposed road to be upgraded and the adjoining areas, and thus provides a useful datum against which future monitoring can take place. The Project Report also includes a project-specific ESMMP detailing the means for mitigating identified impacts. It therefore lays the basis for monitoring.
- (ii) *Annual Audit Reports:* The Project Road will be subjected to an annual environmental audit in line with EMCA 1999. The report will include a summary of the environmental performance of the facility/enterprise vis-à-vis the Environmental Management Plan prepared and, a synthesis of Emergent Concerns.
- (iii) *Signed minutes of Monthly Site Meetings:* Following every site meeting, minutes of deliberations will be produced by the SOW, confirmed, signed and adopted as a basis for following up on Contractor's activity.

9.6: General EHS Plan in Construction Stage

Appendix 9.1 provides a template to guide formulation of Environmental, Health and Safety Plans to guide operations at the construction phase. The EHS Template has been customized for use on construction of the North Horr Jn Ndarathe (A4) road but can also apply to other KENHA sites. Brief highlights are presented in section below.

9.6.1: Legal Anchorage for E, H&S Plans

The EHS Plans will supplement the ESMP prepared under this ESIA Study. However, given that the EHSPs have a deliberate bias towards occupational health and safety, the prevailing legal framework is the Occupational Health and Safety Act OSHA of 2007 and any regulations pursuant to this. Other relevant frameworks include the Environments Health and Safety Guidelines issued by KENHA, the EIA Licence, the Contract for Works, among others all of which are considered binding to the Contractor. As per the Contract for Works, preparation of EHSPs is obligatory to every contractor and the same must be approved by the RE before commencement of works.

9.6.2: Core elements of the EHS Plan

This EHS Plan outlines the road map and confirms the contractor's commitment to operationalization of requirements of OSHA 2007 in undertaking construction of the North Horr Jn Ndarathe (A4) Road. Essentially therefore, the ESHP is a documentation of the Contractors state of mobilization in effecting requirements of OSHA. Core pillars of this EHSP therefore are as follows:-

- i) *A Policy of commitment to effecting obligatory requirements:* Each contractor undertaking any work for KENHA under auspices of the Project will be required to develop an ESHP and particularly outline a policy of commitment to putting in place all obligatory requirements under OSHA 2007 and other guiding frameworks.

- ii) *Comprehensive Hazard Mapping:* Each contractor and subcontractors will undertake comprehensive mapping with hazards associated with all activities to be undertaken as part of their work. Hazards so mapped will be clearly documented and scoped in the EHSP.
- iii) *Disclosure Policy:* All employees working will be entitled to information on hazards associated with their work and will be sensitised on all precautionary measures as per OSHA 2007.
- iv) *Deployment of competent staff:* Each Contractor will ensure that, staff deployed to perform tasks are sufficiently competent and capable to perform the work required. Subsequently to this therefore, each worker will be required to undertake a fitness to work test prior to deployment.
- v) *An elaborated Emergency Procedure:* OSHA 2007 is clear on all emergencies anticipated at places of work and the same will be captured, elaborated and customised for work sites under the project road. Thus, if insecurity and snake bites are occupational hazards between North Horr and Ndarathe, the same will be captured and emergency procedures put in place. As well, if conflict between contractor and herders over construction water is a potential hazard, mitigation of associated emergencies needs to be put in place. This should include provision for routine drills, contacts for medicare providers, etc.
- vi) *A clarified Chain of Command:* To ensure sealing of responsibility gaps in operationalizing the EHSP including handling of emergencies, a clear chain of command, showing responsibilities at each level and the expected flow of information should be clarified in the Plan and clearly posted for with contacts of responsible officers at each level.
- vii) *Identification of budgetary resources for the EHSP:* Each EHSP so prepared will be backed up by a budget statement clearly identifying funds allocation for each activity to include provision and renewal of PPEs, personnel insurance, capacity building among others.

9.6.3: Planning time frame

This EHSP will be prepared with the entire project duration in mind. However, the Plan should have room for review and updating as new challenges or information emerges in course of implementation.

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

10.1 The Report

The Government of Kenya, through its implementing agency, the Kenya National Highways Authority (KeNHA) has earmarked funds through the Development Vote towards undertaking Feasibility Study, preliminary and detailed engineering design of North Horr – Jn Darathe Ap Camp (A4) Road. Development objectives of the immediate project are to improve the movement of goods and people along North Horr- Jn Darathe Ap Camp Part of the Gilgil - Nyahururu - Maralal- South Horr- North Horr – Illeret road corridor and to enhance connectivity between Kenya and Ethiopia. The project seeks to address development constraints caused by poor infrastructure in the Northern region of Kenya, which is one of the most impoverished and isolated regions of the country. This project is also a key link to the LAPSSET Project and opening up of the Northern corridor. Improving the road will no doubt stimulate the development, integrate, and contribute to improving security and bringing about sharing the prosperity of the country with this region.

Under this Contract, KENHA has commissioned Ms Norken-Kenya Ltd (The Consultant) to render all technical support services, which may be deemed relevant to the above project and as specified in the Terms of Reference by Implementing Agency. As part of the contract, and in line with existing national legislation and international practice, the Consultant is expected to undertake Environmental Impact Assessment (EIA) for the said Project.

This ESIA Study Report highlights findings on Environmental and Social Impact Assessment conducted on the 108 Kilometre long North Horr Jn- Darathe AP camp Road Project scheduled for implementation the Government of Kenya through the Kenta National Highway Authority at a cost of Ksh 10.035 Billion Kenya Shillings. The Road starts off in the sandy plains of North Horr Town which are an extension of the Chalbi Desert and proceeds in a NW direction through the El Beso settlement and stops at the Darathe AP Camp located on the eastern periphery of Sibiloi Museum-Kenya's only Museum for Natural History. All traverse is within the North Horr Location of North Horr sub-County and Constituency within Marsabit County.

The Report has been prepared under contract by Lead Experts from Repcon associates, an Environmental Firm of Experts duly registered and licensed by NEMA (NEMA Registration No. 0002) and other Government of Kenya (GoK) agencies.

10.2 Approach to the ESIA Study

10.2.1 Scope of the study

The Terms of Reference provided by the client have identified the scope and objective of the EIA study. The TOR specifies that, in execution of the EIA study, the Consultant shall conduct analyses which shall detail the positive and negative effects of the project on the environment, and prepare an environmental mitigation plan to minimize any undesirable effects resulting during and following rehabilitation works on the road. The TOR further identifies 15 key issues (concerns) to be investigated as part of the EIA study. These include: -

- a) The role of the project in the development plans at national and regional level;
- b) Preservation of areas and land use of particular value including agricultural and natural conservation areas, forests and other important natural resources, cultural and historic sites, etc;
- c) Assessment of direct impact on agriculture, fishing and forestry, particularly the utilisation of the fuel wood and water;
- d) Disturbance of vegetation, and plans for re-vegetation
- e) The prevention of soil erosion and sedimentation;
- f) The presentation of health hazards arising from ponding water and pollution of water courses and/or sources
- g) Assessment of impact due to the existing and proposed drainage structures.
- h) Measures of the rehabilitation for construction materials, borrow pits and quarries;
- i) Health and sanitation of the road construction labour units;

- j) Air quality, water pollution, and the need for relief in areas of environmental sensitivity
- k) The dislocation impacts, noise and visual impacts during the construction stage
- l) The avoidance of reduction of visual intrusion; and
- m) Assessment on the impact on demographic factors including the prevention of undesirable roadside developments, and recommended regulations and measures to limit negative impact on adjacent communities and area.
- n) The Environmental Impact Assessment (EIA) must conform to the National Environmental Management Authority (NEMA) Act, Section 58, second schedule.
- o) The Consultant shall also prepare the ESIA report in accordance with the environmental policies, guidelines and procedures of the National Environmental Management Authority as well as in accordance with the International Environmental Conventions signed by the government

This EIA study was designed to respond to the issues identified by the client in the TOR. The scope of study was however expanded to capture other environmental concerns that are relevant to the project but which may not be captured in the TOR.

10.2.2: Legal Scope of the Study

The Second Schedule of EMCA specifies projects that require to be subjected to EIA studies. In line with the Second Schedule, the proposed construction of the Road was screened and found to devoid of concerns that would require resolution through a full cycle EIA. As such, the NEMA screening procedure as expounded in Legal Notice 101 of June 2003 was adopted leading to development of a Project Report whose focus and scope are defined in Regulation 6, 7 and 8 of Legal Notice 101. Section 6 of part 1 of the LN 101 stipulates that “*An application for an Environmental Impact Assessment License shall be in the form of a Project Report in the form set out in the First Schedule to these Regulations, and the applicant shall submit the application together with the prescribed fee to the Authority... Section 7(1) of Part 11 of the Legal Notice 101 specifies the contents (scope) of the project report.*”

A proponent shall prepare a project report stating: -

- a) The nature of the project;*
- b) The Division of the project including the physical area that may be affected by the project’s activities;*
- c) The activities that shall be undertaken during the project construction, operation and decommissioning phases;*
- d) The design of the project;*
- e) The materials to be used, products, by-products, including waste to be generated by the project and the methods of disposal;*
- f) The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation;*
- g) An action plan for the prevention and management of possible accidents during the project cycle;*
- h) A plan to ensure the health and safety of the workers and neighbouring communities;*
- i) The economic and socio-cultural impacts to the local community and the nation in general;*
- j) The project budget;*
- k) Any other information that the Authority may require*

10.2.3 Data collection for the ESIA Study report

Desktop Study: The study process involved review of diverse documents with a view to familiarizing with the baseline environment. These include: -

- Range Management Handbook for Marsabit District (obtained map for the Project Area)
- Research Work by Sean Avery and others on the Hydrology and climatology of the lake Turkana Basin
- CIDPs for Marsabit County

Accruing secondary data was reviewed so as to provide an insight into the socio-environmental baseline of the program area. Preliminary opinions formed from literature review were re-validated during fieldwork undertaken on the ground.

Field data collection: Field data collection employed diverse methodologies including observations during drives along the target road, observations and photography, identification and detailed investigations at sites of interest, among others. Emergent concerns were further interrogated through interviews with thematic experts.

Stakeholder engagement: In line with statutory requirements, views of stakeholders to the proposed development were solicited as part of the EIA process. Such views/comments were used to refocus the project design and have been appended to the Report as manifest of the public attitude towards the proposed development.

Data Analysis and Impact Prediction: Upon data analysis, potential environmental impacts (both positive and adverse) were predicted based mainly on concerns raised by stakeholder and expert observations on the ground and available tools. The magnitude, significance, and acceptability of predicted impacts were evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation. Impacts were further screened for occurrence and significance of residual (those which cannot be mitigated satisfactorily) and cumulative impacts with a view to providing a basis of making recommendations on the way forward for the project.

10.3 Findings of the Study

10.3.1: Findings from Baseline Characterization

The baseline characterization served to map the scenario pre-existing the proposed upgrading of the 108 Km long Road as a background against which impact prediction was then be undertaken. Main concerns emerged as follows: -

- i) Incidence of high levels of poverty occasioned by low economic production imposed by both aridity and barrenness of the soil
- ii) Lack of viable alternative means to livelihood
- iii) High vulnerability to droughts and escalation of poverty
- iv) Occurrence of sensitive natural resources mainly the Sibiloi National Park and its Koobi Fora beds.
- v) The disappearing Wildlife

These concerns were carried through the impact prediction process

10.3.2: Findings from Baseline Characterization

All stakeholders are largely in support of the project which is expected to open up the North Horr Hinterland of the Eastern shoreline of Lake Turkana inclusive of the Sibiloi National Park and the fishery resources at Ileret. From consultations with local Administration, the Study was sensitised on the need to manage stakeholder perceptions, more-so those of the Daasanach Community in Ileret who may not understand why the road project is not extending to their territory.

10.3.3: Benefits from the Project

The proposed project enjoys overwhelming public support as it is a strategic Economic Enabler likely to provide a favourable environment for economic transformation in the traverse area. Construction will inject over ten billion Kenya shillings some of which will enter the local economy with permanent positive impacts. Once commissioned, the road will provide efficient and comfortable transport of people and goods and will enhance the speed of service delivery including security response.

10.3.4: Advance impacts that may require mitigation

From discussions with the late Dr Richard Leakey, it was revealed that Koobi Fora research beds do not extend into the Traverse area which was a major relief to the Study. Further given the traverse through inherently low population density areas, displacement impact is very small, factors that confer positive net environmental benefit pre mitigation. The main concern however is the tendency of both road construction and operation to occasion and influx of speculators whose demand for services is likely to apply pressure on the local ecology and resources which are both delicate and fragile.

10.4. The need for Strategic Mitigation

From the baseline characterization the extremely sad scenario of an area severely punished by aridity which in tandem with frequent droughts consigns the local population to escalating poverty and very low resilience to subsequent droughts. Drought emergencies and famines including loss of livestock are routine events in the area. Thus, as the project for road upgrading moves towards implementation, the reality is that, a road is basically an economic enabler and should be complemented by other economic enablers towards supporting Economic drivers. Without Economic Drivers as anticipated in Kenya Vision 2030, the road is likely to suffer low economic return. Interventions were identified as follows: -

The need for other economic enablers: For the road to effect an economic transformation in the target area, it required to be complemented by other Economic Enablers namely Water and connection to Grid Power Supply both of which are critical any investment. Probably, some of the Grid Power locally generated in the Lake Turkana Wind Farm can be diverted northwards through Loiyangalani to North Horr. As well, probably the Cross-boundary water transfer from the Omo basin in Ethiopia could be routed through Ileret, Daratthe and North Horr.

The need to climate-proof the local economy: Although mobile pastoralism is an adaptation to high climate variability and aridity, traditional patterns of mobility are proving inadequate as key resource areas are degraded through over-use or lost to other uses, and pastoralists are forced to migrate to new areas. Productivity of the current livestock industry is currently low as to form a basis for economic transformation. Expansion of the sector is greatly limited to the carrying capacity whose execution is strictly supervised by droughts whose frequency is increasing. A possible way out is to make water available which would enable operation of village level feedlots using locally grown feeds. By so doing, the local carrying capacity will be expanded to the benefit of local producers, traders and the national economy. That would be a starting point towards building pastoral resilience.

Identify and invest in Alternative Economic Drivers: With its limitations, livestock keeping is currently the only Economic Driver Possible in the traverse area. Yet, investment in the road and other economic enablers will widen the scope for investment in the area. Other possible economic drivers would include Development of a Tourist Circuit targeting Lake Turkana, Sibiloi National Park, The Mt Kulal/ Mt Nyilu Biosphere Area, Lake Turkana Wind Farm, among others.

Market Marsabit County as a global Centre for Paleo-research: Reading stories available in common Literature, one would be forgiven to believe that Turkana County is the focal area for paleo-research. What with names such as discovery of the Turkana Boy, among others. Yet, the reality on the ground is that, with its Koobi Fora beds sitting within Sibiloi National Parks on the Eastern Shoreline of Lake Turkana (Plate 8.1), Marsabit County is the global focal point for research in the early origins of the Hominid Species with the Turkana Basin Initiative being hosted in Ileret. Marsabit County should take lead and position itself as the focal point for such research and possibly develop the concept of Research Tourism along the lines of medical tourism developed in India and Religious Pilgrimages to Mecca and the Holy Land.

Explore possibility for commercial utilization of the Basalt Rock: Alongside the hot arid climatology, basalt rock seems to be the natural endowment for Marsabit County where tons over tons of basalt rock covering thousands of square Kilometres will be found to the north and west of the County Headquarters. At national level, efforts should be made to explore viability and feasibility of utilizing this material to feed the national construction industry either in housing or road infrastructure development. A policy decision gazetted Marsabit as the sole national source for building stone is probably the starting point towards creating a market for this resource and developing a viable product line for the County. In the process, an economically viable way of utilizing the currently idle land will have been developed with immense benefits to the local pastoralist land owners.



Massive formation of Basalt rocks so common in Marsabit County.

The need to climate-proof the North Horr Jn- Darathe Road: This study is fully cognisant of the huge developmental challenges posed by aridity prevailing in the project area. Given that, the proposed road, that is targeted to be an economic and social game-changer is also vulnerable to the same hostile climate, design should aim at in-building measures to climate proof the road to ensure realization of its economic design life. In particular, the section through the Minor Chalbi Desert requires full attention in this regard.

10.5 Viability of the Impact Mitigation Program

This Study was able to identify viable measures in mitigation with capacity to reverse the overall negative impacts with some becoming highly positive and beneficial to the community. Some residue adverse impacts however remain and require very aggressive monitoring.

An ESMMP to guide resolution of adverse impacts has been developed as part of the Project Report in which case, the burden of mitigation largely lies with the Project Contractor under supervision by the General Manager (Design & Construction) through the Supervisor of Works. Key observations are that most adverse impacts are short-term and will disappear once civil works ends. The other core impacts can be resolved and eliminated through careful management and coordination with relevant bodies such as the NMK.

The ESSMP comes with a complementary budget of Ksh 130 million.

10.6 Recommendation:

Through this ESIA Study, the Kenya National Highway Authority (KeNHA) through the Director General - the proponent - wishes to disclose that the proposed upgrading of Darathe Jn –Darathe (A4) Road has impacts that can readily be mitigated and managed. The majority of adverse impacts identified are of a short-term nature and will cease once the civil works phase is completed. Further, other impacts can be eliminated through effective planning and management through available means of mitigation. By such disclosure, the prayer of the client to NEMA is for an Environmental License for this project to be issued in line with Section 10(2) of Part II of Legal Notice 101.

Bibliography:

1. Carter, M.R. & Barrett, C.B. (2006). The economics of poverty traps and persistent poverty: An asset-based approach. *Journal of Development Studies*, 42(2), pp. 178–199.
2. Heady, H. 1975: Range management, New York, : McGraw-Hill
3. Little, P., McPeak, J., Barrett, C. & Kristjanson, P. (2008). Challenging orthodoxies: Understanding pastoral poverty in East Africa. *Development and Change*, 39(4), pp. 585– 609,
4. Paxton, W. 2013: Equal Shares? Building a progressive and coherent asset-based welfare policy. London: Institute for Public Policy.
5. Ojwang, G.O., Wargute, P.W., Said, M.Y., et al. (2017) Wildlife Migratory Corridors and Dispersal Areas: Kenya Rangelands and Coastal Terrestrial Ecosystems.
6. Republic of Kenya, 2015: The National Wildlife Conservation Status Report, 2015 - 2017. <https://dc.sourceafrica.net/documents/120895-NWCSR-Main-Compressed.html>
7. Bert Van Bocxlaer, 2011: Palaeobiology and evolution of the late Cenozoic freshwater molluscs of the Turkana Basin: Unionidae Rafinesque, 1820, partim Coelatura (Bivalvia: Unionoidea). *Journal of Systematic Palaeontology* , Volume 9, 2011 - Issue 4

Appendices:

- **Appendix 1.1: Terms of Reference for the ESIA, RAP and Gender Mapping Studies**
- **Appendix 1.2: Curriculum Vitae and NEMA Registration for ESIA Study Team**
- **Appendix 1.3: World Bank Checklist for Roads Sector**
- **Appendix 5.1: Record of Stakeholder Engagement**
- **Appendix 7.1: NEMA Checklist for EIA Studies**
- **Appendix 7.4: Comprehensive Impact Assessment for the North Horr Jn Darathe A4 Road based on the Leopold Matrix**
- **Appendix 9.1: Sample Environmental, Health and Safety Plan**

Appendix 1.1: Terms of Reference for the ESIA, RAP and Gender Mapping Studies

5.0 Environmental and Social Impact Assessment

5.1 Background

5.1.1 The Kenya National Highways Authority (KeNHA) is responsible for the management, development; rehabilitation and maintenance of approximately 14,000Kms of class A, B and C roads which is approximately 22 % of the total length of the entire country's classified road Network. Class A roads are international trunk roads linking centres of international importance and crossing international boundaries or terminating at international ports. Class B roads are National trunk roads linking nationally important centres. Class C roads are Primary roads linking provincially important centres to each other or two higher class roads.

5.1.2 Given KeNHA's position as the custodian of the national road network and critical role in providing quality national road network for sustainable social and economic development, it has a responsibility to manage and leverage our resources in a way that promotes a healthy and sustainable environment

5.1.3 KeNHA further recognizes that its activities have wider influences and impact on the environment. The Authority is committed to continually improve its environmental performance. KeNHA will seek to develop amongst supplies/contractors, employees and members of the public an appreciation of their role in bringing about environmental improvement.

5.1.4 KeNHA further recognizes that its activities have wider influences and impact on the environment. The Authority is committed to continually improve its environmental performance. KeNHA will seek to develop amongst supplies/contractors, employees and members of the public an appreciation of their role in bringing about environmental improvement.

5.1.5 Implementation of major project in Kenya is preceded by the Environmental and Social Impact Assessment studies. It is a requirement to undertake the Environmental and Social Impact assessment according to the regulations stipulated in The Environmental Management and Coordination Act (EMCA)

1999 and the Environmental Impact Assessment and Audit Regulations 2003.

5.1.6 To ensure that the above project is implemented in an environmentally and socially sustainable manner, KeNHA intends to engage the services of a competent Consultant to conduct an Environmental & Social Impact Assessment for the proposed project. The ESIA for the proposed project is to be undertaken simultaneously with the feasibility study of the proposed project before the project is implemented so as to identify environmental and social impacts and offer mitigation measures to the anticipated impacts.

5.2 Objectives

5.2.1 The Environmental & Social Impact Assessment (ESIA) is to achieve the following objectives: KeNHA/2390/2021 :- North Horr – Jn Darathe Ap Camp (A4) Road

55

- i) To identify all potential significant adverse environmental and social impacts of the proposed project and recommend measures for mitigation measures.
- ii) To verify compliance with the national environmental and social regulations and industry's standards as well as with the Banks safeguards policies and Environmental and Social Assessment Procedures.
- iii) To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle.

- iv) To recommend cost effective measures to be implemented to mitigate against the expected impacts.
- v) To provide opportunity for consultation of all stakeholders, including communities to be affected by the project as well as Civil Society Organizations in order to obtain their input during the ESIA process.
- vi) To provide opportunity to stakeholders to participate in the identification of mitigation measures for the adverse environmental and social impacts of the project.
- vii) To prepare an Environmental and Social Impact Assessment report and accompanying Environmental and Social Management Plan (ESMP) compliant to the Environmental management and Coordination Act (1999) and detailing findings and recommendations.

5.3 Scope

The ESIA will be carried out in compliance with the Government of Kenya's Environmental Management & Coordination Act of 1999 and the Environmental (Impact Assessment & Audit) Regulations, June 2003, among other relevant laws, regulations, and guidelines standards, as well as the Bank's Environmental and Social Assessment Procedures.

The scope of services to be undertaken by the Consultant shall include but not limited to the following:

Task 1. Description of the baseline environment: The Consultant is required to collect, collate and present baseline information on the environmental and social characteristics of the existing situation in the proposed route. This description involves:

- a) Physical environment (topography, landforms, geology, soils climate and meteorology, air quality, hydrology, etc.).
- b) Biological environment (i.e., flora and fauna types and diversity, endangered species, sensitive habitats, etc.).
- c) Social and cultural environment, including present and projected, where appropriate (i.e., population, land use, planned development activities, community structure, gender, employment and labour market, sources and distribution of income, cultural properties, etc.). This shall also include identification of any resettlement and compensation needs that could trigger the need to prepare a Resettlement Action Plan (RAP)

Task 2. Detailed Description of the Proposed Project: The Consultant is to concisely describe the proposed project, its geographic location, ecological, general layout of facilities including maps at appropriate scale where necessary.

Task 3. Legislative and Regulatory Framework: The Consultant shall identify and describe all pertinent regulations and standards governing the environmental quality, solid and liquid waste management, health and safety, protection of sensitive areas, land use control at the national and local levels and ecological and socio-economic issues. Compliance issues should also be stated.

Task 4. Identify potential environmental and social impacts that could result from the project:

The Consultant shall analyse and describe all significant environmental and social impacts expected due to the proposed project. These would encompass environmental, ecological and social impacts, both positive and negative, as a result of interaction between the proposed project and the environment that are likely to bring about changes in the baseline environmental and social conditions discussed in Task 1. The Consultant shall differentiate between short, medium and long-term impacts. During the analysis, the consultant shall

consider both biophysical and socio-economic factors that will include the impacts of: Population change and migration; Socio-economic characteristics of the different target groups along the proposed route; Forms of social organization and co-operation; Physical and social infrastructure; Change in economic activities; Development resources; Vegetation clearance; Mechanical disturbance; Removal of structure /sites; Effects on flora and fauna; Air quality; Improved access; Accident rates; and Visual/aesthetic change.

Task 5. Occupational Safety & Health concerns: The Consultant shall analyse and describe all occupational health and safety concerns likely to arise as a result of construction and operations of the proposed facility. The Consultant shall make recommendations on corrective and remedial measures to be implemented under the environmental and social management plan. The Consultant will include emergency/disaster preparedness plans for the project.

Task 6. Carry out public participation and consultations on the positive and negative impacts of the project: The Consultant shall carry out a social due diligence which will involve a description of the social, economic and cultural status of the project area. The Consultant shall organize forums for public participation to enable interested & affected parties, including Civil Society Organizations/NGOs, to present their concerns and opinions regarding the proposed project. Deliberate efforts will also be made to ensure inclusion of women in the public consultation. The views of the public will be solicited and incorporated in the main actual report.

Task 7. Propose Mitigation Measures to the identified environmental and social impacts. The consultant shall come up with the feasible mitigation measures for the negative impacts that could result from the proposed project.

Task 8. Development of Environmental and Social Management Plan to mitigate negative impacts: The Consultant shall develop a comprehensive Environmental and Social Management Plan (ESMP). The plan should recommend a set of mitigation, monitoring and institutional measures to eliminate, minimize or reduce to acceptable levels of adverse environmental impacts and/or maximize socio-economic benefits.

The Consultant shall provide cost outlays for the proposed measures as well as their institutional and financial support.

Task 9. Development of Environmental and Social Monitoring Plan: The Consultant is required to give specific descriptions, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, and definition of thresholds that will signal the need for corrective actions as well as deliver monitoring and reporting procedures. The Consultant will provide time frames and implementation mechanisms, staffing requirements and cost outlays.

Environmental & Social Impact Assessment Report: The main output shall be an Environmental & Social Impact Assessment Report. The report shall be in the English Language and has to be clear and concise. The report will be in a format acceptable to KeNHA and NEMA. More specifically, it will be expected to include the following, which are also indicative of the depth of the scope:

1. Executive Summary: This shall include a concise description of the proposed project; environmental setting, highlight of key findings and recommended mitigation and monitoring procedures.
2. Policy, Legal and Administrative/Institutional Framework: This shall include a detailed description of existing legislation, regulation and policy governing solid and liquid waste management, air emissions, environmental quality, social, health and safety among others. The level of compliance to the applicable laws and corporate environment, social, safety and health policy shall be clearly stated.

3. Methodology: A description of the methodology used by the consultant to carry out the study shall be well stated.
4. Description of the proposed project: The consultant shall give project introduction covering a short description of the proposed project activities (construction, operations and maintenance); identify the project sponsor and a brief history of the project.
5. Environmental and Social Impacts identification, assessment and impact significance ranking.
6. Public Consultation: Provide a summary of steps taken to consult local populations, interested parties, and government agencies; with key concerns of each party being included.
7. Identification of potential positive and negative/adverse environmental and social impacts that will arise as a result of implementing the project
8. Impact mitigation measures and Environmental and Social Management Plan: This shall include proposals of feasible mitigation measures, adequate ESMP and the cost of impact mitigation
9. Major Conclusions and Recommendations.
10. References: All sources of information shall be clearly documented with clear names and proper locations under references.
11. Appendices.

The Consultant shall present the report to the National Environment & Management Authority (NEMA) for approval in the required number of copies.

5.4 Resettlement Action Plan

General: To ensure that the above project is implemented in an environmentally and socially sustainable manner, the Consultant will be required to prepare a Resettlement Action Plan for the proposed project in line with Bank's Policy and guidelines on involuntary resettlement.. The preparation of the RAP is to identify Project Affected Populations (PAPs), the assets that will be affected, social impacts on the PAPS and community and offer social safeguard measures and minimize the impacts of Resettlement on the livelihoods of the PAPs.

The Consultant's key staff selected to undertake the Services shall have had extensive experience in preparation of Resettlement Action Plans to the Bank standards of major infrastructure assignments especially road projects.

OBJECTIVES

The objectives of the Resettlement Action Plan will be as follows: -

- To identify all potential project affected persons and the impacts of the proposed projects on their livelihoods and recommend measures to minimize Resettlement effects and safeguard livelihoods.
- To carry out a socio-economic survey to generate baseline data for monitoring and evaluation during project implementation period.
- To carry out an asset inventory survey of all potential assets that will be affected by the proposed projects
- To verify compliance with the Bank's Involuntary Resettlement Policy and any other national Relocation and Resettlement Regulations that govern the industry

- To provide guidelines to stakeholders participating in the minimizing resettlement impacts of the project
- To recommend cost effective measures to be implemented to safeguard the livelihoods. To prepare a Resettlement Action Plan (RAP) report compliant to the Bank and KeNHA Regulations.

The Resettlement Action Plan is expected to cover the elements below, as relevant. When any element is not relevant to project circumstances, it should be noted in the resettlement plan.

1. Description of the project.

General description of the project and identification of the project area.

Potential impacts of the road.

Identification of

- (a) the project component or activities that give rise to resettlement;
- (b) the zone of impact of such component or activities;
- (c) the alternatives considered to avoid or minimize resettlement; and
- (d) the mechanisms established to minimize resettlement, to the extent possible, during project implementation.

Objectives.

The main objectives of the resettlement program.

2. Socio-economic, census and asset survey studies.

The findings of socioeconomic studies to be conducted in the early stages of project preparation and with the involvement of potentially project affected people, including

- (a) the results of a census survey covering
 - (i) current occupants of the affected area to establish a baseline for the design of the resettlement program and to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance;
 - (b) the results of the socio economic survey
 - (i) social characteristics of the potential PAPs, including a description of production systems, labour, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population;
 - (ii) the magnitude of the expected loss (total or partial) of assets, and the extent of displacement, physical or economic;
 - (iii) social infrastructure and services
 - (iv) Information on vulnerable groups or persons as provided for in OP 4.12, para. 8, for whom special provisions may have to be made; and

(v) Provisions to update information on the displaced people's livelihoods and standards of living at regular intervals so that the latest information is available at the time of their displacement.

(vi) Attitude to the project

(c) The results of the impact survey describing the following

(i) land tenure and transfer systems, scope of land acquisition, distribution of land acquisition in administrative units, nature of land to be acquired for the project, including an analysis of development status of land owned by individual PAP households, analysis of likely extent of damage to assets, analysis of potential displacement of livelihoods; inventory of common property natural resources from which people derive their livelihoods and sustenance, non-title-based usufruct systems (including fishing, grazing, or use of forest areas) governed by local recognized land allocation mechanisms, and any issues raised by different tenure systems in the project area,

(ii) the patterns of social interaction in the affected communities, including social networks and social support systems, and how they will be affected by the project;

(iii) analysis of potential displacement of communal assets including public infrastructure and social services that will be affected; and

(vii) social and cultural characteristics of displaced communities, including a description of formal and informal institutions (e.g., community organizations, ritual groups, nongovernmental organizations (NGOs)) that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

3. Legislative and Regulatory Framework

The findings of an analysis of the legal framework, covering

(a) the scope of the power of eminent domain and the nature of compensation associated with it, in terms of both the valuation methodology and the timing of payment;

(b) the applicable legal and administrative procedures, including a description of the remedies available to displaced persons in the judicial process and the normal timeframe for such procedures, and any available alternative dispute resolution mechanisms that may be relevant to resettlement under the project;

(c) relevant law (including customary and traditional law) governing land tenure, statutory mechanism for land acquisition, valuation of assets and losses, compensation, and natural resource usage rights; customary personal law related to displacement; and environmental laws and social welfare legislation;

(d) laws and regulations relating to the agencies responsible for implementing resettlement activities;

(e) gaps, if any, between local laws covering eminent domain and resettlement and the Bank's resettlement policy, and the mechanisms to bridge such gaps; and

(f) any legal steps necessary to ensure the effective implementation of resettlement activities under the project, including, as appropriate, a process for recognizing claims to legal rights to land including claims that derive from customary law and traditional usage (see OP 4.12, para.15 b).

(g) commonalities between GoK, and the Bank guidelines, basis for effecting payment outside Kenyan legal system

4. Institutional Framework

The findings of an analysis of the institutional framework covering

- (a) the identification of agencies responsible for resettlement activities and NGOs that may have a role in project implementation;
- (b) an assessment of the institutional capacity of such agencies and NGOs; and
- (c) any steps that are proposed to enhance the institutional capacity of agencies and NGOs responsible for resettlement implementation.

5. Determine Eligibility

Definition of displaced persons and criteria for determining their eligibility for compensation and other resettlement assistance, including relevant cut-off dates.

6. Valuation of and compensation for losses

The methodology to be used in valuing losses to determine their replacement cost; and a description of the proposed types and levels of compensation under local law and such supplementary measures as are necessary to achieve replacement cost for lost assets.

7. Propose Resettlement measures and entitlement matrix.

A description of the packages of compensation and other resettlement measures that will assist each category of eligible displaced persons including the vulnerable populations to achieve the objectives of the policy. In addition to being technically and economically feasible, the resettlement packages should be compatible with the cultural preferences of the displaced persons, and prepared in consultation with them.

8. Site selection, site preparation, and relocation.

Alternative relocation sites considered and explanation of those selected, covering (a) institutional and technical arrangements for identifying and preparing relocation sites, whether rural or urban, for which a combination of productive potential, locational advantages, and other factors is at least comparable to the advantages of the old sites, with an estimate of the time needed to acquire and transfer land and ancillary resources;

- (b) any measures necessary to prevent land speculation or influx of ineligible persons at the selected sites;
- (c) procedures for physical relocation under the project, including timetables for site preparation and transfer; and
- (d) legal arrangements for regularizing tenure and transferring titles to resettlers.

9. Housing, infrastructure, and social services.

Plans to provide (or to finance resettlers' provision of) housing, infrastructure (e.g., water supply, feeder roads), and social services (e.g., schools, health services); plans

to ensure comparable services to host populations; any necessary site development, engineering, and architectural designs for these facilities.

10. Propose Mitigation Measures for Environmental protection and

management.

A description of the boundaries of the relocation area; and an assessment of the environmental impacts of the proposed resettlement and measures to mitigate and manage these impacts (coordinated as appropriate with the environmental assessment of the main investment requiring the resettlement).

11. Carry out Public Participation and Community participation.

Involvement of resettlers and host communities, (a) a description of the strategy for consultation with and participation of resettlers and hosts in the design, implementation of the resettlement activities and modalities for disclosure;

(b) A plan for CSO engagement in the resettlement planning process;

(c) a summary of the views expressed and how these views were taken into account in preparing the resettlement plan;

(d) a review of the resettlement alternatives presented and the choices made by displaced persons regarding options available to them, including choices related to forms of compensation and resettlement assistance, to relocating as individuals families or as parts of pre-existing communities or kinship groups, to sustaining existing patterns of group organization, and to retaining access to cultural property (e.g. places of worship, pilgrimage centers, cemeteries); and

(e) institutionalized arrangements by which displaced people can communicate their concerns to project authorities throughout planning and implementation, and measures to ensure that such vulnerable groups as indigenous people, ethnic minorities, the landless, and women are adequately represented.

12. Propose Measures for Integration with host populations

Measures to mitigate the impact of resettlement on any host communities, including

(a) consultations with host communities and local governments;

(b) arrangements for prompt tendering of any payment due the hosts for land or other assets provided to resettlers;

(c) arrangements for addressing any conflict that may arise between resettlers and host communities; and

(d) any measures necessary to augment services (e.g., education, water, health, and production services) in host communities to make them at least comparable to services available to resettlers.

13. Propose Grievance Redress procedures

Affordable and accessible procedures for third-party settlement of disputes arising from resettlement; such grievance mechanisms should take into account the availability of judicial recourse and community and traditional dispute settlement mechanisms.

14. Organizational responsibilities

The organizational framework for implementing resettlement, including identification of agencies responsible for delivery of resettlement measures and provision of services; arrangements to ensure appropriate coordination between agencies and jurisdictions involved in implementation; and any measures (including technical assistance) needed to strengthen the implementing agencies' capacity to design and carry out resettlement activities; provisions for the transfer to local authorities or resettlers themselves of

responsibility for managing facilities and services provided under the project and for transferring other such responsibilities from the resettlement implementing agencies, when appropriate

15. Prepare an Implementation schedule.

An implementation schedule covering all resettlement activities from preparation through implementation including target dates for the achievement of expected benefits to potential PAPs and hosts and terminating the various forms of assistance. The schedule should indicate how the resettlement activities are linked to the implementation of the overall project.

16. Provide Resettlement Costs and budget.

Estimated costs of the resettlement process and total budget for the RAP in tables showing itemized cost estimates for all resettlement activities, including allowances for inflation, population growth, and other contingencies; timetables for expenditures; sources of funds; and arrangements for timely flow of funds, and funding for resettlement, if any, in areas outside the jurisdiction of the implementing agencies.

17. Propose Measures for Monitoring and Evaluation.

Arrangements for internal monitoring of resettlement activities by the implementing agency, supplemented by independent external monitoring as considered appropriate by the Bank, to ensure complete and objective information; performance monitoring indicators to measure inputs, outputs, and outcomes for resettlement activities and means of verification; involvement of the displaced persons in the monitoring process; evaluation of the impact of resettlement for a reasonable period after all resettlement and related development activities have been completed; using the results of resettlement monitoring to guide subsequent implementation.

18. Resettlement Action Plan Report

The main output shall be a Resettlement Action Plan Report. The report shall be in the English Language and has to be clear and concise. The report will be in a format acceptable to KeNHA and the Bank.

5.5 Terms of Reference for Gender Analysis

Introduction

The purpose of this is to develop strategies to promote gender equality in the road infrastructure development. The focus is to enhance understanding on the gender dimensions of road infrastructure development in the surrounding communities, through identification of barriers to women's full participation in economic development. The emphasis is to determine strategic solutions to address the different needs and gender dynamics of the population living along the project.

Tasks

- i. The Consultant shall conduct a Gender analysis of the road project in so far as the road influence the lives of women, children, the elderly and the disabled, and quantify the benefits which would accrue to them during and after the construction of the road.
- ii. The Consultant shall indicate the positive and negative effects of the development of the road section on this target group and shall recommend appropriate modifications to minimize any negative effects.
- iii. The Consultant shall collect data on different economic and social characteristics of the target population and identify tasks currently undertaken by the target group that could be affected by the project; include the

division of time and labour by gender and age to accomplish tasks, and proportion of time spent on transportation related activities.

iv. The Consultant shall consult women, children and elderly as to the effects of the infrastructure system on them; reduction in time spent transporting fuel, water and produce; type of appropriate technology needed to improve transportation and its effects on employment; ownership of transport vehicles; and savings in transport cost.

v. The Consultant shall identify those who are now providing transport services and how they will be affected; effects on target groups access to employment, education, health and community services, and recreation.

vi. The Consultant will assess the extent to which transportation project will affect target groups control over economic resources and the family budget.

vii. The Consultant shall demonstrate how the project can respond to the needs of target group either by adjusting the location, the timing and the support services; and how they may participate in project management.

viii. The Consultant shall identify the road project components that would help the target population benefit from the project including improving the general layout and traffic movement.

Conduct of Work

The Consultant will be expected to be fluent in English Language and be able to work closely with KeNHA's staff and other third parties relevant to the assignment. All documentation shall be in English. The Consultant shall undertake not to reveal to unauthorized parties nor to use in any way the technical information e.g. procedures, data, plans, drawings, equipment findings and recommendations, which will be placed at its disposal by KeNHA and other stakeholders, or which in any case comes to the Consultant's knowledge during the execution of this assignment.

The consultant will be required to adhere to KeNHA's Safety, Health and Environment (HSE) requirements.

Improvement of Terms of Reference

The Consultant may offer suggestions and improvements to the Terms of Reference that he/she considers will result in better implementation of the project. Such proposals if accepted will form part of the Terms of Reference of the assignment. The effect on time and cost estimates given under the above clause shall be clearly identified.

Appendix 1.2: Curriculum Vitae and NEMA Registration for ESIA Study Team

Michael Wairagu- ESIA Lead Expert and Team Leader

PERSONAL DATA

Name: Michael Mwangi Wairagu
Date of Birth: 1960
Marital Status: Married
Nationality: Kenyan
Address: Physical address: The Repcon Center,
Sigona 410 of KEFRI/KARI Rd, Muguga
Mailing address: P.O. Box 79605, Nairobi
Telephone: 254 (20) 2248119
Mobile 0721-274-358, 0732-274358;
E-mail: info@repcon.co.ke

Profession: Environment and Social Safeguards Specialist/Hydrologist

ACADEMIC BACKGROUND

B.Sc. Forestry& Wildlife Management, Moi University - 1985

MSc in Environmental Hydrology; University of Toronto - 1989

Courses taken include:-

- Hydrology of surface and sub-surface waters
- Groundwater hydrology
- Land-use hydrology
- Environmental issues in developing countries
- Environmental issues in managing arid and semi-arid lands
- Advanced Soil Science
- Graduate seminar on research and communication skills

OTHER PROFESSIONAL TRAINING

- Certificate in Mathematical Groundwater Modeling, **Institute of Meteorological Training and Research, Nairobi. 1994.**
- Certificate in Watershed Management, **Forest and Forest Products Research Institute, Tskuba, Japan 1986.**
- Certificate in Environmental Protection and Planning. Third Annual Course for NTZDC Managers, **April 1998, KEFRI Muguga.**

- Certificate in Participatory Skills Development and Training of Trainers, **Social Forestry Training Center- Kitui, 1991.**
- Certificate in Research Methods and Bio-statistics, **Social Forestry Training Center, KEFRI, Muguga**

KEY QUALIFICATIONS

Wairagu is a qualified Environmental Hydrologist with over 16 years experience (after Msc.) in the fields of Water Resource Planning and Development, Forestry, Environmental Impact Assessment, ASAL Ecology and Resource Planning among others. Other key qualifications are as follows: -

- Practical experience in Environmental Impact Assessment in the fields of Rural Development, Roads, Urban Civil Works, Agriculture, ASAL and Water Resource Development, Irrigation and Drainage, Forestry, Tourism etc.
- Practical experience in conduct of Strategic Environmental Assessments. I have already successfully concluded two as follows:-
 - ✓ SEA for the JICA funded Masterplan for Mombasa Special Economic Zone
 - ✓ SEA for the GoK funded Masterplan for the Leather Industrial Park at Kinanie, Athi River
- Practical experience in the formulation of ESMFs and RPF documents. I have participated in more than six studies targeting formulation of ESMF and RPF documents. In four of these projects, I was hired directly by the World Bank to work on projects in Nairobi and Zanzibar. They include:
 - a. Formulation of ESMF and RPF documents for the Kenya Municipal Programme (KMP) and the Keya Informal Settlements Programme (KISIP)
 - b. Formulation of and ESMF and RPF for the Zanzibar Secondary education project.
 - c. Formulation of an ESMF/ RPF for the World Bank Community Driven Development project (WKCDD&NRM project)
 - d. Formulation of an ESMF and RPF for the OBA Water and Sanitation project for the Greater Nairobi area.
 - e. Formulation of and ESMF for the Phase II of the Arid Lands Resource management project (ALRMAP II) in 2003. As part of the assignment, environmental assessments on potential of tapping both solar and wind energy to power health centers in Garissa and Wajir Districts were explored.
- Multi-disciplinary specialist training in the fields of Hydrology and Watershed Management, Water and Sanitation, Environmental Concerns, Irrigation and Drainage, Soils Science, Groundwater modeling, Land-use, Fuel wood and bio-energy issues,

- Practical experience in project management cycles- **feasibility studies, appraisal, implementation, monitoring and evaluation etc** acquired when serving as Forestry and Environmental Advisor to the African Development Bank,
- Analytical and report writing skills developed when working as a researcher in the Kenya Forestry Research Institute,

PROFESSIONAL EXPERIENCE:

1994 –TO DATE: Consultant in Water, Forestry and Environmental Planning trading as Repcon Associates.

2011: Lead expert on the Supplementary EIA studies on the proposed Mombasa Southern bypass. Client: Katahira engineers and KeNHA.

2011: Lead expert on the preparation of the Resettlement Action Plan for the proposed Mombasa Southern bypass. A RAP was prepared to guide compensation for the close to 2000 people likely to be displaced by the proposed Mombasa Southern Bypass to be funded by JICA. Client: Katahira engineers and KeNHA.

2011: Hydrologist in the Baseline Survey in the feasibility study and design of the Kieni Irrigation Project. Client: National Irrigation Board.

2011: Team Leader and Consultant in the Final Evaluation of MATF-Round V projects in Kenya, Uganda and Tanzania. Wairagu led a team of 4 consultants who evaluated the 5th Round of projects implemented by FARM-Africa under the Maendeleo Agricultural Technology Fund-MATF. Client: FARM-Africa.

2010: Team Leader and Hydrologist: Environmental and Social Impact Assessment in the proposed Juba River Port expansion Project- Southern Sudan. Our team was commissioned by Katahira Engineers to undertake the environmental and social Assessment for the proposed expansion of the Juba River Port on the Nile. Client: This assignment had a component on investigating potential; impacts of tapping solar power to power the expanded port. JICA and GOSS.

2010: Team leader/Lead Expert: ESIA and RAP studies for the 80km long Lanet- Suswa 33kV transmission line. RAP and ESIA reports were prepared and approved by NEMAS. Client: KPLC.

2010: Environmentalist/ Hydrologist on the ADB-funded District Agriculture Sector Investment Project-DASIP. Under auspices of CODA, I was contracted to provide specialist input in Hydrology and Environmental Management for 27 irrigation projects funded by the ADB under DASIP within 5 regions of Northern Tanzania. The project is ongoing.

2010: Lead Expert and team leader in the Development of an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) for the World Bank funded Kenya Informal Settlements Improvement programme (KISP). Under this Programme, the GOK is supporting 15 Kenyan Municipalities to invest in projects such as roads, water supply, sewage, that improve informal settlements and Repcon Associates has been contracted to prepare modalities for guiding resolution of environmental and displacement impacts in the Programme. The studies culminated in formulation of ESMF and RPF documents in line with World Bank's Environmental Safeguards. Client: GOK and the World Bank.

2009: Team Leader in the Environmental and Social Impact Assessment for the 274 Km 132kV transmission line from Nanyuki-Meru, Ishiara Kieni, Mwingi-Kitui-Wote-Sultan Hamoud Transmission. Wairagu was Team Leader in the development of the Resettlement Action Plan and Environmental Impact Assessment. The purpose of the EIA and RAP was to give general guidelines for the EIA and Resettlement policies as stipulated in the laws of Kenya. Advice on the mechanisms for compensation claims triggered by the 274km way leave created was documented. A Resettlement Action Plans was prepared for the Transmission Line Projects.
Client: KPLC

2009: Development of an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) for the World Bank funded Kenya Municipal Programme (KMP). Under this Programme, the GOK is supporting 15 Kenyan Municipalities to undertake Institutional Reforms and simultaneously invest in infrastructural development towards enhanced service delivery. Wairagu has been contracted to prepare modalities for guiding resolution of environmental and displacement impacts in the Programme. The result was an ESMF and RPF documents formulated along the World Bank's Environmental Safeguards. **Client: GOK and the World Bank.**

2009: Impact Assessment of Dairy Goat Enterprises in Meru and Kitui/Mwingi areas. Wairagu led a team of 2 consultants who undertook impact assessment studies for the Dairy Goat Project implemented in Meru and Kitui Mwingi by FARM-Africa. **Client: FARM-Africa.**

2008/09: Environmentalist/ Hydrologist in the Environmental Impact assessment studies in respect of 24 flood control projects in the Nyando Basin Kenya. EIA studies were undertaken for 24 flood control schemes where proposed mitigations included weirs, evacuation centers, boreholes, dispensaries, etc. **Client: JICA and WRMA.**

2008: Hydrologist/ Catchment conservation Specialist to the Africa Development Bank funded Monduli Water Supply and Sanitation Project: With funds from the Africa Development bank, The Government of Tanzania was implemented and Water supply and Sanitation Project covering 18 villages and 2 small towns in Monduli District. Wairagu was contracted to review the ESMF and RPF prepared under auspices of the project following which, he organized communities in the project area to implement the ESMF in aspects of catchment and environmental conservation including sanitation. **Client: Monduli District Council and the ADB.**

2006: Hydrologist in the JICA funded study on Integrated Flood Management for the Nyando River Basin, Kenya. My specific role is to prepare a Watershed Management Plan for the Nyando Basin. **Client, Ministry of Water and irrigation in association with JICA (on going)**

2006: Development of an ESMF and RPF for the World Bank funded Western Kenya Community Driven Development project. Under this project, the World Bank was financing community-based projects in the field of Water resources, and natural resource management including flood mitigation in three basins of rivers Nzoia and Yalla in Western Kenya. Wairagu was contracted as part of the ERM Team that drafted both ESMF and RPF frameworks for this project that is currently under implementation. **Office of the President, Special Programmes and the World Bank.**

2006: Development of an Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) for the World Bank funded OBA Pilot Project in Kenya. This project involved developing capacity for Rural Community Water projects in the Athi Water Services board are to adopt use of commercial funding to invest in water supply. **Client: The World Bank (WSP-Africa).**

2004 : Environmental Audit/ Impact study on Deforestation, Charcoal Burning and Environmental Degradation in Jamamme District Somalia. Client: Agro sphere, Nairobi.

2002 Hydrologist in the Ewaso Ng'iro North Catchment conservation and Water Resource Management Study. In this capacity, I led teams that undertook several studies as follows:-

- **Environmental Baseline Study of the Ewaso Ng'iro North Drainage Basin**
- **Feasibility Study and Design of an Integrated Catchment Conservation and Management Programme for the Ewaso Ng'iro North Drainage Basin.** Study and was executed in association with Nippon Koei of Japan. Client: The Ewaso Ng'iro North Development Authority and the African Development Bank.
- **Environmental Impact Assessment in the Feasibility Study and Design of Small-Scale Irrigation Projects within the Lower Ewaso Ng'iro North Drainage Basin.** The assignment investigated potential environmental impacts of small-scale irrigation development in the ASAL districts under the ENNDA jurisdiction. It was undertaken as part of the Ewaso Ng'iro North Catchment Conservation and Water Resource Management Study and was executed in association with Nippon Koei of Japan. Client : ENNDA/ADB/Nippon Koei (Japan).
- **Environmental Impact Assessment in the Feasibility study and design of rural community water supply projects within the Ewaso Ng'iro North Drainage Basin.** The assignment involved an analysis of the current water supply scenario in the 21 districts drained by the Ewaso Ng'iro North River. Costed investment packages to enhance supply of water for domestic and livestock watering were developed followed by an analysis of Environmental Impacts. The study was undertaken as part of the Ewaso Ng'iro North Catchment Conservation and Water Resource Management Study and was executed in association with Nippon Koei of Japan. Client : ENNDA/ADB/Nippon Koei (Japan).
- **Feasibility Study to Develop a Research, Training and Information Center for the Ewaso Ng'iro North Development Basin.** Among other duties, the center would undertake drought monitoring to provide Early Warning Systems on all resources for districts within the ENNDA jurisdiction.

2000: Monitoring study on environmental and social implications of use of firewood and other alternative sources of Household Energy in Refugee Camps. The study was undertaken at the Dadaab and Kakuma refugee camps in Garissa and Turkana Districts respectively at the request of the UNHCR.

1999: Environmental Impact Assessment for the Nairobi Roads Improvement Project under the El Nino Emergency Project. This assignment was undertaken jointly with Tahal Consulting Engineers. The aim was to assess the potential negative impacts of road rehabilitation operations in Nairobi under the El Nino Emergency Project. Client: The El Nino Emergency Project/Tahal Engineers.

1999: An environmental rehabilitation plan for the Aberdares. Treetops salient .Hotel and Vicinity. An Afforestation design aimed at enhancing aesthetic beauty in the vicinity of Treetops Hotel was prepared. Client: **Aberdare Safari Hotels.**

1995 – 1998: Forest Conservation Advisor- African Development Bank /Gok Nyayo Tea Zones Improvement and Forest Conservation Project. I was the forestry/ environmental specialist

member of a multi-disciplinary team comprising of a tea agronomist, a forester, a budgeting specialist, soil specialist, monitoring & evaluation specialist and a Management Information System (MIS) specialist. My assignment was to plan and implement a rehabilitation programme for 22 forest blocks, which comprise the catchments for Kenya's main river system. Additionally, I designed and implemented in-house training programmes for counter-part staff.

1985-1993 KENYA FORESTRY RESEARCH INSTITUTE

1989-1993: Hydrologist/Research Officer: Hydrology Section, Kenya Forestry Research Institute

1985 - 1989: Trainee Hydrologist: Environment and Silviculture Department, Kenya Forestry Research Institute

LANGUAGE PROFICIENCY

	<u>WRITTEN</u>	<u>READING</u>	<u>SPOKEN</u>
English	Excellent	Excellent	Excellent
Kiswahili	Excellent	Excellent	Excellent

CERTIFICATION

I, the undersigned, certify that these data describes me, my qualifications and my experience.

Name: **Michael M. Wairagu**

Signature:



Date: June, 2016

FORM 5

(r. 14(4))



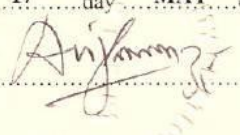
Application Reference No.: **015**
Registration No.: **0177**

FOR OFFICIAL USE

THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT
CERTIFICATE OF REGISTRATION AS AN ENVIRONMENTAL IMPACT
ASSESSMENT/AUDIT EXPERT

This is to certify Ms. **MR. MICHAEL MWANGI WAIRAGU**
of **P. O. BOX 79605 - 00200, NAIROBI** (Address)
has been registered as an Environmental Impact Assessment Expert in accordance with the provisions
of the Environment Management and Coordination Act and is authorized to practice in the capacity of
a Lead Expert/Associate Expert/Firm of Experts (Type) **LEAD EXPERT**

Dated this **17TH** day **MAY** of 20 **07**

Signature 

(Seal)

Director General
The National Environmental Management Authority



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/15706

Application Reference No:

NEMA/EIA/EL/20428

M/S **Michael Mwangi Wairagu**
(individual or firm) of address

P.O. Box 79605-00100, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **0177**


in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **6/28/2021**

Expiry Date: **12/31/2021**

Signature.....

(Seal)

 **Director General**
The National Environment Management
Authority

P.T.O.



ISO 9001: 2015 Certified

Benjamin Ndiithi-Associate EIA Expert

CURRICULUM VITAE

NAME: Benjamin Wachira Ndiithi

ADDRESS: P. O. BOX 284-20303 Ol'Kalou. Tel: 0722 107 943, 0733 646 131

E-mail: benjaminwachira53@yahoo.com

EDUCATION

Hold B.Sc. (Forestry) Degree, Honors, Moi University, Eldoret.1986.Moi University – 2nd and 3rd years (1984/86)

1983-1984 University of Nairobi, Kabete Campus in my 1st year of study.

2018 April –Undertook Certificate in Statistical Packages for Social Scientist (**SPSS Version 20**) ,Course No. 5/2018 at Kenya School of Government, Nairobi

2017 April -Certificate in Integrated Environmental Impact Assessment & Audit (EIA/EA) Course No. 13/2017 at Kenya School of Government(KSG) , Nairobi.

2017 August-Registered and authorized to practice in the capacity of an Associate Expert by NEMA , Vide **Expert Registration No. 9440** under Act Cap 387 Laws of Kenya on 8/22/2017.

2018 March: Issued with Year 2018 License to Practice Environmental Impact Assessment/ Audit (EIA/EA).-**License No. NEMA/EIA/ERP/7796 on 3/27/2018.**

1994-Diploma Clearing and Forwarding, Kenya Institute of Cargo Forwarders , Nairobi.

1980/81: Form V and VI (A- Level) at Njoro Boys' High School, Nakuru

Scored: **2 Principal pass & 2 Subsidiary pass**

Subject combination of study- (Mathematics, Chemistry and Biology- MCB).

1976/79 : O-Level at Nkubu High School, Meru, and **Scored Division 1**

Computer Skills: Have a personal laptop computer.

WORK HISTORY

2020 May: Contracted by Junipeus_Company Ltd the TOR being Identification and Documentation of Indigenous Tree Species in Muranga County the client being Green Zone Development Support Project (Phase 2; lifespan of project was 6 years ,2019-2025) in partnership with AfDB, GOK and Communities ,and implementing agent being KFS.

2019 May and June: Undertook study of ecological impact of Wildlife Control Fence Social Economic and Ecological Study in Mt, Kenya Ecosystem (Thuchi River to Thingithu river),Meru County under sub- contract by Juniperus Company Ltd, main financial support of Upper Tana Natural Resource Management Project(UTanRMP).

2019July/August: Contracted to undertake part in Preparation of Munguni Hill Participatory Forest Management Plan 2010-2023 in Tharaka–Nithi County by Lead firm Juniperus Company Ltd.

2018 December: Being the team leader with other experts from Norcken International Limited, led and carried out consultative meetings at Kamuge and also at Lokori in Turkana County on LAPSSET road project component.

2018 September –Among the staff of REPCON Associates Firm; The firm was forming part of a consortium of Engineers led by UNICONSULT (K) Ltd who had been engaged by KeNHA to undertake Design Review including Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for the Dualling of the Nyali-Mtwapa-Kwa Kadzengo section (A7) Road.

2018 July/August-Team Leader; JICA Study Team for the Improvement of access to Electricity and stabilize electric Power Supply to Nyandarua County through maximization and extension of distribution transformers in the Republic of Kenya: Questionnaire for Data Survey in Support of the Abbreviated Resettlement Action Plan- RAP.

2016/17 - Among the team Carrying out Strategic Environmental Assessment (SEA) for **LAPSSET**.

2016 October: Carrying out EIA/SIA with others from REPCON Associates the **Dual-ling of Nairobi-Dagorretti Corner C60/C61(Phase 2)** ,Nairobi.

2016 March: Participated in Environmental Impact Assessment /Social Impact Assessment (EIA/SIA) for the **Mombasa Northern By-Pass Road** from Miritini to Kwa Kadzengo in Kilifi

2015 January: Participated in Environmental Impact Assessment (EIA)/ Social Impact Assessment (SIA) during the upgrading to Bitumen standard of **Daraja Sita – Chebole – Chebunyo –Emurua Dikirr in Bomet and Narok.**

2014 November: Took part in Environment Impact Assessment(EIA)/SIA of the **Kangundo to Kenol, Kenol to Koma Rock, Katumani to Mombasa Road and the rehabilitation of Kenol-Machakos Town.**

2013/14: Key Environmentalist in the **UNHCR’S Light Years Ahead Project, a CIDA Solar Street Light** funded in the five refugee camps (viz. Ifo , Ifo 2, Dagahaley ,Hagadera and Kambioos) in Dadaab and Alinjugur in Garissa County.

2012/13: The National Alliance (TNA) Party Coordinator, Nyandarua County.

2012: Consultant for right tree species for **Farm Concern International in Tharaka Nithi County.**

October 2010: i) Environmental /Social Impact Assessment (EIA/SIA) **at Juba River Port Expansion Project , Juba ,Government of Southern Sudan (GOSS).** Also interacted on day-to-day with IDPS at the Port.

ii) Did **End of Term Evaluation for MATF Round Five of Bulb Onion** in Kieni, Nyeri, Kenya and Mang’ola, Karatu, Tanzania.

iii) Participated in carrying out Social Impact Assessment of the **132 Kv Nanyuki-Isiolo-Meru Transmission Line** (A KETRACO contracted project).

B) Muringa Holdings-October 2005-January 2006: **Operation Manager Western Kenya Region** Stationed at Changoi Tea Estate Kericho.

C) Electoral Commission of Kenya (**ECK**):**2002-2008** -Engaged during General Election and several By-elections in Nyandarua in various stations and in different positions/ranks.

D) Civil Service 1986-2000 (14 years)

Duty and ranks worked:

Lecturer ,Kenya Forestry College, Londiani (1996-2000);

Forest Department Hq, **Training Counterpart** in Conservation and Management of Indigenous Forest(COMIFOR) project (1994-1996)

Kenya Forestry Master Plan preparation (1993-1995);

Provincial Forest Officer (PFO), North Eastern Province and by virtue of office was a member of Provincial Tender Board (1992)

District Forest Officer (DFO), Nyamira, and by virtue of office held was a member of District Tender Board (1990-1991)

Forester in-charge Suam Forest Station (1988-1989),Trans Nzoia

Assistant Forester Timboroa Forest Station (1986-1987).Uasin Gishu

Untrained Teacher 1982/83:- Bahati (PCEA) Secondary School, Nakuru (now Bahati Girls' School)

D) Community /Social Work

2000-To –date **PCEA Church: Brigade Officer**-Teaching children ages 6 to 18 years.

2002/04 **Honorary Secretary**, Ol'Kalou Farmers Sacco Society Ltd.

Co-authored “Environmental Studies” Diploma Teaching manual for Kenya Forestry College, Londiani on a GTZ contract.

Other courses:

Indigenous Forest Conservation and Management courses.

OTHERS:-

Clean driving / motorcycle riding license-class “ A,B,C,E,F and G”.

-Writing project proposals on HIV/AIDS for CBOs at Ol'Kalou .

Appendix 1.3: World Bank Checklist for Roads Sector

THE WORLD BANK EIA CHECKLIST FOR ROAD PROJECTS

	ENVIRONMENTAL ISSUE	ENVIRONMENTAL IMPACT	PLACE AS APPLICABLE YES(Y) NO(N) NOT APPLICABLE
1	Solid waste (Does the subproject)?	i. Generate ii. Collect iii. Dispose iv. None of the above	YES YES YES
2	Liquid waste (Does the subproject)?	i. Generate ii. Collect iii. Dispose iv. None of the above	
3	Drainage and surface water (Does the subproject)?	i. Overload drainage facility ii. Generate waste iii. Collect waste iv. Dispose surface water v. None of the above	NO YES YES YES
4	Sanitation and sewage (Does the subproject)?	i. Overload sewerage system ii. Generate waste iii. Collect waste iv. Dispose surface water v. None of the above	N/A YES YES YES
5	Water resources (Does the subproject)?	i. Reduced charges ii. Enhanced charges iii. Pollute ground water iv. None of the above	NO NO
6	Land resources (Does the subproject)?	i. Green areas ii. Erosion	YES YES NO NO

		iii. Soil contamination iv. Water contamination v. None of the above	
7	Aesthetic Value (Does the project degrade or scar?)	i. Natural beauty ii. Landscape iii. The scenery iv. Recreation facilities	YES YES YES
8	Human health and safety (Does the project increase /or decrease)		
9	Traffic (Does the project?)	i. Enhance traffic flow ii. Increase traffic flow iii. Reduce traffic iv. Enhance road capacity flow v. None of the above	YES YES NO YES
10	Development (Does the sub-project impart?)	i. Social benefit ii. Enhance access iii. Retard iv. None of the above	YES YES NO
11	Integration into the environment (Does the project fail to integrate into the environment due to?)	i. Poor alignment ii. Poor design iii. Faulty construction iv. Failure to rehabilitate the work sight v. None of the above	NO NO NO NO
12	Road user comfort (Does the sub-project take into account?)	i. Foot path ii. Pedestrian crossing iii. Street lighting iv. Road marking v. Pedestrian sheds	YES YES YES

		vi. None of the above	
<p>Arising from the above assessment, state whether the subproject benefits outweigh the potential residual negative environmental effects. Positive impacts outweigh negative ones. All adverse impacts can be mitigated.</p>			

Appendix 5.1: Record of Stakeholder Engagaement

Appendix 5.1: Summary of outcome from Stakeholder Engagement Meetings

Appendix 5.2: Public Consultative Meetings

1. Appendix 9.1.2.1: Public Consultative Meeting with Residents of Elbeso.
2. Appendix 9.1.2.2: Public Consultative Meeting with the Herding Community at Daradhe.

Appendix 5.3: Focus Group Discussion.

Appendix 5.4: Key Informant Interviews

Appendix 5.1: Outcome summary from the meetings.

Records of Stakeholder Consultations

Stakeholder consultations were used as entry points for the ESIA process to bridge the information gap between the stakeholders and the ESIA team. Stakeholder consultations took the form of leaders meetings, Public consultative meetings, Focus group Discussions and Key informant interviews. The main aim of public consultations as stipulated by the 2010 Constitution is to foster social good will between the public and implementing agency/team.

Stakeholder consultations the ESIA study took place in both Marsabit town and North Horr town. The meetings in these counties sort to encourage the public to have meaningful inputs into the decision-making process during the Feasibility study for the upgrading of the North Horr-Elbeso-Daradhe road.

The ESIA Process being alive to the fact that public participation and stakeholder engagement as a constitutional right can act as an early warning sign of several factors. Factors that can be improved or mitigated. These are factors such as lack of adequate information/civic education about the project and the stages of the project can be mitigated through planning for more meetings. Factors such as project bias by the public can be mitigated through more thorough and engaging public meetings with the public.

Stakeholder engagement and public meetings are a means through which public concerns can be aired and also accurate and timely information can be disseminated and can contribute to sustainable decision-making process. Through these meetings the consultants seek to inform, consult, involve, collaborative and empower stakeholders to make informed decisions.

To achieve its mandate, the ESIA team organized four type of meetings targeting leaders; the general public; special community group (focus group); and government agencies & NGOs. From the four types of meetings, a total of sixteen (14) meetings were held. The meetings were held between 29th November and 3rd of December, 2021. Meeting type and attendance by gender is shown in table 9.1 below.

The ESIA process consulted a total of 194 stakeholders amongst which 56.2% were males and 43.8% were females as observed in table 9.1. Generally, in all the meetings conducted except the focus group discussion, the male gender was dominant which is a clear indication of patriarchy in the project area. To obtain meaning consultation with women, the ESIA team held a focused group discussion separately with the women from Elbeso community to get their personal views on the proposed road development.

Table 9.1: Summary table of meetings held and attendance

<u>S/No</u>	<u>Broad Category of Meetings</u>	<u>Male</u>	<u>Female</u>	<u>Total Attendance</u>	<u>% share of attendance</u>	<u>Total number of Meetings</u>	<u>% share of meetings</u>
1	Leaders Meeting	33	9	42	21.7	1	7.1
2	Public Meetings	64	22	86	44.3	2	14.3
3	Focused Group Discussion	0	54	54	27.8	1	7.1
4	Key Informant Interviews	12	0	12	6.2	10	71.4

	TOTALS	109	85	194	100	14	100.0
--	---------------	------------	-----------	------------	------------	-----------	--------------

First Key Stakeholder Consultation Meeting

The first and only key stakeholders' meeting was held in the Down Town Conference Hall at North Horr Town Centre. The meeting's main aim was to bring leaders from North Horr town so as to disclose the project to them and also collect their views/feedback and recommendations for the project. The meeting was attended by 42 participants with representation from the National government, Community leaders, Youth leaders, women representatives and religious leaders.

Public Consultative Meetings

Two meetings were held so as to introduce the project at community level. One meeting was held at the Elbeso Market while the other one was held with the herding community at the Daradhe Watering Hole. The two public meetings/barazas were attended by 86 participants.

Focus Group Discussion Meeting

One focus group discussion was held with the Women from the Elbeso community. The main aim was to introduce the project to the women and further obtain views on the role of the women in road development project and how they would want to be involved in the implementation of the proposed road development project at hand.

Key Informant Interviews

Key informant interview involved holding one-on-one interviews with key stakeholders to the project. The main aim of the interviews was to collect qualitative data and information from stakeholders with a vast knowledge on the project area. The key informant interviews were conducted from November, 29th to December, 3rd 2021 and were conducted in both Marsabit town and North Horr town. The stakeholders consulted includes:-

1. The County Commissioner's Office
2. National Environment Management Authority
3. Water resources Authority
4. County Department of Physical planning
5. Kenya Wildlife Services
6. Kenya Forest Services
7. Assistant County Commissioner's Office- North Horr
8. Veterinaries Sans Frontiers – VSF- (NGO),
9. Concern Worldwide, (North Horr Office
10. Catholic Mission Centre, North Horr

A summary of all the core issues/emerging concerns documented during the meetings are outlined in table 9.2 below.

Table 5.2: Summary of core issues from Stakeholders Engagement Meetings at North Horr

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
16.	Leaders Meeting	1 st Dec ,2021 Down Town Hall, North-Horr	Community Leaders from North Horr Town	33	9	42	<ul style="list-style-type: none"> The land in North Horr Division is communally owned apart from land within the town centres i.e. North Horr and the Elbeso Market. The whole community should be involved in discussions for acquisition of community land for the road construction not hand picking few individuals to be involved in the discussions. Water-pan and burrow pits dug during road construction will be a safety hazard if left unsecured after road has been completed.
17.	Public Consultation Meeting	Elbeso Market 30 th November,2021	Community Members from the Elbeso Area.	38	22	60	<ul style="list-style-type: none"> The community would prefer in kind compensation for communally owned land and additional assistance such as construction of schools, hospitals, dispensaries and wells.
18.	Public Participation Meeting	Daradhe Watering Hole 2 nd December 2021	Herding Community Members from Daradhe Area.	26	0	26	<ul style="list-style-type: none"> Improvement of the road to Daradhe will be a great boost especially for the livestock market. The construction of the road will also assist the local community to access to cheaper commodities and also access to government services.
19.	Focus Group Discussion Meeting	Elbeso Market 3 rd December, 2021	Women from the Elbeso Community	0	54	54	<ul style="list-style-type: none"> Women should also be involved in the construction of the road.

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
20.	Key Informant Interview	5 th November 2022, ACC's Office- North Horr	<u>Ministry of Interior and Coordination of National Government:</u> Mr. Omingo Oluoch ACC North Horr Mr. Franco Kazungu D/OCS North Horr	2	0	2	<ul style="list-style-type: none"> The 105 kilometre road project will only improve transportation in one Location (North Horr Location) and two Trading Centres (North Horr and Elbeso) The project area is inhabited by four communities, majority being the Gabra community in North Horr and some few/minority Borana and Somali communities while Daradhe to Illeret is occupied by the Dasanach community all the way to the Ethiopian border. The land traversed by the project is mostly communally owned. The project is located in a pastoralist zone and is prone to pastoral conflicts arising from grazing and watering rights Illelet is a division / location with four sub-locations and has a higher population growth rate as compared to North Horr. The road would be more beneficial to both fishermen and pastoralist if extended to Illeret town – Illeret town enjoys diverse socioeconomic profile, rapid population growth The road should extend to Illelet at the Kenya-

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
							<p>Ethiopia border.</p> <ul style="list-style-type: none"> The road will improve security as Law enforcers will move faster to respond to emergencies and restore peace.
21.	Key Informant Interview	29th November 2022 County Commissioners Office- Marsabit County	Mr. Martin Buluma Assistant County Commissioner	1	0	1	<ul style="list-style-type: none"> Insecurity: The highly insecure area is from North Horr to Daradhe where most incidents originate from the urban centres trickling down to the rural areas. Mostly the clashes are between the local communities and rarely interfere with on-going projects. Will the upgrading of the road help to reduce the clashes?
22.	Key Informant Interview	29th November 2022 County Surveyors Office- Marsabit County	Mr. Abdulahi Marsabit County Surveyor	1	0	1	<ul style="list-style-type: none"> Land is communally owned by the community in the rural areas. Land in urban areas like North Horr and Maikona is privately owned by individuals Valuation of land was done by the Ministry of Lands and land value index for the county is available in Ardhi House in Nairobi
23.	Key Informant Interview	29th November 2022 Kenya Wildlife Services- Marsabit County	Mr. John Wambua KWS Assistant Director Northern Region	1	0	1	<ul style="list-style-type: none"> Project to Replace affected trees during/after construction. Project to avoid riverine forests which are

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
							<p>ecologically rich areas for birds and wildlife</p> <ul style="list-style-type: none"> The road will enhance quick response to medical emergencies especially at Sibiloi national park.
24.	Key Informant Interview	29th November 2022 NEMA Marsabit County	Mr. Vincent Oloo County Director of Environment – Marsabit County	1	0	1	<ul style="list-style-type: none"> Hold public meetings chaired by the DCC for Public disclosure and participation. The site camp, Burrow pits and Boreholes should also have an EIA undertaken and licences submitted NEMA county office. EIA report to be submitted to County office.
25.	Key Informant Interview	29th November 2022 Water Resources Authority Office	Mr. Hussein Guyo Sub Regional Manager Mr. Benard Simba-Water Right Officer	2	0	2	<ul style="list-style-type: none"> Potential threat to underground water resources from faecal contamination in North Horr since shallow wells and pit latrines are located in the same vicinity (no safe distance). Water quality is good for construction but not fit for human consumption. Borehole developed for the purpose of construction should be reverted to the community after the construction. This will encourage settlement and enhance utilization of water resources. conflicts brought about by water sources are not eminent in the project area but might be a problem past Daradhe

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
26.	Key Informant Interview	29th November 2022 Kenya Forest Service, Marsabit Conservancy Office	Mr. Abraham Kipchumba. Forest Officer	1	0	1	<ul style="list-style-type: none"> When collecting soils for construction purposes, to avoid areas with invasive tree species like ‘Mathenge’ so as to avoid its spread. Proposed road development project is likely to trigger Forest Act of 2016 -According to forest conservation Act of 2016 Santalum album (Sandal wood) is an endangered species. The species might be found within the corridor during construction.
27.	Key Informant Interview	1 st December 2021 VSF Veterinaries Sans Frontiers (NGO)	Mr. James Nakulo-Field Officer, Marsabit County	1	0	1	<ul style="list-style-type: none"> Construction of the road will improve livestock trade in the county and even inter-country animal trade Road construction will be of greatly improve quick delivery of veterinary services. Road safety measures particularly on reduction/slowing of motorists speed should be put in place.
28.	Key Informant Interview	03rd December 2021 Concern Worldwide	Mr. Adam Bagajo- North Horr Office Manager	1	0	1	<ul style="list-style-type: none"> The current murram road is used by the communities which trek for long distances to access water watering holes and once it’s improved it may interfere with their paths. Provide a reserve on the side of the road to be used by the animals

No	Type Of Meeting	Date & Venue	Stakeholders/ Participants	Attendance			Summary Of Core Issues
				M	F	T	
							<ul style="list-style-type: none"> The construction should continue to Limerick town to enable concern worldwide offer/provide their services there.
29.	Key Informant Interview	03 rd December 2021 Catholic Mission Centre	Father Peter -----	1	0	1	<ul style="list-style-type: none"> The proposed road development will improve delivery of government services to the locals. Interaction between communities will improve co-existing and promote peace The road will lead to improved social amenities such as schools which will help to reduce level of illiteracy
	TOTAL STAKEHOLDERS CONSULTED			109	85	194	

- **Appendix 5.1.1.1: First Key Stakeholder Consultation Meeting with Leaders and stakeholders from North Horr Town.**

Consultation Meeting with Leaders from North Horr in Preparation for The Environmental and Social Impact Assessment (ESIA) For North Horr-Daradhe Jn (A4) Road Project

Type of meeting	Leaders Meeting
Venue of the meeting	Down Town Hall, North-Horr
Time of the meeting	9.50 am – 12.18 pm
Date of the meeting	1 st December,2021
Agenda of the meeting	Disclosure of the North Horr-Daradhe Jn Road Project in the feasibility study, environmental and social impact Assessment and detailed engineering design.

Min 1 of 2/FS/2021: Introduction and Speeches

The leaders meeting was held on 1st December, 2021 at the Down Town Hall, North-Horr town. The meeting was attended by a total 42 members with 33 males and 9 females. Among the attendants were; Assistant County Commissioner- Mr. Omingo Oluoch, District peace committee vice chairman, five (5) members from Repcon Associates who were physically present and other invited leaders from various institutions.

The meeting had two main agendas: to disclose the general outline of the North Horr-Daradhe Jn Road Project and discuss its possible social and environmental impacts.

Assistant County Commissioner (ACC) - Mr. Omingo Oluoch

The ACC thanked all members for attending the meeting as representatives of various organizations. The meeting was to discuss the upgrading of North Horr- Daradhe Jn road into bitumen standard. The ACC explained that there was an ongoing road construction from Marsabit to Karachi and would later link to North Horr. The ACC requested members to preach peace as there were several cases of insecurity in the recent past. The ACC noted that insecurity was a hinderance to development and urged members to take individual responsibility in preaching peace. Members were invited to introduce themselves and then invited Mr. Wachira to make his presentation.

Min 2: Project presentation- Benjamin Wachira

Introduction

The Government of the Republic of Kenya (GoK) has assigned Norken Ltd & Uniconsult Consulting Engineers and, Repcon Associates to undertake Preliminary and Detailed Engineering Design for upgrading the North Horr-Daradhe Road Jn to bitumen standards.

The Project Road is under the management of the Kenya National Highways Authority (KeNHA).

The road which is currently an earth road measures approximately 100km. The project road starts at North Horr town runs in a Northerly direction through El Beso to Daradhe. The existing road alternates between earth and gravel surface. The drainage along the several section of road is also poor, with flood water ponding on the road whenever it rains in Ethiopia. This is caused by the fact that the existing road level is lower than the surrounding ground. It is also worth noting that the infiltration rates are low hence during rainfall, most of the water floods the road section. The final design will propose a realignment to give alternatives. Drainage is not taken care of adequately. Due to the drainage problems noted above the road alignment will need to be lifted.

The scope of the assignment encompassed undertaking an Environmental and Social Impact Assessment (ESIA) as per the Environmental Management and Coordination Act 1999 which requires all new projects to carry out an ESIA study at the project planning phase in order to ensure that significant impacts on the physical and social environment are taken into consideration at the construction, operations and decommissioning stages.

The ESIA study also provide guidelines that aims at harmonizing the coexistence of the project with the surroundings and at the same time facilitates key stakeholders make informed decisions during evaluation and approval of any project.

Legal Regulatory Framework

The ESIA for the proposed road is being undertaken in accordance to the Environmental Management and Coordination Act (EMCA), 1999 and its subsequent supplements. EMCA (Waste Management) Regulations, 2006 and EMCA (Water Quality) Regulations, 2006;

EMCA (Controlled Substance) Regulations, 2007; EMCA (Noise and Vibration Control) Regulations, 2009; EMCA (Emissions Control) Regulations,2006; EMCA (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009; EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations,2006; The Land Act 2012, Water Act, Irrigation Act among other pertinent legal and institutional framework regulating roads development.

Rationale of the ESIA Studies

The SIA and EIA studies provide an analysis of the implications of the planned investment on the social and biophysical environment in the project areas. This addresses key environmental and social aspects of the proposed investment project in relation to other land uses and likely impact on the communities in the project area hence this workshop.

The objective of the ESIA is to analyse and evaluate the anticipated impacts of the proposed road upgrading project to bitumen standards on the physical, biological, socio-cultural and socio- economic environment and prepare an EIA report recommending appropriate solutions to minimize any undesirable effects resulting from the road improvement.

Scope of the ESIA

The key activities to be undertaken during the assessment will include the following: -

- Consultations with the key project stakeholder including the project proponent, community members, administrative authority, opinion leader and sub county departmental heads.
- Physical inspections of the proposed project area/corridor
- Review of available documents concerning this area.
- Report writing, review and submissions to NEMA offices.

Project description

The proposed project shall involve upgrading the existing earth road connecting North Horr to Daradhe to bitumen standard. The road is generally in rid able standard save for a few rocky/stony sections. The alignment crosses several seasonal river beds and is aligned with riverine forests in several sections. The project shall follow the existing alignment as much as possible.

The drainage structures to be developed shall include bridges and culverts. The key activities to be undertaken during the development shall include: -

- Filling and shaping of the road section
- Cutting of earth section to facilitate widening of the road;
- Upgrading or construction of longitudinal and cross drainage structures;

Project

Stakeholders

The Stakeholders:

The Governmental Officials in the various departments found in the project area, departmental heads, Sub County and Local Administrative Officers,

Local Leaders and the general public- The views of stakeholders in the design of the Environmental and Social Impact mitigation measures, Management and Monitoring Plan would be sought. Several stakeholders' forums would be held for this project and the main agenda of these meetings would be evaluation of the proposed project which would include discussion of perceived project impacts, their mitigations and how to holistically incorporate environmental consideration in the project planning and implementation.

Normally the road networks when developed will provide a better environment for the movement of people and goods thus lead to economic and social growth.

Components to be looked into include

The Bio-physical environment (natural resources) such as water ways, sand dunes, hills/volcanic deposits and indigenous vegetation. -The project area is characterized as an arid/semi-arid area which depict vegetation cover found in these areas consist mainly of Acacia sp. The vegetation cover is mainly concentrated along the seasonal river beds/storm water ways. Efforts of afforesting these areas normally are challenging.

Ground cover of vegetation along the road alignment varies seasonally with rainfall and grazing intensity.

The area also has several springs located at each end, one at North Horr being protected and used as a watering point by the community members while one at Daradhe is not fenced off.

The road traverses several vast flood plains and these are often evident during the rainy season as masses of water are seen while during the dry season they are indicated with the existence of sand and, rock deposits in the plains and the road and several water ways that cuts across the road.

The project area has several hills remnants of volcanic activities. The hills are the main sources of the storm water, run-off thus flooding the area during the rainy season. The flash floods are normally accompanied with rooks, sands and tree stamps from as far as from Ethiopia. Soil Erosion: Level of soil erosion in the areas is seen to be high due to poor land management, overstocking of livestock and the flash floods which has led to land degradation.

Wildlife: The project area is a buffer zone for small animals such as the gazelle and dik-dik.

The socio-economic environment

- Socio-economic activities: The main economic activity is pastoralism.
- Socio-economic infrastructure: no communication network in Daradhe.
- Land Use: The main land use in the project area is pastoralism.
- Settlements: The project area is sparsely settled and community's lives in pockets of villages along the way.
- Encroachment of the road reserve: It was noted that the community members have developed a few structures within the road reserve at El Beso. The level of encroachment is minimal.
- Tourism: The prospect seems poor more so because of tribal feuds.

The area is largely occupied by the Gabra who are still living in their traditional ways. There is a high level of insecurity in the area mainly caused by cattle rustling in the area and conflicts for graving area and watering holes.

Min 3 of 2/FS/2021: Question and answer session

The session was chaired by the team leader Mr. Wachira who requested members to participate by explaining the positive and negative impacts of the project. They were further asked to raise questions where they needed clarity.

S/no	Name and Institution	Question /Inputs	Answer
------	----------------------	------------------	--------

S/no	Name and Institution	Question /Inputs	Answer
1	Mr. Haji Helema Adano	The project will ease movement between North Horr and Daradhe	The road will ease movement to Daradhe after its construction. Currently public service vehicles do not use the road due to its current bad state.
2	Mr. Guyo Tadi- Chairman- Community Policing	The project will bring social change in the community	The project will bring social interactions through eased movement.
3	Mr. Tuye Habane- Village Elder	The project would lead to growth of businesses	
4	Mr. Galgallo Tuye	It will link Nort Horr to other areas	It will link North Horr with Daradhe and Later to Baragoi in Samburu and also to Marsabit town.
5	Mr. Kunchora Tadi – Head teacher	The project will improve business and the economic status of residents	The road will increase movement of goods within the area. Herders can fetch better prices from sale of livestock as transport costs to the market will reduce.
6	Mr. Haji Doko- District Peace Committee Member	Linking the project to other areas like Marsabit will ensure access to fresh food as transport will be faster.	Vehicles will be willing to transport goods to areas within project areas without fearing costs on wear and tear. This will also reduce the cost of transporting goods and eventual cost of goods will be lower.
		The project to employ locals and this will further enhance social cohesion.	It's a constitutional requirement for a project to employ local persons. This will include both skilled and unskilled local labour.
		The road will require lots of water and the contractor will have to construct water pans in catchment areas and drill boreholes.	
7	Mr. Hassan Baraka- Community Elder	The road will save lives due to easy access to health services.	
8	Mr. Chiruke Duba- District Peace Committee Member	The road will require new watering points. This watering points should be given to the community after construction.	The contractor will be requested to surrender boreholes and water pans to the community after construction.
9	Mr. Abdi Wario-	North Horr town will expand after	

S/no	Name and Institution	Question /Inputs	Answer
	Yuborso Youth Group	tarmacking.	
10	Mr. Pastor Joseph Kimani-First born Christian Church	Investors in North Horr will increase and there will be more businesses. The road will also reduce insecurity.	New investors will migrate to the area to do businesses and make use of local resources. This will lead to growth of North Horr town and possible emergence of new urban centres along the road.
11	Mr. Talaso Guyo-North Horr Home Group	There will be continuity of transportation even during the rainy season. Access to Daradhe is impossible when it rains as the road becomes impassable.	
12	Mr. Wato Mamo- Youth Representative	There is a high degree of wear and tear due to bad state of the road and this will reduce.	The current state of the road which alternate as gravel and earthen in some areas causes lots of wear and tear. Upgrading the road to bitumen standards will reduce costs of maintaining a vehicle.
12	Mr. Chuluke Duba- District Peace Committee	The road should extend to Ethiopia as there is more businesses there. The road will also reduce the current tribal conflicts.	The road section from North Horr to Daradhe junction is part of the larger project that will later extend to Ethiopia through Illeret. The road will bring social interaction between the Gabra community and the Dasanach community and stop tribal conflict between them.
13	Mr. Wato Katelo- Youth Representative	The road will bring peace through increased social interactions as communities move from one area to another.	The road will bring social interaction between the Gabra community, the Borana community and the Dasanach community and stop tribal conflict between them.
14	Mr. Konchora Tadi- Teacher	It will equalize those with expensive and cheaper Vehicles as cheaper vehicles cannot currently operate within the area due to bad state of the road.	
15	Mr. Galgallo Tuye Adano-Village Elder	The road will increase accidents	The road project will put measures to mitigate occurrence of accidents. This will include road bumps, road signs within settlement areas and animal crossing areas.
		May cause destruction of ecology.	An environmental and social management plan will be developed to address project impacts on the environment.

S/no	Name and Institution	Question /Inputs	Answer
		Destruction of Knoll hill which is a land mark in North Horr as contractors tend to excavate hills for construction materials.	The scenic sites should be safeguarded and the contractor will be requested in the report not to excavate the hill for its identity importance to North Horr.
16	Mr. Guyo Tadi- Youth Representative	Theft cases are likely to increase as thugs can easily access the area faster by road.	
17	Pastor - Joseph Kimani- First Born Christian Church	It may bring bad behaviours like immorality and cause spread of HIV and AIDs as more people settle in North Hall town.	Community sensitization on negative impacts of the road will be done.
		Project might cause destruction of people's property along the town around North Horr town	The law requires that all affected persons to be given/accorded just compensation prior to the beginning of civil works. During the field survey, the consultants will identify each and every person affected by the project and design a compensation matrix for all PAPs in right of way.
18	Mr. Haji Ellema- District Peace Committee	The local community is a pastoralist community and there is need to put animal crossing signpost at designated crossing areas.	This will be included in the project impact management plan to require the contractor put bumps, sign posts, etc. at animal crossing areas.
19	Mr. Konchora Tadi- Teacher	The road will increase traffic and later increase carbon emissions	Upgrading the road will increase the number of vehicles using the road. The expected traffic towards Daradhe is minimal with minimal carbon emission.
		The project will alleviate the education standards in the area and increase its access.	
20	Mr. Tuye Habane – Village Elder	Digging Borrow pits will increase risks of accident on people and animals.	The contractor will be requested to bury borrow pits after construction. Alternatively, the pits can be turned to water pans by slanting the side walls.
21	Mr. Hassan Baraka- Village elder	The area has lots of natural resources which will be exploited by constructing the road.	Exploitation of resources will lead to improved people's life as new industries emerge and arrival of new investors. The community should be prepared for the impacts to benefit.
22	Mr. Telaso Galgallo- North Horr Home	The design should have underpasses for animal crossing.	This will be considered and incorporated in the designs where possible.

S/no	Name and Institution	Question /Inputs	Answer
	Group		
23	Mr. Haji Yatani- Village Elder	He has property in North Horr town around the project area and wants to be compensated if his structure is affected.	All private properties affected by the project will be valued and compensated. Compensation of community land will be discussed between the community and KeNHA where the community will give their proposal.
24	Mr. Haji Elema, Village Elder	All land between North Horr and Daradhe is owned by the Gabra community, however, land parcels within North Horr town and Elbeso centre have private ownership. All land has not been surveyed. Community land should be surrendered for road at a participatory involving all leaders and community members and not hand-picked representatives.	A meeting involving all leaders and community land stakeholders will be held to discuss surrendering their land for road construction.
25	Mr. Konchora Tadi- Teacher	The road will utilize community resources like land, how will the community benefit.	The community will propose compensation for land. The community will further benefit from water pans and boreholes drilled to provide construction water.

Min 4 of 2/FS/2021: Way Forward

More consultations will be held with more stakeholders to disclose the project.

Min 5 of 2/FS/2021: Closing Remarks

Assistant County Commissioner- Mr. Omingo Oluoch

Mr. Omingo Oluoch stated that the North Horr-Daradhe Jn Road Project will be of great help to the residents of North Horr. The ACC requested the community to support the project as it was to help the community and thanked them for their participation.

The meeting was adjourned at 12.18 pm with a word of prayer by Mr. Abdulahi Isak.

Attendance List



Kenya National Highways Authority

Quality Highways, Better Connections

STAKEHOLDER MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND DETAILED ENGINEERING DESIGN IN NORTH HORN OF AFRICA
JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: CATHOLIC MISSION GUEST HOUSE, NORTH HORN

DATE: 1ST DECEMBER 2021

S/NO	NAME	GENDER	ORGANISATION	DESIGNATION	CONTACT INFO	SIGN
1	Aggrey Elilema	M	BPC	Chairman	0713041434	
2	Joseph Halake	M	Wayu	Katua elder	0716241947	
3	Hassan Baraka	M	Elder		0711341889	
4	Elana Vattani	M	Elder		0727962890	
5	Wato KATELO	F	Teacher Youth Rep	Member	0798166786	
6	KONCHORA TADI	M	TEACHER	HEAD TEACHER	0712628573	
7	BARILLE DUBA	M	CATECHIST (North)	CATECHIST	0728669474	
8	JARSO BORA	M	Elder		0769598472	
9	Nauma - ABDI	F	Somali group Somali group	Somali elders	0710582902	
10	SHAHU DULKHA	F	Elder		0723123025	
11	Tuye Habane	M	Somali group	Chairman	0721645340	
12	ADANO BONAFA	M			0701638551	
13	Guyob - Saleesa	M	N.Y.C	Youth rep	07294781019	
14	ngatani Kalacha Gufu	M		Elder	0768191755	



Kenya National Highways Authority

Quality Highways, Better Connections

**STAKEHOLDER MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND DETAILED ENGINEERING DESIGN IN
NORTH HORN JN- DARATHE AP CAMP ROAD PROJECT (A4)**

VENUE: CATHOLIC MISSION GUEST HOUSE, NORTH HORN

DATE: 1ST DECEMBER 2021

S/NO	NAME	ORGANISATION	DESIGNATION	CONTACT INFO	SIGN	Gender
1	Chuluke Duba	DPC DISTRICT PEACE COMMITTEE	V/Chair	0712829624		F
2	HAWO MAMU	FABRIC KLOMBO	Chairlady	0727720946		F
3	GAGGALLO TUYE ADAMO	ACE	Elder	0706833618		M
4	TALASO GUYO BORU	YUYE HARRHOM GROUP	Member	0712926146		F
5	ABDI WARIO JILLO	YUBURSO YOUTH	member	0727528027		M
6	HABISA BUDHA BARAKO	MAZIOGIERA KLOMBO GROUP	V/Chairlady	0727545996		F
7	TUYE HABANE SOLA	SHAINO M. CO-OPERATIVE MEETA HALL	Chairman	0721945646		M
8	ADAMO BONAYA	YOUTH	Youth	0704385571		M
9	Guyo Salesa	youth Rep	youth Rep	0729751019		M
10	Yattani Kalacha Gugu		Elder	0768197355		M
11	ABDULLAH ISAK BONAYA	IMAM	IMAM	0724090020		M
12	GUYO Tadi HURG	Chairman community policy	Chairman	0791291223		M
13	REV JOSEPH KIMANI	First Born C. Church	MISSIONARY	0740666315		Male
14	BOYA Mambo	ELDER	ELDER	0728994137		M












VENUE: CATHOLIC MISSION GUEST HOUSE, NORTH HERRING

DATE: 1ST DECEMBER 2021[illegible]

STAKEHOLDER MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND DETAILED ENGINEERING DESIGN IN NORTH HOKR
JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: CATHOLIC MISSION GUEST HOUSE, NORTH HOKR

DATE: 1ST DECEMBER 2021

S/NO	NAME	GENDER	ORGANISATION	DESIGNATION	CONTACT INFO	SIGN
13	Doko YATANI	m	D.B.C N.HOKR		0712351809	
16	Elana Nattani	m	Elana		0727962890	
17	Hassan Berrak	m	Elana		0711391829	
18	Reba Gonche	m	O.P.N.HOKR-HOKR	Superior	0702246503	
19	UMAR AHMED	m	O.P.N.HOKR-HOKR	Interior	0706155773	
20	Abdub Galpillo	m	Youth leader		0704650890	
21	Samuel Kaman	m	Kation Associates		0725574251	
22	Benjamin Wachira	m	Repcon Associates	H/L	0722107943	
23	James Wamere	m	Repcon Associates		0721888494	

Photos of the meeting



Mr. Benjamin Wachira the ESIA Field Team Leader making his presentation during the meeting.



North Horr ACC, Mr Omingo Oluoch addressing the meeting.



A member participating in the question-and-answer session.

- **Appendix 9.1.2: Public Consultative Meetings**

Appendix 9.1.2.1: Public Consultative Meeting with Residents of Elbeso.

Public consultation meeting in the feasibility study, environmental and social impact Assessment and detailed engineering study of North Horr Jn- Daradhe AP Camp Road Project (A4)

Type of meeting	Public Consultation Meeting
Venue of the meeting	Elbeso
Time of the meeting	4.30 P.M- 6.00 P.M
Date of the meeting	30 th November,2021
Agenda of the meeting	Disclosure of the North Horr Jn- Daradhe AP Camp Road Project (A4) in the feasibility study, environmental and social impact Assessment and detailed engineering study

Min 1: Introduction and speeches

The meeting was held on 30th November, 2021 at Elbeso at North Horr Constituency, Marsabit County. The meeting was attended by a total of 60 members with 38 males and 22 females. In attendance were; Assistant County Commissioner North Horr, Mr. Omingo Oluoch, Elbeso Location Assistant Chief, five (5) members from Repcon associates and 53 members from Elbeso Location. This was the first public hearing to be held in the feasibility studies, ESIA and detailed engineering design of the North Horr Jn- Daradhe-AP camp road Project. The main agenda of his meeting was to disclose the North Horr Jn- Daradhe-AP camp Project to the locals and obtain their views on the project. The meeting started at 4.20 P.M by a word of prayer from Mr. Bonoya Racha, a member of the community and chaired by the ACC, Mr. Omingo Oluoch. The assistant chief, Mr. Budha Jillo helped in translating the project in the local direct.

Assistant County Commissioner- Mr. Omingo Oluoch

The ACC appreciated members for attending the meeting and welcomed everyone to the meeting. He informed members that the meeting intended to disclose the proposed road project from North Horr to Daradhe AP Camp. He noted that this project will be great help to the community as it will open up the area and attract more development projects. The ACC noted that there have been increased cases of insecurity for the past two weeks caused by incitement and propaganda between two communities. He warned locals against hostility amongst themselves emphasizing that developments cannot take place in an insecure place. He encouraged locals to welcome the project as it would solve numerous problems in the area.

Field Team Leader -Benjamin Wachira

The team leader welcomed members to the meeting and went ahead to introduce five members from Repcon Associates. He noted that the main agenda of this meeting was to disclose the North Horr Jn- Daradhe-AP camp Project to the locals and obtain their views on the project.

Min 2: Project presentation

The team leader Mr. Benjamin Wachira introduced the project as follows:

The North Horr Jn-Daradhe AP camp road project is an initiative of the Government of Kenya where KeNHA has been appointed as the implementing agency. The project road starts at North Horr town runs in a Northerly direction through El Beso Market Centre ending at the AP Camp in Daradhe. The proposed road project shall involve upgrading the existing road which alternates between earth and gravel surface connecting North Horr to Daradhe to bitumen standard. The proposed road measures around 105 Km with a width of 100m to accommodate other utilities such as electricity and water pipelines in future.

The project is in the feasibility study stage where KeNHA has assigned Norken (K) Ltd & Uniconsult Consulting Engineers and, Repcon Associates to undertake Environmental and Social Impact Assessment (ESIA), Preliminary and Detailed Engineering Design for upgrading the North Horr-Daradhe Road to bitumen standards.

Min 3: Question and Answer Session

This was an open session chaired by the assistant Chief, Mr. Budha Jillo who requested members to introduce themselves by name when raising or responding to questions. A total of eight (8) questions were raised by the Repcon team touching on perceived benefits and negative impact of the project, land ownership, land compensation and gender roles in the community as shown in the table.

S/No	Name of Participant	Question/ Input	Answer
1	Benjamin Wachira- ESIA Field Team Leader	What are your perceived benefits from the project?	Umuro Boru The road will ease means of transport by road from one place to another and also save time of transport.
			Shukah Abudho Over the years, transportation of food commodities has been a great problem in Marsabit area. The proposed road will enhance easy transportation of food commodities especially during drought seasons.
			Abudho Obrian Any road project promotes existing businesses and leads to establishment of more businesses in an area. The

S/No	Name of Participant	Question/ Input	Answer
			proposed road project will enhance opening up of more businesses in Elbeso and Marsabit County at large.
			Galeallo Ibrae Social amenities such as schools, hospitals, dispensaries will be developed within the community. It will be easier to attend to health emergencies within the community.
			Ibrahim Jillo The community has been suffering from dust related diseases. The proposed road will enhance reduction of dust along the traverse leading to decrease in dust related diseases. Movements during rainy seasons have been a great problem as the area becomes flooded making it difficult to move from one place to another. The road will enhance easy movement during rainy seasons.
2	Benjamin Wachira- ESIA Field Team Leader	What are your perceived negative impacts of the project?	Any development leads to integration of different communities. Our community may suffer from negative cultures such as thuggery introduced by other communities affecting our beliefs and culture.
			Shukah Abudho The road will lead to destruction of structures along the traverse leading to loss of shelter.
			Ibrahim Jillo In the eventuality of road accidents, there will be increased deaths of both

S/No	Name of Participant	Question/ Input	Answer
			human beings and animals.
		.	Sharamo Duba We welcome the proposed road project in the area irrespective of negative impacts brought about by any development.
3	Benjamin Wachira- ESIA Field Team Leader	How is land owned in Community?	Land is communally owned apart from small sections in urban settlements where land is owned individually.
4	Benjamin Wachira- ESIA Field Team Leader	How would you want the project to compensate for communally owned land?	The community would prefer in kind compensation for communally owned land such as construction of schools, hospitals, dispensaries and wells.
5	Caroline Wakoigi – Gender Expert	What role do women play in the household?	Salo Daru Women are involved in various activities such as cooking for their families, looking after their children, fetching firewood, fetching water for domestic use and herding young goats and sheep.
			Kame Robi Women are also involved in constructing the traditional houses “Manyatta” and making of mats.
6	Caroline Wakoigi – Gender Expert	What role do men play in the household?	Galeallo Ibrae Men are the household heads and are mandated at looking after their families. They are also involved in activities such as; construction of livestock sheds, herding of livestock, digging shallow wells, constructing semi-permanent and permanent structures.
7	Caroline Wakoigi – Gender Expert	What is the livestock holding per household in the community?	Most households own at least 20 goats and sheep.

S/No	Name of Participant	Question/ Input	Answer
8	Caroline Wakoigi – Gender Expert	Does the community have medicinal trees?	<p>There are several medicinal trees used by the community for medicare. These trees include:</p> <ul style="list-style-type: none"> (i) Ilam- used as an anti-venom for snake bites (ii) Arkens- Used to cure sore throats (iii) Lalaftu- Used to cure muscle pains and menstrual pains (iv) Wanga Used to cure Sexually Transmitted Diseases (STIs).

Emerging Issues

- It emerged that most land in North Horr is communally owned with exception of few land parcels in the urban settlements which are individually owned.
- The community would prefer in kind compensation for communally owned land such as construction of schools, hospitals, dispensaries and wells.

Min 4: Way Forward

The meeting agreed on the following issues:

- More stakeholder consultations meetings will be held with different stakeholders to inform about the project;
- The community would prefer in kind compensation for communally owned land such as construction of schools, hospitals, dispensaries and drilling of wells; and
- The community in Elbeso is in favour of the proposed road project.

Min 5: Closing Remarks

Assistant County Commissioner

The ACC thanked members for attending the meeting noting that the proposed project will be of great benefit to people in Elbeso and Marsabit County at Large. He pointed out that the government will compensate for all affected structures in the Right of Way of the proposed project and warned the locals against construction of structures in the ROW with an aim of getting compensation. He also requested locals to allow the project contractor utilize the available local resources.

The ACC encouraged members to maintain peace and co-exist peacefully with other communities in the County noting that any developmental project thrives better in a secure area.

Assistant Chief- Mr. Budha Jillo

The Assistant Chief thanked members for attending the meeting. He pointed out that the project will be improve means of transport in the county and also aid in opening up the county for more developmental project. He encouraged locals to live peacefully amongst themselves and other communities.

Field Team Leader- Mr. Benjamin Wachira

The team leader appreciated members for their active participation in the meeting and for welcoming the proposed road project in their area. He informed members that the project intends to involve all stakeholders in Marsabit County and obtain their views concerning the project. He noted that more stakeholders will be consulted to make sure that their inputs are incorporated in the feasibility study stage of the project

The meeting was called off at 6.00 P.m. with a word of prayer from one of the members.

Signed Attendance List



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HORN JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: EL-BESO

DATE: 30TH NOVEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	SHARAMO DUBA	M	ELBESO		
2.	ELEMA MAGADO	M	ELBESO		
3.	GALGALO IBRAE	M	ELBESO	0701331989	
4.	UMURO KATELLO	M	ELBESO		
5.	SORA RACHA	M	ELBESO	0794650319	
6.	MUDHA BARAKO	M	ELBESO	0716563884	
7.	DALU ROBA	M	ELBESO		
8.	BONAYA ELEMA	M	ELBESO		
9.	BORU WARIO ISACKO	M	ELBESO	0700800398	
10.	BUDHA KUYAYO	M	ELBESO		
11.	BOYA SAQO	M	ELBESO	0742568756	
12.	IBRAE SORI	M	ELBESO	0746728985	
13.	ELEMA MATA BORU	M	ELBESO		
14.	ABUDHO ISACKO	M	ELBESO	0743969629	
15.	ISACKO SORI	M	ELBESO	0701812823	
16.	ABDUB ALI	M	ELBESO	0798317345	
17.	ROBA UMURO	M	ELBESO		
18.	DIBA BUDHA	M	ELBESO		
19.	UMURO BORU	M	ELBESO		
20.	GUYO YATTANI SALESA	M	ELBESO	0713642767	



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HORN JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: EL-BESO

DATE: 30TH NOVEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	GALGALLO UMURO	M	ELBESO	0759603492	E-Umuro
2.	IBRAHIM JILLO	M	ELBESO	0712556869	IBrahim
3.	BONAYA RACHA	M	ELBESO	0706493540	Bonaya
4.	GALGALLO DUBA	M	ELBESO	0706493540	Duba
5.	BOKU ABUDHO	M	ELBESO	0746686912	Boku
6.	BORU GUYO ELEMA	M	ELBESO	0746887515	Boru
7.	GALGALLO KULUTA	M	ELBESO	0704567175	Kuluta
8.	ROBA QUNYO	M	ELBESO	0799720291	ROBA
9.	SORA MAGADO	M	ELBESO		S.M.
10.	BORU ROBA	M	ELBESO		Boru
11.	QABALE ADANO	F	ELBESO		Qabale
12.	GUYO ABUDHO	M	ELBESO		Guyo
13.	TUME BARILE FODANA	F	ELBESO	0759923622	Tume
14.	LALAFU BUDHA	F	ELBESO	0759814344	Lalafu
15.	SALLO SORA	F	ELBESO		Sallo
16.	KAME ROBA	F	ELBESO		Kame
17.	KABALE GALEALLO	F			Kabale
18.	TATTANE GALEALLO	F	ELBESO		Tattane
19.	MIDINA DALU	F	ELBESO	0794072581	Midina
20.	ARBE JILLO	F	ELBESO		Arbe



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HORN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: EL-BESO

DATE: 30TH NOVEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	GUMATO GURA	F	ELBESO		
2.	WATO BUTE	F	ELBESO	0714439735 0714497	
3.	GUTHO WARIO	F	ELBESO	0745552319	
4.	DOKE UMURO	F	ELBESO		
5.	GUMATO BORU	F	ELBESO		
6.	WATO BORU	F	ELBESO		
7.	TESO DABASSO	F	ELBESO	0746920697	
8.	DIKO GARGALLO	F	ELBESO	0719540626	
9.	SHUKAH ABUDITU	F	ELBESO	0791291296	
10.	JILLO BUDHA	F	ELBESO	0711868243	
11.	ADHO SORI BACKO	F	ELBESO	0714365029	
12.	ABDUB JARSO GUYO	M	ELBESO		
13.	KIMBO RACHA GUFU	M	ELBESO		
14.	Benjamin Wachira	M	@ELBESO	0722107943	
15.	Omingo Olwael	M	ELBESO	0724810265	
16.	CAROLINE WAKOIGIA	F	Repcon Associate	0701363661	
17.	Samuel Karamu	M	Repcon Asst	0725579250	
18.	James Wawen	M	Repcon Associate	0721838494	
19.	Eunice Njunge	F	Repcon Associate	0727951185	
20.	BUDHA Y JILLO	M	Asst Chief North Horn	0726271241	

Photos from the meeting



Assistant County Commissioner, Omingo Oluoch addressing members in the meeting.



Field team leader, Benjamin Wachira disclosing the proposed road project to the locals.



A member airing his views during the meeting.



Ms. Salo Daru, a member representing women airing her views in the community.

Appendix 9.1.2.2: Public Consultative Meeting with the Herding Community at Daradhe.

Second Public Participation Meeting for the Environmental and Social Impact Assessment for the Proposed Upgrading of the North Horr-Elbeso- Daradhe section of the A4 road in Marsabit County

Type of meeting	Public Consultation Meeting
Venue of the meeting	Daradhe Watering Hole
Time of the meeting	1.00 PM
Date of the meeting	: 02/12/2021:
Agenda of the meeting	Disclosure of the North Horr Jn- Daradhe AP Camp Road Project (A4) in the feasibility study, environmental and social impact Assessment and detailed engineering study

Min 1 of 3: Introduction and speeches

The meeting was held on 2nd December, 2021 at the Darathe watering point in North Horr Constituency, Marsabit County. The meeting was attended by thirty one (31) persons, Twenty nine (29) males and two (2) females. In attendances were: Daradhe Location Chief, five (5) members from Repcon associates and twenty six (26) herders. This was the second public hearing to be held in the feasibility studies, Environmental and Social Impact Assessment, preliminary and detailed engineering study for the North Horr Jn- Daradhe-AP camp Project. The main agenda of his meeting was to disclose the North Horr Jn- Daradhe-AP camp Project to the locals and obtain their views on the project. The meeting started at 1.00 PM by a word of prayer from a member of the community and chaired by the area Assistant chief Mr. Guyo

Mr. Guyo Boru, Daradhe Area Assistant Chief.

He started by thanking the herders for taking time to sit in during the meeting. He went ahead to urge the herders to be attentive and listen closely as they would be the ones to disseminate the same information to other members of the community that were not present in the meeting.

Min 2 of 3: Project Disclosure- Benjamin Wachira, ESIA Team Leader

He started by thanking everyone present for taking time from their cattle watering activities to attend the meeting. He went ahead to introduce the team of consultants who had accompanied him.

In the disclosure, he explained that the government of Kenya through its implementing body KeNHA had plan on improving the North Horr- El-beso- Daradhe AP's camp road to Bitumen standards. He stated that the proposed project was undergoing its feasibility study stage and

would later on undergo the detailed design stage so as to settle on a final and most suitable alignment.

He noted that the proposed road corridor would be 105KMs long, with a 100M wide corridor where only 10M would be utilized and the rest of the section set aside for utilities such as power, water pipes and also to leave room for future developments. He noted that the road construction would also involve construction of bridges over the numerous river crossings along the traverse.

In his final remark, he noted that there was a future plan to extend the road to illeret at the boarder of Kenya and Ethiopia. He went ahead to invite members of the meeting to the Plenary session.

Min 3 of 3: Question and Answer Session

The session was led by the area chief, Mr. Mamo with a series of questions being raised from both the consultants and the attendees of the meeting. The questions were mainly on the perceived advantages of the road, any negative impacts of the road and also open comments from the attendees of the meeting.

S/No	Name	Question/ Input	Answer
1.	Mr. Benjamin Wachira-Field Team Leader	What are your perceived benefits from the project?	<p>Mr. Barako Warabu</p> <p>The road will ease means of transport from one place to another and also save time of transport.</p> <p>The road will also lead to increased and competitive business opportunities.</p> <p>Mr. Mamo Momoa</p> <p>Over the years, transportation of food commodities has been a great problem in Marsabit area. The proposed road will enhance easy transportation of food commodities.</p> <p>The road project will also provide employment opportunities for the youths during construction.</p> <p>Mr. Alema Salesa</p> <p>Social amenities such as schools, hospitals, dispensaries will be developed within the community. It will be easier</p>

S/No	Name	Question/ Input	Answer
			<p>to attend to health emergencies within the community.</p> <p>The project will also promote accessibility to clean drinking water as currently same watering hole being used to water the livestock is the same they use for drinking and such watering holes are only accessible after walking for long distances.</p>
2.	Mr. Benjamin Wachira- Field Team Leader	What are your perceived negative impacts of the project?	<p>Mr. Alema Salesa</p> <ul style="list-style-type: none"> Any development leads to integration of different communities. Our community may suffer from negative cultures such as increased cases of cattle rustling by other communities. The road may also lead to increased accidents both for human and livestock as most herders follow the road in their movements. He suggested installation of bumps to help limit and control speed.
3.	Mr. Adam Lolo	Being a livestock trader, the road construction is a welcome as in the previous times trucks for transporting livestock can only come as far as El-beso thus he has to walk for two days from Daradhe to El-beso to access transport.	
4.	Mr. Sola Roba	The community welcomes the proposed road project with or without the negative impacts brought about by any development. The project should also be extended to other remote areas like Kolka to promote accessibility.	

Min 4 of 3: Way forward

The local community is open and welcomes the road project and they wished that the developments would also be extended to other remote areas.

Min 5 of 3: Closing Remark

Mr. Benjamin Wachira, the ESIA Team leader noted that this was just the engagement with the public and that more meetings would be arranged to engage the public in such matters.

There being no other business, the meeting was called to an end at 2.05 PM with a word of prayer said by an elder of the community.

Signed Attendance sheets



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HOKR JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: DARADE AP'S CAMP

DATE: 2nd DECEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	ELENA SARESA	M	N/HOKR		
2.	GUYO BORU	M	N/HOKR ^{Asst. Chief}	0718005646	
3.	SORA ROBA	M	N/HOKR		
4.	HALKANO WARIO	M	N/HOKR		
5.	DIDO MAMO	M	N/HOKR		
6.	HALKANO GAYA	M	N/HOKR		
7.	ROBA GOLO	M	N/HOKR		
8.	RAMATH ABUDO	M	N/HOKR		
9.	OTACHU BURI	M	N/HOKR		
10.	BARAKO WOKABU	M	N/HOKR		
11.	GALGALO JARA	M	N/HOKR		
12.	SORA SARESA	M	N/HOKR		
13.	ROBA SHARAMO	M	N/HOKR		
14.	GUYO TUYE	M	N/HOKR		
15.	MOLU ABUDO	M	N/HOKR		
16.	TURA GONJUBO	M	N/HOKR		
17.	YATANI JIBA	M	N/HOKR		
18.	JARSO DALACHA	M	N/HOKR		
19.	UMURO ALI	M	N/HOKR		
20.	GALGALO SHARAMO	M	N/HOKR		



Kenya National Highways Authority

Quality Highways, Better Connections

**PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND
DETAILED ENGINEERING DESIGN IN NORTH HOKR JN- DARATHE AP CAMP ROAD PROJECT (A4)**

VENUE: DARADE AP'S CAMP

DATE: 2nd DECEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	GODANA DENG	M	N/HOKR.		
2.	ALI DUBA	M	N/HOKR.		
3.	MARIO BAGAJA	M	N/HOKR.		
4.	DUBA DIBA	M	N/HOKR.		
5.	WOTTO KALTUMA	M	N/HOKR.		
6.	ADAM LOLO	M	ANIMAC TRADER	0728179436	A.L.
7.	WALTER JAMES	M	REP CON	0721838494	M. JAMES
8.	Samuel Kamau	M	Repcon	0725579291	Samuel Kamau
9.	Caroline Wakoigwa	F	Repcon	0701363667	Caroline Wakoigwa
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					

Photos of the Meeting



The Assistant chief of Daradhe Location Mr. Guyo addressing the meeting.



EIA team leader Mr. Benjamin Wachira addressing the meeting



Members of the pastoralist community present during the meeting.

Appendix 9.1.3: Focus Group Discussion.

Focus Group Discussion Meeting in the Environmental and Social Impact Assessment and detailed design engineering design in North Horr Jn-Daradhe Ap camp road project (A4)

Type of meeting	Focus Group Discussion Meeting
Venue of the meeting	Elbeso
Time of the meeting	9.30 A.M- 11.00 A.M
Date of the meeting	3 rd December, 2021
Agenda of the meeting	Disclosure of the North Horr Jn- Daradhe AP Camp Road Project (A4) in the feasibility study, environmental and social impact Assessment and detailed engineering study

Min 1: Introduction and speeches

The meeting was held on 3rd December, 2021 at Elbeso at North Horr Constituency, Marsabit County. The meeting was attended by a total of 58 members with 3 males and 55 females. In attendance were; Elbeso Sub-Location Assistant Chief, three (3) members from Repcon associates and 54 from Elbeso Sub-Location. This was the first focus group discussion meeting held in the feasibility studies, ESIA and detailed engineering design of the North Horr Jn-Daradhe-AP camp road Project. The main agenda of this meeting was to disclose the North Horr Jn- Daradhe-AP camp Project to the locals and obtain their views on the project. The meeting started at 9.30 a.m. by word of prayer from the Assistant chief who also chaired the meeting.

Assistant Chief- Mr. Budha Jillo

The assistant chief, Mr.Budha Jillo appreciated members for attending the meeting and welcomed everyone to the meeting. He informed members that the meeting intended to disclose the proposed road project from North Horr to Daradhe AP Camp. He noted that this project will be great help to women and the community at large as it will open up the area and attract more development projects. The Assistant went ahead to invited Repcon team to address the meeting.

Gender Mapping Expert- Ms. Caroline Wakoigia

The Gender mapping expert, Ms. Caroline Wakoigia welcomed members to the meeting and went ahead to introduce two (2) members from Repcon Associates. She noted that the main agenda of this meeting was to disclose the North Horr Jn- Daradhe-AP camp Project women in the community and obtain their views on the project. She reiterated that women are an integral part of the society and should be actively involved in any development project in their community. She informed members that KeNHA appreciate all cultures in the country and it's for this reason that this meeting would want to learn more from the women about their tradition and culture.

Min 2: Project presentation

The Gender Mapping Expert, Ms. Caroline Wakoigia presented the project as follows:

The North Horr Jn-Daradhe AP camp road project is an initiative of the Government of Kenya where KeNHA has been appointed as the implementing agency. The project road starts at North Horr town runs in a Northerly direction through El Beso Market Centre ending at the AP Camp in Daradhe. The proposed road project shall involve upgrading the existing road which alternates between earth and gravel surface connecting North Horr to Daradhe to bitumen standard. The proposed road measures around 105 Km with a width of 100m to accommodate other utilities such as electricity and water pipelines in future.

The project is in the feasibility study stage where KeNHA has assigned Norken (K) Ltd & Uniconsult Consulting Engineers and, Repcon Associates to undertake Environmental and Social Impact Assessment (ESIA), Preliminary and Detailed Engineering Design for upgrading the North Horr-Daradhe Road to bitumen standards

Min 3: Question and Answers

This was an open session chaired by the assistant Chief, Mr. Budha Jillo who requested members to introduce themselves by name when raising or responding to questions. A total of 11 questions were raised by the Repcon team touching on culture and traditions and roles of women in the proposed road project.

S/No	Issues to be investigated	Core issues/Concerns
(i)	What is the average family size and composition, extent of polygamy	<p>Polygamy is allowed in the tradition and the extent of polygamy depends on the financial capacity of the husband.</p> <p>Most men in the community have an average of two wives with exception of Elbeso sub-Location where majority of men are monogamous.</p> <p>A family is made up of the father, mother and children where most families have a fertility rate of 5 children resulting to 7 members per household on average.</p>
(ii)	Who is the household head in the family in the Gabra community?	Men are the household heads in the family. However, there are female headed households as tradition does not allow wife inheritance in cases where the husband passes on.
(iii)	What are the gender roles in the household	Men are the household heads and are the family bread winners. Their roles include: involved in constructing livestock sheds, herding of livestock, developing water pans and shallow wells, constructing semi-permanent and permanent structures. They are also involved in

S/No	Issues to be investigated	Core issues/Concerns
		<p>milking (Donkeys and Camels)</p> <p>Women are involved in domestic activities such cooking, fetching water, fetching firewood and looking after their children. They are also involved in construction of dwelling structures “Manyattas”, herding kids and making mats.</p> <p>Children both boys and girls are involved in herding livestock.</p>
(iv)	What is the education achievement for male and female?	Majority of males and females in the community have very low levels of formal education. A small percentage of children go to schools as most of them being pastoralists are involved in herding livestock.
(v)	Investigate ownership and access to family wealth and productive resources.	Ownership and access to wealth is strongly patriarchal (household head) with all wealth considered to be owned by the men.
(vi)	What is the livestock holding per family? What is the herd composition?	<p>Most households own at least 20 goats and sheep, four (4) donkeys and at least 100 camels. The herd composition includes goats, sheep, camels and donkeys.</p> <p>The Community in general was reluctant to respond to this question.</p>
(vii)	What is the degree of vulnerability due to advanced age, sickness, physical disability etc	<p>The community has a majority of aged males and females above 70 years.</p> <p>Common disabilities in the community include blindness and physical disability mostly limping.</p>
(viii)	What is the degree of access to services: - water, school, Medicare	<p>Schools are sparsely distributed in North Horr Location. The location has only three (3) primary schools. There is a primary school at Elbeso, Elbeso primary school which offers education from class one to class three, another school is located in Koka (12 km from Elbeso) and North Horr primary school (35 Km from Elbeso). There are three secondary schools At North Horr town: A mixed day secondary school, a boy’s secondary school and a girl’s secondary school. There are no secondary schools in Elbeso or Daradhe.</p> <p>There is a dispensary at Elbeso with only one nurse and a hospital at North Horr. There are no health facilities at Daradhe.</p> <p>Water is fairly accessible in Elbeso as there is one</p>

S/No	Issues to be investigated	Core issues/Concerns
		borehole that was skunked by county government. Other water sources include shallow wells and storm water harvesting through dams.
(ix)	What is the role of traditional birth attendants and other indigenous specialist?	<p>The community has mid wives who are preferred by many pregnant women compared to hospitals due to their free services and also limited access to health centers.</p> <p>There are other traditional Specialists who cure diseases using medicinal trees. The specialists cure diseases such intestinal problems, muscles pains, sexually transmitted diseases, sore throats.</p>
(x)	How widely is indigenous traditional knowledge (ITK) applied in Medicare?	Majority of people in the community use traditional medicare as it's cheap and also the health centers are scares in the area.
(xi)	What are the names of plants used and what cases do they treat?	<p>There are several medicinal trees used by the community for Medicare. These trees include:</p> <ul style="list-style-type: none"> (v) Ilam-used as snake venom (vi) Arkens- Used to cure sore throats (vii) Lalaftu-Used to cure muscle pains and menstrual pains (viii) Wangga -Used to cure Sexually Transmitted Diseases (STIs). (ix) Qobo- used to cure ringworms
(xii)	What is the role of women in traditional medicine?	The community has mid wives who are often preferred by many pregnant women compared to hospitals.
(xiii)	How relevant is the proposed road project to women?	<p>Food commodities in Elbeso are sold at a higher price compared to other areas due to absence of a good road network. The proposed road will enable women access commodities at a lower price and on time.</p> <p>It is difficult to attend to health emergencies especially for expectant mothers with a poor road network. The project will help in saving lives of expectant mothers and their babies during critical moments.</p> <p>There is surplus milk which go to waste especially during rainy seasons. With the road construction being implemented, women will be able to sell the surplus milk in the market as the mode of transport will be easier.</p>

S/No	Issues to be investigated	Core issues/Concerns
(xiv)	What role will women play in the proposed road development?	<p>Women can offer unskilled labour in light manual labour during construction of the road such as fetching construction water, carrying construction ballast.</p> <p>Women can start food business where they will be selling food to the contractor and his labour force.</p>

Emerging Issue

It emerged that women play a crucial role in the any project and in this case Elbeso women requested to be involved in offering unskilled labour during road construction.

Min 4: Way Forward

The meeting resolved that:

- Women are an integral part in any development and should be actively involved in implementation of the project.
- The North Horr Jn- Daradhe-AP camp road Project to offer unskilled labour to women during construction.

Closing Remarks

Assistant Chief-Budha Jillo

The assistant Chief thanked members for their active participation in the meeting. He noted that the project will be of great benefit to the women in Gabra community as it will means improve means of transport in the area and also create more job opportunities to the locals.

Gender Mapping Expert- Ms. Caroline Wakoigia

The Gender mapping expert appreciated all members for attending the meeting. She emphasized that women should be involved in all development projects in their area as they are an integral part of the community.

Attendance Sheet



PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HERR JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: ELBESO

DATE: 3rd DECEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	Shuka Ibrae Abudo	F	North Horr		
2.	Sallo Mamo Roba	F	North Horr		
3.	Dima Duba Godana	F	North Horr		
4.	Bulle Palu Roba	F	North Horr		
5.	Sabdio Isacko Filq	F	North Horr		
6.	Lalafa Budha Dulati	F	North Horr		
7.	Doke Guyo Abudo	F	North Horr		
8.	Robe sharama yq	F	North Horr		
9.	Talaso Bute Konchero	F	North Horr		
10.	Tinne wambu elema	F	North Horr		
11.	Yattane Guyo Yattani	F	North Horr		
12.	Yattane Bashuna Doh	F	North Horr		
13.	Jillo Budha Kuyayo Rache	F	North Horr		
14.	Borre Ibrae Isacko	F	North Horr		
15.	Arbe Yattani Baw	F	North Horr		
16.	Hagaya Gith Isacko	F	North Horr		
17.	Gultu Wario Tura	F	North Horr		
18.	Kabale Ibrahim Jillo	F	North Horr		
19.	Tinne Basile Godana	F	North Horr		
20.	Sallo Dasa Isacko	F	North Horr		



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HORN JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: ELBERO

DATE: 3rd DECEMBER 2021

S/NO	NAME	LOCATION	CONTACT	SIGN	GENDER
1.	Teso Asud Bante	North Horn			F
2.	Gano Balali Isacko	North Horn			F
3.	Wato sales Diba	North Horn			F
4.	Orge kumfa wario	North Horn			F
5.	Sallo Ali Doka	North Horn			F
6.	Buke Duba Jillo	North Horn			F
7.	Sallo Wano Adano	North Horn			F
8.	Robe Jarbo Ali	North Horn			F
9.	Talso wano Adano	North Horn			F
10.	Budha Dub Gamo	North Horn			F
11.	Doko Bonaya Bonu	North Horn			F
12.	Teso Dabasso Ramata	North Horn			F
13.	Tume shama Bonu	North Horn			F
14.	Gano Godana Elenq	North Horn			F
15.	BUDHA YANNI JILLO	ASS/CHIEF NORTH-HORN	0726271241		M
16.	James Naweru	REP-CON	0721838494		M
17.	Samuel Kamau	Repron As	0725579256		M
18.	Caroline Wakaigia	Repron Ass	0101363667		F
19.					
20.					



Kenya National Highways Authority

Quality Highways, Better Connections

PUBLIC CONSULTATIVE MEETING IN THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT AND DETAILED ENGINEERING DESIGN IN NORTH HERR JN- DARATHE AP CAMP ROAD PROJECT (A4)

VENUE: ELGEYO

DATE: 3rd DECEMBER 2021

S/NO	NAME	GENDER	LOCATION	CONTACT	SIGN
1.	Midina Dalu Roba	F	North Horr		
2.	Sallo Huga Hidi	F	North Horr		
3.	Yaltane Guyo Legayo	F	North Horr		
4.	Marcanda Katello Goba	F	North Horr		
5.	Jillo Yaltane Adhe	F	North Horr		
6.	Yaltane Adano Dalacho	F	North Horr		
7.	Bukata Wario Goba	F	North Horr		
8.	Chachu Abuto Ibrahe	F	North Horr		
9.	Kabale Gulallo Racha	F	North Horr		
10.	Chuloke Bonaya Racha	F	North Horr		
11.	Midina Adano Dalacho	F	North Horr		
12.	Wato Beni Hara	F	North Horr		
13.	Robe shama Umuro	F	North Horr		
14.	Gumato Gurra Salea	F	North Horr		
15.	Shanu Isacko Ibrahe	F	North Horr		
16.	Daku Huga Barako	F	North Horr		
17.	Adho Kari Isacko	F	North Horr		
18.	Wax Diba Dadu	F	North Horr		
19.	Talso Wario Aba	F	North Horr		
20.	Wato Katello Orge	F	North Horr		

Photos from the meeting



Assistant chief Elbeso Sub-Location addressing members in the meeting.



A member airing her views during the meeting



A section of members present in the meeting.

Appendix 9.1.4: Key Informant Interviews

Appendix 9.1.4.1: Summary Table from Key Informant Interviews

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
1.	29/11/21	County Commissioner's Office	Martin Buluma ASS. County Commissioner	-Security: The highly insecure area is from North Horr to Daradhe .Will the upgrading of the road help to reduce the clashes?	<ul style="list-style-type: none"> • Most clashes originate from the urban areas and trickle down to the rural areas • Mostly the clashes are between the local communities and rarely interfere with on-going projects. • Public participation is very important at the grass root. Mostly the locals do not take it kindly when projects are initiated without their knowledge. • There are high unemployment rates among the youth in North Horr • The A.C.C promised to inform North Horr D.C.C. about the presence of the Repcon team at North Horr
2.	29/11/21	Interior	Mr. Omingo Oluoch ACC North Horr Franco Kazungu D/OCS North Horr	<ul style="list-style-type: none"> • The Road when developed will only improve transportation in North Horr. 	<ul style="list-style-type: none"> • The 105 kilometre road project will only improve transportation in one Location (North Horr Location) and two Trading Centres (North Horr and Elbaso) • The project area is inhabited by four

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
				<ul style="list-style-type: none"> To maximise on the benefits, the road should be extended to Illeret town. 	<p>communities majority being the Gabra community in North Horr and some few/minority Borana and Somali communities while Daradhe to Illeret is occupied by the Dasanach community all the way to the Ethiopian border.</p> <ul style="list-style-type: none"> The land traversed by the project is mostly communally owned. The project is located in a pastoralist zone and is prone to pastoral conflicts arising from grazing and watering rights Illelet is a division / location with four sub-locations and has a higher population growth rate as compared to North Horr. The road would be more beneficial to both fishermen and pastoralist if extended to Illeret town – Illeret town enjoys diverse socioeconomic profile, rapid population growth The road should extend to Illelet at the Kenya-Ethiopia border. The road will improve security as Law enforcers will move faster to respond to emergencies and restore peace.

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
3.	29/11/21	County Surveyors Office	Mr. Abdulahi County Surveyor	<ul style="list-style-type: none"> Land ownership Valuation of land 	<ul style="list-style-type: none"> Land is communally owned by the community in the rural areas. Land in urban areas like North Horr and Maikona is privately owned by individuals Valuation of land was done by the lands ministry and value index is available in Nairobi
4.	29/11/21	Kenya Wildlife Services	Mr. John Wambua Assistant Director Northern Region	<ul style="list-style-type: none"> Are there any wildlife migration corridors? Replacement of trees affected during construction. Riverine forests are ecologically rich areas for birds and wildlife 	<ul style="list-style-type: none"> Animals across the traverse include Dik-diks, antelopes, Zebras. Poaching is not a serious concern at the moment but might change after the construction of the road The road will help response to medical emergencies especially at Sibiloi national park. Signage should be considered to care for the crossing animals mostly along the riverine forests. Local communities still belief in killing of an animal as a form of initiation to

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
					adulthood
5.	29/11/21	NEMA at County level	Mr. Vincent Oloo County Director of Environment	<ul style="list-style-type: none"> Core environmental concerns. Hazards eminent in the corridor-North Horr-Daradhe. NEMA requirements in planning of the corridor development 	<ul style="list-style-type: none"> Hold public meetings chaired by the DCC for Public disclosure and participation. Involve the project Engineer to explain about the road design Considering that boreholes will be drilled, each borehole should have an EIA undertaken and licences acquired from both NEMA and WAR. Burrow pits should also have an EIA undertaken and licences submitted NEMA county office. EIA report to be submitted to County office. The site camp should also have a license and a separate EIA report. The site camp must consider the workers and provide proper sanitary facility. Proper management of construction

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
					<p>waste materials and dust.</p> <ul style="list-style-type: none"> • Signage to be put in place to avoid accidents
6.	29/11/21	Water Resources Authority	Mr. Hussein Guyo Sub Regional Manager Benard Simba-Water Right Officer	<ul style="list-style-type: none"> • Are there any riparian area, ground water conservation areas with unique ecological formation within the corridor? • Availability of ground water within the traverse. • What are the challenges in managing water quality within the area? • Are there any hazards to ground water within the corridor? • Apply for permits for boreholes and quality water testing • Karache is an area of 	<ul style="list-style-type: none"> • Marsabit county is an arid area without a single river. • Potential ground water in the highlands is poor • Pollution is high in North Horr since shallow wells are located in the same vicinity. • Bore hole drilled for the purpose of construction should be reverted to the community after the construction. This will encourage settlement. • conflicts brought about by water sources are not eminent in the project area but might be a problem past Daradhe • Water quality is good for construction but not fit for human consumption.

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
				ecological importance with numerous shallow wells.	
7.	29/11/21	Kenya Forest Service	Mr. Abraham Kipchumba. Forest Officer	Presence of tree species listed in IUCN red.	<ul style="list-style-type: none"> • Trees removed during construction, the contractor to support public schools to establish tree nurseries for replacement purpose. • Provide seedlings of trees which are commonly found in the region like Acacia and Baranite eqyptica. • When collecting soils for construction purposes, to avoid areas with invasive tree species like 'Mathenge' so as to avoid its spread. • According to forest conservation Act of 2016 Santalum album (Sandal wood) is an endangered species. The species might be found within the corridor during construction.
8.	01/12/21	VSF - Veterinaries Sans Frontiers (NGO)	Mr. James Nakulo	-Average number of livestock per family -Means of livelihood per family -Gender roles	<ul style="list-style-type: none"> • Most locals are pastoralist with very few involved in small scale trade of household goods and livestock trade within the county and across the borders



NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
				<p>-Benefits/How the community stands to gain from the project</p> <p>-Main concerns of the local communities on safety of their animals after the construction.</p>	<ul style="list-style-type: none"> • Women roles include taking care of the family, construction of manyatta and taking care of young animals. • Men are the family heads and make decisions, they look after the livestock. • Construction of the road will improve livestock trade in the county and even inter-country animal trade • Road construction will be of great help in quick delivery of veterinary services. • Measures to reduce motorists speed should be put in place
9.	03/12/21	Concern Worldwide	Mr. Adam Bagajo	<ul style="list-style-type: none"> • The current marram road is used by the communities which trek for long distances to access watering holes and once it's improved it may interfere with their paths. • Provide a reserve on the side of the road to 	<ul style="list-style-type: none"> • The construction should continue to Limerick to enable to concern worldwide give their services there.

NO	DATE	INSTITUTION	NAME/DESIGNATION	ISSUES RAISED	COMMENTS
				be used by the animals	
10.	03/12/21	Catholic Mission Centre	Father Peter	<ul style="list-style-type: none"> Extend the road to institutions run by the church. Local communities still participate in outdated cultural practices like FGM 	<ul style="list-style-type: none"> The road will improve the transport system and also lead to affordable goods for the locals It will improve delivery of government services to the locals. Interaction between communities will improve co-existing. The road will lead to improved amenities schools which will help to reduce level of illiteracy

Appendix 9.1.4.2: Evidence from Key Informant Interviews





Key Informant Interview with County Commissioner's Office, Martin Buluma (Assistant County Commissioner

Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp and Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
County Commissioner's Office	Martin Buluma Assistant County Commissioner	Highly insecure areas - North Horr - bandage a) will the road open up the area and help reduce the clashes	<ul style="list-style-type: none"> - Most clashes begin in the town area and trickle down to the rural centres - Most clashes are between the communities themselves and rarely interfere with ongoing projects like the ongoing construction project at Ndikona. - Public participation is important at the grassroots as previously they have encountered problems with the local not being open to new development for lack of information. - High unemployment rates among the youth in North Horr. 	  P.O. Box 1-60500, MARSABIT Email: cc.marsabit@gmail.com

Repon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key Informant Meeting with Interior ACC North Horr, Mr. Omingo Oluoch and D/OCS North Horr, Mr. Franco Kazungu .


Institution	Name/Designation	Issues raised	Comments made	Signature/date
Interior	Omingo Oluoch ACC - North Horr District	Intercommunity Conflict between Dassanach and Gallur along Derada - Uleret & border	The road should extend to Uleret - border of Ethiopia and Kangsi. Reasons: 1. Economic activities in Uleret 2) One bridge at Uleret - to be upgraded	 5/11/2021 
INTERVIEW	FRANCO KAZUNGU D/OCS N/Horr	Inter community Conflict between Dassanach and Gallur & community		 5/11/2021 

Page 2

Repcon Associates NEMA Firm of experts no 0002. Contact Mr. MM Wairagu-ESIA Team Leader on 0721274358


Key Informant Interview with County Department of Physical Planning, Mr. Adullahi (County Surveyor)

Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp road Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
✓ County Surveyor	Adullahi 0721 962 383	Land ownership Valuation of land	<ul style="list-style-type: none"> - Land is under community ownership in the rural areas. - Land ownership in townships - North Horr- Maikona is adjudicated and individually owned - Issues of land acquisition and compensation are handled and consent is given by the community. - No planning has been done yet - Valuation of land done by the ministry of land and value index can be available in Nairobi. 	

Repton Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Stakeholder consultations in the ESIA study for the North Horr JN- Daratthe AP Camp Road Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
Kenya Wildlife Services	Assistant Director Northern Region John Wambua 0722418900 jwambua@kws.go.ke	<p>Are there any wildlife migration corridors along the proposed corridor?</p> <p>→ Encourage tree replacement during construction. It can be done in areas that they can survive like the highlands area.</p> <p>→ Put up bridges in areas that have shallow loggins.</p> <p>→ Riverine forests are ecologically rich areas for birds and wild life.</p>	<p>→ Animals along traverse include buffaloes, antelopes, zebras,</p> <p>→ Poaching is not a serious concern at the moment but might change with the road construction.</p> <p>→ Road development will help improve response to medical emergencies especially at Sibibi National Park.</p> <p>→ It will also boost traffic and tourism at Sibibi Park.</p> <p>→ Put up signposts to take care of wildlife crossing mainly along the riverine forests.</p> <p>→ Local communities still believe in killing an animal as a form of initiation to adulthood.</p> <p>→ Area is a bird rich area.</p>	 29/11/2021

Key Informant Interview with NEMA Marsabit County, Vincent Oloo (County Director of Environment)



Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp road D.

Institution	Name/ Designation	Issues Raised	Please give your comments/ Concerns	Date
NEMA at county level	Vincent Oloo - County Director of Environment	<ul style="list-style-type: none"> Core environmental concerns at county level. Any risks/ hazards eminent in the Corridor - North Horr to Darede NEMA requirements in planning of corridor development. Any other matter 	<ul style="list-style-type: none"> 7 Had atleast two barazas shared by the BOC for public disclosure and participation. 7 Bring in the engineer / Project manager to talk about the project design. 7 Go aside about sources of construction water. Any bore hole drilled, and EIA study should be undertaken and licences acquired from both for EIA & WRR. 7 Burroughs too should have an EIA undertaken and a license acquired. 7 EIA Report to be submitted in the NEMA county office. 7 The site camp should also have a licensed separate EIA report. 7 Welfare of the site workers: Sanitary provisions, Water. 7 Environmental concerns: Dust, Traffic Control, waste management for contractors camp. 	29 NOV 2021

Repcon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key Informant Interview with Water Resources Authority Office , Hussein Guyo (Sub Regional Manager) , Benard Simba (Water Right Officer)


Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp road Project

Institution	Name/ Designation	Issues Raised	Please give your comments/ Concerns	Signature/ Date
Water Resources Authority	Hussein Guyo Sub-regional manager 0125092449 MR Simba Benard 072479568 Water Right Officer.	<ul style="list-style-type: none"> Is there any riparian area, ground water conservation area or areas with unique ecological formation within the corridor etc.? Availability of ground water resources in the traverse What are the challenges in managing water quality within the area? Are there any hazard to ground water within corridor? <p>Happy for permit for bore hole drilling and water quality testing.</p> <p>Kalache is an area of ecological importance with numerous shallow wells</p>	<p>Marsabit is an Arid zone with a 7E m² area.</p> <p>No permanent source of waters seasonal rivers and laqas</p> <p>Potential of ground water is highlands is poor but no problems will be encountered in Chalbi basin</p> <p>Pollution is high in North Horr since pit latrine and shallow wells are located in same vicinity.</p> <p>Boreholes drilled for construction revert to community encouraging settlements</p> <p>Encourages ground water retention (bore) to tap flow from Ethiopian highlands</p> <p>Conflicts brought about by water sources are not eminent in the project area but might be a problem past barade.</p> <p>Quality of water is good for construction but not for human consumption</p>	 29/11/2021 

Repeon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key informant Interview with Kenya Forest Service, Marsabit Conservancy Office, Abraham Kipchumba (Forest Officer).




Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp road Project

Institution	Name/ Designation	Issues Raised	Please give your comments/ Concerns	Signature/ Date
Kenya Forest Service	Abraham Kipchumba Forest officer 0726399179	Presence of tree species listed in IUCN red	<ul style="list-style-type: none"> → For trees removed during construction, contractor to establish support public schools to establish tree nursery for replacement purposes. → Procure seedlings of trees that are mostly found in the area like acacia, Banile egyptica. → When clearing soil for construction avoid areas with invasive tree species like "machege" to avoid its spread. → Forest Conservation and management Act of 2016. → Santal wood (Santalum album) is an endangered species which we might encounter during road species. 	

Repton Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key Informant Interview with VSF Veterinaries Sans Frontiers (NGO), James Nakulo (Field Officer, Marsabit County)

Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp and Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
VSF - Veterinaries Sans Frontiers	James Nakulo	<p>1) Average number of livestock per family</p> <p>2) Means of livelihood for affected community</p> <p>3) Gender roles</p> <p>4) Benefits / How the community stands to gain from the project.</p> <p>5) Main concern for the local community after construction will be the safety of their livestock</p>	<p>1) Most locals are pastoralists with few involved in small scale trade of household items and livestock both within the country and cross border.</p> <p>Women -> continuity of life, taking care of the family, construction of mangroves</p> <p>Men -> livestock grazing, decision making</p> <p>2) Improved trade both for livestock and livestock products (Economic improvements)</p> <p>3) Road development with all enable timely delivery of services offered by the VSF.</p> <p>- Design should be able to accommodate means to reduce speed of vehicular traffic to ensure safety of livestock</p>	 01/12/2021  

Repcon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key Informant Interview with Concern Worldwide, Adam Bagajo (North Horr Office Manager)

Stakeholder consultations in the ESIA study for the North Horr JN- Darathe AP Camp road Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
Concern Worldwide	Adam Bagajo (WARD Development ASSISTANT-NORTH HORN PROGRAMMES CONCERN WORLDWIDE)	<p>→ The current murrum road is used by the community that means for long distance to access watering holes and once improved it may interfere with their path.</p> <p>→ Provide a reserve on the side of the road to be used by livestock.</p>	The road upgrading should also continue to allow to enable them continue offering their services there.	<div style="border: 1px solid black; padding: 5px; transform: rotate(-15deg);"> <p>CERTIFIED BY Adam Bagajo WDA - Concern Worldwide Signature: [Signature] DATE: 03/12/2021 for N/Horr office</p> </div>

Repcon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358

Key Informant Interview with Catholic Mission Centre, Father Peter

Stakeholder consultations in the ESIA study for the North Horr JN- Daratthe AP Camp road Project

Institution	Name/Designation	Issues Raised	Comments Made	Signature/Date
Catholic Mission Centre	Father Peter - 0103600027	<p>Know the road to institutions run by the church too like Helima primary school</p> <p>- Local community skill participatory in outdated cultural practices like FGM.</p>	<p>- The road will improve the transport system and also lead to affordable goods for the locals</p> <p>- Will also improve delivery of government services to the locals</p> <p>- The road will also encourage interaction between the local Gabor community and other communities</p> <p>- Improved road network will lead to improved amenities like schools and also lead to reduced poverty levels.</p>	<p><i>[Signature]</i> 13/12/2021</p>



Repecon Associates- NEMA Firm of experts no 002, Contact Mr. MM Wairagu- ESIA Team Leader on 0721274358



The ESIA Team consulting with ACC Martin Buluma at the County Commissioner's Office



The ESIA Team consulting with Mr Vincent Oloo the County Director of Environment (NEMA) for Marsabit County,



The ESIA team consulting with Mr John Wambua Assistant Director of the Kenya Wildlife Services- Northern Region



The ESIA team during the consultations with Mr Hussein Guyo the Sub Regional Manager Water Resources Authority Office.



The ESIA team undertaking consultations at the Kenya Forest Services with Mr Abraham Kipchumba



ESIA Field Team Leader Mr Benjamin explaining the project to VSF Veterinaries Sans Frontiers (NGO) officer Mr James Nakulo

Appendix 7.1: NEMA Checklist for EIA Studies

SECOND SCHEDULE: ISSUES TO BE CONSIDERED IN ENVIRONMENTAL IMPACT ASSESSMENT

The following issues may, among others, be considered in the making of environmental impact assessments.

1. Ecological Considerations - (a) Biological diversity including - (i) effect of proposal on number, diversity, breeding habits, etc. of wild animals and vegetation; (ii) gene pool of domesticated plants and animals e.g. monoculture as opposed to wild types. (b) Sustainable use including - (i) effect of proposal on soil fertility; (ii) breeding populations of fish, game or wild animals; (iii) natural regeneration of woodland and sustainable yield; (iv) wetland resource degrading or wise use of wetlands. (c) Ecosystem maintenance including - (i) effect of proposal on food chains; (ii) nutrient cycles; (iii) aquifer recharge, water run-off rates etc; (iv) a real extent of habitants; (v) fragile ecosystems.

2. Social considerations including - (a) economic impacts; (b) social cohesion or disruption; (c) effect on human health; (d) immigration or emigration (e) communication - roads opened up, closed, rerouted (f) effects on culture and objects of culture value

3. Landscape - (a) views opened up or closed; (b) visual impacts (features, removal of vegetation, etc; (c) compatibility with surrounding area; (d) amenity opened up or closed, e.g recreation possibilities.

4. Land uses - (a) effects of proposal on current land uses and land use potentials in the project area. (b) possibility of multiple use. (c) effects of proposal on surrounding land uses and land use potentials.

5. Water: Important aspects to consider are the effects of the proposal on: (a) water sources (quantity and quality) - (i) rivers; (ii) springs; (iii) lakes (natural and man-made); (iv) underground water; (v) oceans; (b) drainage patterns / drainage systems;

THIRD SCHEDULE :GENERAL GUIDELINES FOR CARRYING OUT AN ENVIRONMENTAL IMPACT ASSESSMENT STUDY

An environmental impact assessment study shall be conducted in accordance with the general environmental impact assessment guidelines and administrative procedures issued by the Authority. An environmental impact assessment study shall include the following:

1. Sources of Impact
2. Project Inputs
3. Project Activities
4. Areas of Impact on the Natural and Human Environments
5. Environmental Impacts (General Impacts on the Natural and human Environment)
6. Environmental Guidelines and Standards (National Legislation, International guidelines. International Conventions and Treaties)
7. Mitigation Measures
8. Environmental Management Plan 9. Environmental Monitoring and Auditing.

Appendix 7.4: Comprehensive Impact Assessment for the North Horr Jn Darathe A4 Road based on the Leopold Matrix

Comprehensive Impact Assessment for the North Horr Jn Darathe A4 Road based on the Leopold Matrix ⁷

1. Agricultural Lands

a)	Are there cultivable lands in the area?	<input type="text" value="No"/>	No	Unk
b)	Will project decision result in more or improved cultivable land?	<input checked="" type="text" value="No"/>	No	Unk
c)	Will project decision result in less or damage cultivable land?	Yes	<input checked="" type="text" value="No"/>	<input type="text" value="Unk"/>

ESTIMATE IMPACT ON AGRICULTURAL LAND:

ND HA MA LA O LB HB

2. Soil Erosion

a)	Will project decision help to prevent soil loss or erosion	Yes	<input checked="" type="text" value="No"/>	Unk
b)	Will project decision directly cause or worsen soil loss or erosion?	<input checked="" type="text" value="Yes"/>	No	Unk
c)	Could project decision indirectly lead to practices that could cause soil loss or erosion?	<input checked="" type="text" value="Yes"/>	No	Unk
d)	Is it necessary to consult a soils scientist	Yes	<input checked="" type="text" value="No"/>	Unk

ESTIMATED IMPACT ON SOIL EROSION:

ND HA LA LA O LB HB

3. Slope Stability

a)	Does project decision involve actual modification of slopes	<input checked="" type="text" value="Yes"/>	No	Unk
b)	Will project decision affect stability of slopes indirectly	<input checked="" type="text" value="Yes"/>	No	<input type="text" value="Unk"/>
c)	Will project decision result in slope stability?	Yes	<input checked="" type="text" value="No"/>	<input type="text" value="Unk"/>
d)	Could project decision cause people livestock or property to be located where existing unstable slopes could be a hazard?	Yes	<input checked="" type="text" value="No"/>	Unk
e)	Is it necessary to consult a geo-technical engineer?	Yes	<input checked="" type="text" value="No"/>	Unk

ESTIMATED IMPACT ON SLOPE STABILITY:

ND HA MA LA O LB HB

⁷ Selected option is shades

4. Energy - Mineral Resources

a)	Do energy - mineral resources exist in project area?	Yes	No	Unk
b)	Will project decision help to develop, now or in the future, important energy-mineral resources?	Yes	No	Unk
c)	Will project decision cause significant consumption of additional energy -mineral resources such as engine fuels?	Yes	No	Unk
d)	Could project decision prevent or impede future development of essential energy-mineral resources?	Yes	No	Unk
e)	Is it necessary to consult with a mineral's agency or mining engineer?	Yes	No	Unk

ESTIMATED IMPACT ON ENERGY/ MINERAL RESOURCES:

ND HA MA LA **LA** Q LB HB

5. Surface Water Quantity

a)	Do water resources exist in project area?	Yes	No	Unk
b)	Is information available on present and future demands on water resources as result of the project?	Yes	No	Unk
c)	Will project decision help to increase or preserve available surface water supplies by such things as improved drainage / run-off conditions?	Yes	No	Unk
d)	Will project decision increase demand or cause loss of available surface water directly or indirectly?	Yes	No	Unk
e)	Is it necessary to consult a hydrologist?	Yes	No	Unk

ESTIMATED IMPACT ON SURFACE WATER QUANTITY:

ND HA MA **LA** LA Q LB HB

6. Surface Water Quality

a)	Is information available on present water quality?	Yes	No	Unk
b)	Will project decision lead to additional natural or man-made discharges into surface waters?	Yes		Unk
c)	Will project decision help to improve or protect surface water quality?	Yes	No	Unk
d)	Could project decision cause deterioration of surface water quality either directly or indirectly?	Yes	No	Unk
e)	Is it necessary to consult a water quality engineer or agency?	Yes	No	Unk

ESTIMATED IMPACT ON SURFACE WATER QUALITY:

ND HA MA **LA** LA Q LB HB

7. Ground Water Quantity

a)	Do ground water resources exist in project area?	<input checked="" type="checkbox"/> Yes	No	Unk
b)	Is information available on present and future demands on water resources as result of the project?	<input checked="" type="checkbox"/> Yes	No	Unk
c)	Will project decision help to increase or preserve available ground water supplies by such things as improving recharge conditions?	Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unk
d)	Will project decision increase demand or cause loss of available ground water either directly or indirectly?	<input checked="" type="checkbox"/> Yes	No	Unk
e)	Is it necessary to consult a hydro-geologist?	Yes	<input checked="" type="checkbox"/> No	Unk

ESTIMATED IMPACT ON GROUNDWATER QUALITY:

ND HA ☒ MA ☒ LA LA O LB HB

8. Ground Water Quality

a)	Is information available on present water quality?	<input checked="" type="checkbox"/> Yes	No	Unk
b)	Will project decision cause any natural or man-made discharges into ground aquifers?	Yes	<input checked="" type="checkbox"/> No	Unk
c)	Could project decision cause deterioration of ground water quality?	Yes	<input checked="" type="checkbox"/> No	Unk
d)	Could project decision cause deterioration of ground water quality either directly or indirectly?	Yes	<input checked="" type="checkbox"/> No	Unk
e)	Is it necessary to consult a ground water quality specialist?	Yes	<input checked="" type="checkbox"/> No	Unk

ESTIMATED IMPACT ON GROUND WATER QUALITY.

ND HA MA ☒ LA LA O LB HB

9. Air Quality

a)	Is information available on existing air quality?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Unk
b)	Will project decision produce any air emission directly?	Yes	<input checked="" type="checkbox"/> No	Unk
c)	Will project decision help to reduce existing air pollution sources such as open burning operations?	Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unk
d)	Could project decision lead to practices that worsen air quality such as causing increased road traffic or industrialization?	<input checked="" type="checkbox"/> Yes	No	<input type="checkbox"/> Unk
e)	Could project decision lead to a change in engine use or fuel combination that could cause serious air problems?	<input checked="" type="checkbox"/> Yes	No	<input type="checkbox"/> Unk

ESTIMATED IMPACT ON AIR QUALITY:

ND HA MA ☒ LA LA O LB HB

10. Noise

a)	Is noise now a problem in project area?	Yes	<input type="checkbox"/> No	Unk
b)	Will project help in reducing undesirable noise	Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unk

	conditions?			
c)	Will project cause temporary or sustained increases in noise generation conditions such as heavy machinery or road travel?	Yes	No	Unk
d)	Could project cause movements of people to high noise level locations?	Yes	No	Unk
e)	Is it necessary to consult a noise specialist?	Yes	No	Unk

ESTIMATED IMPACT ON AIR QUALITY:

ND HA MA LA O LB HB

11. Aquatic Ecosystems

a)	Are there any aquatic ecosystems of which the types listed below which, by nature of their size, abundance or type, can be considered significant or unique?	Yes	No	Unk
	River?			
	Streams?			
	Lakes?			
	Ponds?			
b)	Are these systems essentially:			
	Pristine?	Yes	No	Unk
	Moderately degraded?	Yes	No	Unk
	Severely degrade?	Yes	No	Unk
	Ponds?			
c)	Are these systems used by the local people:			
i)	Consumptively			
	For drinking water?	Yes	No	Unk
	For Irrigation?	Yes	No	Unk
	For livestock?	Yes	No	Unk
ii)	Non-consumptively			
	For washing and bathing?			
	For waste Disposal?			
	For Transportation?			
	For Harvest of non-domesticated plants or animals as food, fiber animals as food, fiber fur or other useful products?			
d)	Will the project directly affect consumption use of water?	Yes	No	Unk
e)	Will the project directly or indirectly affect either non-consumptive or consumptive uses of these ecosystems by:			
	Use or production of toxic material (both during construction and / operation) which might enter these systems?	Yes	No	Unk

Alteration of drainage?
 Increasing erosion?
 Causing increase in populations so as to place
 added stress on their systems?

Yes
 Yes
 Yes

No
 No
 No

Unk
 Unk
 Unk

ESTIMATED IMPACT ON AQUATIC ECOSYSTEMS:

ND HA MA LA LA O LB HB

12. Wetland Ecosystems

- a) Are there any aquatic ecosystems of the types listed below which by nature of their size, abundance of type, can be considered significant of unique?

Marsh?

Yes

No

Unk

Swamp?

Yes

No

Unk

Bog?

Yes

No

Unk

Flood Plain?

Yes

No

Unk

Estuary?

Yes

No

Unk

- b) Are these systems

Pristine?

Yes

No

Unk

Moderately degraded?

Yes

No

Unk

Severely degraded?

Yes

No

Unk

- c) Are these systems used by local people for:

Drinking water?

Yes

No

Unk

Livestock Water?

Yes

No

Unk

Washing and Bathing?

Yes

No

Unk

Waste Disposal?

Yes

No

Unk

Agriculture?

Yes

No

Unk

Harvest on non-domesticate plants or animals as food, fur, or fiber?

Yes

No

Unk

- e) Will the project either directly or indirectly affect wetlands by:

Changing population or land use practices so as to increase Drainage of wetlands for use as agricultural, industrial or urban land?

Yes

No

Unk

Use or production (either during construction and / operation of toxic materials which might enter wetlands?

Yes

No

Unk

Use the water directly?

Yes

No

Unk

Alter drainage patterns so as to affect wetlands?

Yes

No

Unk

Increase erosion so as to affect wetlands?

Yes

No

Unk

ESTIMATED IMPACT ON WET LAND ECOSYSTEMS:

ND HA MA LA LA O LB HB

13. Terrestrial Ecosystems

- a) Are there any aquatic ecosystems of which the types listed below which, by nature of their size, abundance or type, can be considered significant or unique?

Forest?

Yes

No

Unk

Savanna?

Yes

No

Unk

	Grassland?	Yes	No	Unk
	Desert?	Yes	No	Unk
b)	Are these ecosystems:			
	Pristine?	Yes	No	Unk
	Moderately degraded?	Yes	No	Unk
	Severely Degraded?	Yes	No	Unk
c)	Are these present trends towards alteration of these ecosystems through cutting, burning, etc. to produce agricultural, industrial, or urban land?	Yes	No	Unk
d)	Does the local population use these ecosystems to obtain non-domesticated:			
	Food plants?	Yes	No	Unk
	Medicinal Plants	Yes	No	unk
	Wood Products?	Yes	No	Unk
	Fiber?	Yes	No	Unk
	Fur?	Yes	No	Unk
	Food Animals?	Yes	No	Unk
e)	Will the project require clearing or alteration of:			
	Small areas of land in these ecosystems?	Yes	No	Unk
	Moderate areas of land in these ecosystems?	Yes	No	Unk
	Large areas of land in these ecosystems?	Yes	No	Unk
f)	Does the project rely on any raw materials (wood, fiber) from these Ecosystems?	Yes	No	Unk
g)	Will the project decrease use of products from these ecosystems by producing or providing substitute materials?	Yes	No	Unk
h)	Will the project cause increased population growth in the area, bringing about increased stress on these ecosystems?	Yes	No	Unk

ESTIMATE IMPACT ON TERRESTRIAL ECOSYSTEMS:

ND HA MA **LA** LA O LB HB

14. Endangered species

a)	Is the existence of endangered species in the project area:			
	Very unlikely	Yes	No	Unk
	Probable	Yes	No	Unk
	Highly probable	Yes	No	Unk
	Documented fact	Yes	No	Unk

b)	Are these species: Of scientific interest only?	Yes	No	Unk
	Of scientific interest and highly sought after by local people for food, hides, sale to animal dealers.			
c)	Will the project affect the habitat of these animals: Directly by destruction of habitat?	Yes	No	Unk
	Indirectly by altering habitat through changing drainage, land use?	Yes	No	Unk
d)	Will the project increase ease of access to these habitats?	Yes	No	Unk
e)	Will the project increase population in the project area, thus placing increased pressure on these species and / or on their habitat?	Yes	No	Unk

ESTIMATED IMPACT ON ENDANGERED SPECIES

ND HA MA LA O LB HB

15. Migratory Species

a)	In the project area are there any: Migratory fish	Yes	No	Unk
	Migratory birds	Yes	No	Unk
	Migratory animals	Yes	No	Unk
b)	Are these species used by local people for food, fur, or other products?	Yes	No	Unk
c)	Will the project require any dams, roads, pipelines or other alignments which could interfere with these migratory animals?	Yes	No	Unk
d)	Will the project destroy any habitat (resting, feeding reproductive) which are critical to these species?	Yes	No	Unk
e)	Will increased population place additional stress on these species?	Yes	No	Unk

ESTIMATED IMPACT ON MIGRATORY SPECIES

ND HA MA LA O LB HB

16. Beneficial Plants

a)	Do non domesticated plants occur in the project area which are used or sold by local peoples as:			
	Food?	Yes	No	Unk
	Fiber?	Yes	No	Unk
	Ornament?	Yes	No	Unk
	Forage?	Yes	No	Unk
	Building Materials	Yes	No	Unk

- | | | | | |
|----|---|-----|----|-----|
| b) | Do these plants occur in : | | | |
| | Undisturbed habitat? | Yes | No | Unk |
| | Moderately disturbed habitat? | Yes | No | Unk |
| | Severely disturbed habitat? | Yes | No | Unk |
| c) | Are these plants: | | | |
| | Utilized heavily? | Yes | No | Unk |
| | Utilized moderately? | Yes | No | Unk |
| | Utilized only occasionally? | Yes | No | Unk |
| d) | Is this use: | | | |
| | Peculiar to the local population? | Yes | No | Unk |
| | Universal in the region / country? | Yes | No | Unk |
| e) | Will the project: | | | |
| | Decrease habitat for these plants? | Yes | No | Unk |
| | Increase access to these plants? | Yes | No | Unk |
| | Provide substitute products or the necessary money to replace the use of these plants through increased population? | Yes | No | Unk |

ESTIMATED IMPACT ON BENEFICIAL PLANTS

ND HA MA LA LA O LB HB

17. Beneficial Animals

- | | | | | |
|----|--|-----|----|-----|
| a) | Do non domesticated animals occur in the project area which are used or sold by local people as: | | | |
| | Souvenir products? | Yes | No | Unk |
| | Food? | Yes | No | Unk |
| | Fur? | Yes | No | Unk |
| | Pets? | Yes | No | Unk |
| b) | Do these animals occur in: | | | |
| | Undisturbed habitats? | Yes | No | Unk |
| | Moderately disturbed habitat? | Yes | No | Unk |
| | Severely disturbed habitat? | Yes | No | Unk |
| c) | Are these animals: | | | |
| | Utilized heavily? | Yes | No | Unk |
| | Utilized moderately? | Yes | No | Unk |
| | Utilized only occasionally? | Yes | No | Unk |
| d) | Is this use: | | | |
| | Peculiar to the local population? | Yes | No | Unk |
| | Universal in the region/country? | Yes | No | Unk |

e)	Will the project:			
	Decrease habitat for these animals?	Yes	No	Unk
	Increase habitat for these animals?	Yes	No	Unk
	Increase access to these animals?	Yes	No	Unk
	Provide substitute products or the necessary money to replace the use of these animals?	Yes	No	Unk
	Increase use of these animals through increased population?	Yes	No	Unk

ESTIMATED IMPACT ON BENEFICIAL ANIMALS:

ND HA MA LA LA Q LB HB

18. Pest Plants

a)	Are there currently any pest plant problems in the project area?	Yes	No	Unk
b)	Are there any potential pest plant species known to exist in the project area?	Yes	No	Unk
c)	Are these pest plants associated with:			
	Severely disturbed land?	Yes	No	Unk
	Agricultural land?	Yes	No	Unk
	Stagnant or polluted water?	Yes	No	Unk
d)	Will the project:			
	Increased habitat for pest plants?	Yes	No	Unk
	Decreased habitat for pest plants?	Yes	No	Unk
	Provide opportunity for control of pest plants?	Yes	No	Unk
	Increase the possibility of introduction of pest plants through increased commerce?	Yes	No	Unk

ESTIMATED IMPACT ON PEST PLANTS:

ND HA MA LA Q LB HB

19. Pest Animals

a)	Are there currently any problems with pest animals in the project area?	Yes	No	Unk
b)	Are there any animals in the project area which, under altered ecological conditions, have the potential for becoming pest species	Yes	No	Unk
c)	Are these species associated with:			
	Severely disturbed land?	Yes	No	Unk
	Agricultural land?	Yes	No	Unk
	Aquatic Habitats?	Yes	No	Unk

d)	Will the project:			
	Increased habitat for pest animals?	Yes	No	Unk
	Decreased habitat for pest animals?	Yes	No	Unk
	Provide opportunity for control of pest animals?	Yes	No	Unk
	Increase the possibility of introduction of pest animals through increased commerce?	Yes	No	Unk
	Provide the opportunity for control of pest animals?	Yes	No	Unk

ESTIMATED IMPACT ON PEST ANIMALS:

ND HA MA LA **O** LB HB

20. Disease Vectors

a)	Are the known disease problems in the project area transmitted through vector species such as mosquitoes, flies, snails, etc?	Yes	No	Unk
b)	Are these vector species associated with :			
	Aquatic habitats?	Yes	No	Unk
	Forest habitats?	Yes	No	Unk
	Agricultural habitats?	Yes	No	Unk
	Degraded habitats?	Yes	No	Unk
	Human settlements?	Yes	No	Unk
c)	Will the project:			
	Increase vector habitat?	Yes	No	Unk
	Decrease vector habitat?	Yes	No	Unk
	Vector control?	Yes	No	Unk
d)	Will the project work force be possible source of introduction of disease vectors not currently found in the project areas?	Yes	No	Unk
e)	Will increased access to any commerce with the project area be a possible source of disease vectors not presently occurring in the project area?	Yes	No	Unk
f)	Will the project provide opportunities for vector control through improved standards of living?	Yes	No	Unk

ESTIMATED IMPACT ON DISEASE VECTORS:

ND HA MA LA **LA** O LB HB

21: Disease Vectors

a)	Are vector-borne diseases an important part of the local public health situation?	Yes	No	Unk
b)	Are these clinics or other disease control programs in operation or planned for the area?	Yes	No	Unk
c)	Will the project decision result in an increase in disease vector density or distribution?	Yes	No	Unk
d)	Will the project decision result in workers of other persons entering the area with contagious or vector borne diseases?	Yes	No	Unk
e)	Will the project decision result in clearing operations			

	that could expose workers to disease vectors?	Yes	No	Unk
g)	Will the project decision increase the hazard of accident to the local population to receive health care?	Yes	No	Unk
h)	Is it necessary to consult with a public health specialist?	Yes	No	Unk

ESTIMATED IMPACT ON PUBLIC HEALTH:

ND HA MA **LA** O LB MB HB

22. Resource/Land-use

a)	Are the natural resources of the area under intensive use pressure?	Yes	No	Unk
b)	Are lands in the project area intensively developed?	Yes	No	Unk
c)	Will the project decision increase pressure on land resources?	Yes	No	Unk

ESTIMATED IMPACT ON PUBLIC HEALTH

ND HA **MA** LA LA O LB HB

23. Conventional / Non-conventional Energy sources

a)	Will the project increase the demand for conventional energy sources (petroleum, hydropower)?	Yes	No	Unk
b)	Will the project increase the demand for nonconventional energy sources (fuelwood, dung, agricultural wastes)?	Yes	No	Unk
c)	Should an energy planner be consulted?	Yes	No	Unk

ESTIMATED IMPACT ON ENERGY SOURCES:

ND HA MA LA O LB HB

24. Distribution Systems

a)	Are the production / distribution networks for agricultural and manufactured commodities fully understood?	Yes	No	Unk
b)	Will the project decision enhance the equitable distribution of these products?	Yes	No	Unk
c)	Will the project decision increase the demand for certain commodities within or outside the area?	Yes	No	Unk
d)	Will the project decision decrease the demand for certain locally produced goods?	Yes	No	Unk
e)	Will the project decision improve the ease with which consumers in the area obtain commodities?	Yes	No	Unk
f)	Will the project decision improve the ease with which consumers in the area obtain commodities?	Yes	No	Unk
f)	Is it necessary to consult a social anthropologist?	Yes	No	Unk

ESTIMATED IMPACT ON DISTRIBUTION SYSTEMS

ND HA MA LA O LB HB

25. Employment

a)	Is there potential work force in the area fully employed?	Yes	No	Unk
b)	Will the project decision substantially increase the rate of employment?	Yes	No	Unk
c)	Will the project decision remove job opportunities in the area?	Yes	No	Unk
d)	Will the project decision result in drawing workers from other local employers?	Yes	No	Unk
e)	Is it necessary to consult with a socio-economist?	Yes	No	Unk

ESTIMATED IMPACT ON EMPLOYMENT

ND HA MA LA O LB HB

26. At-Risk Population

a)	Are the adverse impacts of the project unequally distributed in the target population?	Yes	No	Unk
b)	Have the at-risk groups been identified?	Yes	No	Unk
c)	Have all possible actions been identified that would lessen the impact on at-risk groups?	Yes	No	Unk
d)	Is the assistance of a social anthropologist required to adequately answer these questions?	Yes	No	Unk

ESTIMATED IMPACT ON AT-RISK POPULATION

ND HA MA **LA** LA O LB HB

27. Migrant population

a)	Are there presently certain mobile groups in the target population?	Yes	No	Unk
b)	Will the project decision result in immigration of people to the area?	Yes	No	Unk
c)	Are local institutions and agencies adequately geared to handle this influx?	Yes	No	Unk
d)	Will the project decision result in the movement of people out of the area?	Yes	No	Unk
e)	Can their probable destinations be predicted?	Yes	No	Unk
f)	Are local institutions and agencies or receiving agencies able to handle these migrant groups?	Yes	No	Unk
g)	Is it necessary to consult a social anthropologist?	Yes	No	Unk

ESTIMATE IMPACT ON MIGRANT POPULATION

ND HA **MA** LA O LB HB

28. Community Stability

a)	Are the interrelationships of various social groups in the project area understood?	Yes	No	Unk
b)	Will the project decision establish institutions that will improve these interrelationships?	Yes	No	Unk
c)	Will the project decision establish create competition among social groups that would reduce community cohesion?	Yes	No	Unk
d)	Is it necessary to consult a social anthropologist?	Yes	No	Unk

ESTIMATED IMPACT ON COMMUNITY STABILITY

ND HA **MA** LA O LB HB

29. Cultural and Religious Values

- | | | | | |
|----|--|------------|-----------|-----|
| a) | Have studies been conducted of the cultural values of the project area? | Yes | No | Unk |
| b) | Are the cultural characteristics unique to the project area adequately known? | Yes | No | Unk |
| c) | Will the project decision adversely affect the religious attitudes of area residents? | Yes | No | Unk |
| d) | Are there special superstitions or religious taboos that will affect the acceptance of the project by the target population? | Yes | No | Unk |
| e) | Is it necessary to consult a social anthropologist? | Yes | No | Unk |

ESTIMATED IMPACT ON CULTURAL AND RELIGIOUS VALUES

ND HA MA LA **O** LB MB HB

30. Tourism and Recreation

- | | | | | |
|----|--|------------|-----------|-----|
| a) | Is there at present a significant degree of tourism in the area? | Yes | No | Unk |
| b) | Is there un-exploited tourism or recreation potential in the area? | Yes | No | Unk |
| c) | Will the project decision result in more effective utilization of present or future tourism opportunities? | Yes | No | Unk |
| d) | If so, will this adversely affect an existing or potential tourist or recreation attraction? | Yes | No | Unk |
| e) | Will the project decision adversely affect an existing or potential tourist or recreation attraction? | Yes | No | Unk |

ESTIMATED IMPACT ON TOURISM AND RECREATION

ND HA MA **LA** O LB MB HB

31. Nutrition

- | | | | | |
|----|---|------------|-----------|-----|
| a) | Have adequate data been gathered on the nutritional levels in the project area? | Yes | No | Unk |
| b) | Do these data differentiate among various population sub-groups, by age, sex or social level? | Yes | No | Unk |
| c) | Will the project decision result in changed food habits in the target population? | Yes | No | Unk |
| d) | Will these changes result in improved nutritional characteristics? | Yes | No | Unk |
| e) | Are the services of a nutrition specialist required? | Yes | No | Unk |

ESTIMATED IMPACT ON NUTRITION

ND HA MA LA **O** LB MB HB

**Resident Engineer,
The North Horr Jn Ndarathe AP Camp (A4) Road
Construction Project**

**Contract No.....for Construction of the North Horr Jn
Ndarathe AP Camp (A4) Road Construction Project**

Environmental, Health and Safety Plan (EHSP)

Submitted by.....(Contractor)

INSTRUCTIONS

This Environmental, Health and Safety Plan (EHSP) will be prepared for all subcontracts issued under the main contract for construction. Each EHSP therefore, will be tailored specifically to the project being conducted so as to capture the specific hazards and requisite mitigation measures. This approach determines the level of rigor for implementing the work planning and control attributes based on the importance/significance of the activity in relation to the associated hazards and consequences. The level of detail within each EHSP and corresponding AHA(s) should be commensurate with the size, complexity and risk level of the construction project.

For larger projects, the prime subcontractor may *either* flow down this requirement to each of its subcontractors; or serve as a control and coordination point, requiring all subcontractors' activities to be conducted under the prime subcontractor's solitary EHSP .

Sub-Section 6 (3) of the Occupation Health and Safety Act 2007 requires *Every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed and, on the basis of these results, adopt preventive and protective measures to ensure that under all conditions of their intended use, all chemicals, machinery, equipment, tools and process under the control of the occupier are safe and without risk to health and comply with the requirements of safety and health provisions in this Act.* This Act is the governing document that must be utilized when completing this EHSP to ensure that requirements stipulated in the Guidelines are being met and incorporated into the project planning process. The completed EHSP is to be submitted to the Resident Engineer for review and approval prior to commencement. This EHSP is intended to be a living document; updated as necessary throughout the project cycle as new challenges emerge, among others.

There are three parts to this EHSP template. All the sections in Part 1 are required to be completed for each construction project, regardless of the size or complexity. All of the sections in Part 2 are required to be completed but checked and filled in as applicable for the particular project's scope of work. Enter information in all of the fill in blocks that are applicable. For those that are not applicable, enter "N/A" or other suitable explanation.

In line Section 6(3) of OSHA 2007, an Activity Hazard Analysis (AHA), is required for all projects, regardless of the size, scope or complexity of work. Every project will have at least one definable construction activity, and therefore at least one AHA. Depending upon the complexity of the project, one or several AHAs may need to be completed. In some cases, AHAs may need to be staged, in coordination with the initiation of the various phases of a project.

PART 1 – PROJECT GOVERNANCE / EMERGENCY INFORMATION

Section 1 – Project Description and Emergency Contacts

Fill in the names and telephone numbers of the contact personnel for this particular project. In accordance with the Section 14 (1) of OSHA, the Subcontractor's designated on-site safety representative must be knowledgeable of the project's hazards and have the authority to correct unsafe conditions or behavior. Attach the qualifications of your safety representative for this project (see section 10). If you have subcontractors performing work on this project, list their contact information. Update as necessary throughout the project.

Note: Some projects of long duration or complexity may be required to develop an emergency response plan and conduct a drill at least once during the project, or more often as necessary.

Section 2 – Subcontractor Policy Statement

Enter your Company's health and safety policy statement. At minimum, your policy must include:

- Specific statement of intent to comply with OSHA 2007, all Regulations issued under OSHA 2007 and all other statutory requirements including permits.
- A statement that all requirements of the plan apply to all lower tier subcontractors and must be flowed down to all subcontractors at all levels.
- Statement of employee's rights and responsibilities regarding a safe and healthful work environment in accordance with the work site OSHA poster (issued under Cap 514).
- Statement of Stop Work Authority for all workers.

Refer to Section 7(1) of OSHA 2007 for additional information regarding program policies.

Section 3 – KENHA Acknowledgement

Construction of the North Horr In Ndrathe AP Camp is a Project under KENHA. Consequently, this EHSP and all revisions thereof must all be approved by the KENHA EHS Unit.

Section 4 – Construction Environmental, Safety & Health Manual Acknowledgement

KENHA has developed a construction ESH manual to serve as a primary reference document to identify our required ESH work processes and work practices to help ensure project success. It is your

responsibility to ensure you have read and fully understood the contents of this manual. The KENHA ESH Unit must be contacted, if you have any questions.

Section 5 – Safety Briefings and Inspections

The Subcontractor must conduct frequent safety briefings and inspections, based upon the duration and complexity of the project. Describe the frequency and initiation of safety briefings and inspections on your project at KENHA.

PART 2 – PROJECT CHARACTERIZATION

Section 6 – Project Characterization

Under Section 6(1) of OSHA 2007, all Subcontractors must identify existing and potential workplace hazards and assess the risk of associated workers injury and illness. This section will help to serve as first step in characterizing your project and the associated hazards and will aid in the development of the AHA(s).

List the project's Definable Work Activities: A definable work activity is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Add additional lines as necessary to identify all the definable construction activities of your project. Refer to Chapters 7-9 of OSHA 2007 for additional information regarding Definable Work Activities.

Check all of the Hazards/Activities that apply to your project: The checklist in this section includes those activities which are subject to NEMA specific controls beyond what is required by OSHA standards, or have the potential to affect natural resources including storm water, wetlands, streams, air quality, vegetation and wildlife. In the left-hand column, check all activities that will be performed as part of this project. Identify your Competent Person(s) or Qualified Person(s) where applicable. Refer to the ESMP and EIA Licence for additional information on each topic area.

This checklist is presented in part for project planning and scheduling purposes, as some activities require NEMA specific permits to be acquired prior to being allowed to perform them. If your project involves an activity that has a check in the right-hand column, then your EHSP must include a copy of your company program that addresses the controls and requirements for performing that activity for KENHA. Details of KENHA specific requirements are presented in the ESMP and EIA Licence issued in respect of this Project. The subcontractor is responsible for knowing and abiding by the requirements of both documents.

Section 7 – Project Support Features, Site Control and Logistics

For large or complex projects, attach a diagram showing: construction areas, laydown areas, staging areas, alternative exit routes, material storage areas, pedestrian routes, temporary traffic controls, material receiving areas, etc. Use Section 10 of this template to identify which appendix the Logistics Plan appears in your EHSP.

Section 8 – Required Training/Qualification Submittals

Check all boxes applicable to this Project's work scope. The subcontractor is responsible for assuring that all workers have met the training requirements specific to their job description, in addition, the subcontractor must maintain those documents for each worker on site throughout the duration of the project. Identify where you will maintain those records on the construction site.

However, the subcontractor must submit training/qualification documentation for each worker performing work associated with the specific topics and list in Section 10. This submittal must be reviewed and accepted by the RE prior to each worker starting work.

Section 9 – Hazard Communication

Hazardous chemicals (as defined in Part IX of OSHA 2007) to be brought or used on site are to be identified and managed appropriately. The subcontractor is responsible for maintaining an up-to-date chemical inventory (only of those chemicals brought on site), and copies of Safety Data Sheets (SDS) must be maintained at the task or project support facilities and made available for review by site workers, the DOSH and/or its authorized Agents.

Identify the methods to be used to inform the other employer(s) of any precautionary measures that need to be taken to protect all parties and/or other subcontractor employees during normal operating conditions and in foreseeable emergencies. Identify the methods you will use to inform other affected workers of your labeling system if the labeling system is not readily understandable.

Section 10 – Plan Attachments

A description of the qualification (or resume) of the individual serving as the Primary Subcontractor's Designated Safety Representative(s) on this project must be included in the Plan. Additionally, if your project involves a hazard/activity that has a check in the right-hand column of Section 6, then your EHSP must include a copy of your company's program addressing that topic. Alternatively, your company may submit a project specific plan/AHA that details your approach to addressing that topic. You are responsible for ensuring that your project specific controls are in alignment with OSHA 2007 requirements.

PART 3 – ACTIVITY HAZARD ANALYSES (AHA)

In line with this EHSP, an Activity Hazard Analysis (AHA) will be prepared for each standalone construction activity (e.g. welding, excavations, concrete work, structural steel, electrical, scaffold, roofing etc.) prior to the commencement of work. For larger projects, the primary subcontractor may either flow down this requirement to each of its lower tier subcontractors or serve as a single control and coordination point for all project AHAs.

Prior to the start of each phase of work, it will be the responsibility of the subcontractor to develop a thorough AHA that details the hazards and controls for the steps associated with that phase of work and submit it to the RE for review.

If the project's complexity and/or schedule necessitate several AHAs to be developed for different phases of the Project, the subcontractor may use the tracking table as a tool to coordinate which AHAs are in effect and which AHAs are yet to be developed.

The EHSP template is provided in electronic format to enable copy and paste functions for those subcontractors whose basic data remains unchanged, yet allow for the work steps, hazard and controls information to be tailored to the particular activities/materials/location of the project at hand. The AHA template rows can be expanded to include additional tasks, or reduced in number to accommodate changes, and to vary the final product to match the relative complexity of the project.

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 1

(Project Name)

Construction Environmental, Safety & Health Plan

SECTION 1 - PROJECT DESCRIPTION & EMERGENCY CONTACTS

Project Start / End Dates	Start:	Complete:
Project Location	Enter the work location(s) at KENHA	
Detailed Scope of Work	Enter breakdown and description of work activities	

FOR ALL EMERGENCIES CALL:

Main Contractor:Mobile.....
Responsible SubMobile.....
Occupational Health and Safety Manager.....Mobile.....
Nearest Hospital.....Mobile.....

For all incidents, injuries, property damage, near-misses etc.... the following personnel MUST be immediately contacted upon scene stabilization

Project Personnel	Name	Phone Number(s)	Email
KENHA Project Manager	Enter the name of KENHA Project Manager	Enter number: xxx-xxx-xxxx	Enter: user@domain
KENHA Project ESH	Enter the name of KENHA ESH&Q Point of Contact	Enter number: xxx-xxx-xxxx	Enter: user@domain

OTHER CONTACT INFORMATION

Subcontractor Project Manager	Enter the name of subcontractor Project Manager	Enter number: xxx-xxx-xxxxd	Enter: user@domain
Subcontractor Site Superintendent	Enter the name of subcontractor's Site Superintendent	Enter number: xxx-xxx-xxxx	Enter: user@domain
Subcontractor Health & Safety Representative	Enter the name of subcontractor health & safety representative	Enter number: xxx-xxx-xxxx	Enter: user@domain

Subcontractors	Phone Number	Email
Enter Subtier company name	Enter number: xxx-xxx-xxxx	Enter: user@domain
Enter Subtier company name	Enter number: xxx-xxx-xxxx	Enter: user@domain
Enter Subtier company name	Enter number: xxx-xxx-xxxx	Enter: user@domain

EHSP REVIEWS

Reviewed & Approved by: (EHS Officer for Contractor)	EHSP Reviewed & Concurred by:..... Resident Engineer, KENHA	EHSP Reviewed & Concurred by: EHS Manager, KENHA
Signature	Signature	Signature

Signatures and dates

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 1

SECTION 2 - SUBCONTRACTOR POLICY STATEMENT

(MUST INCLUDE THE FOLLOWING)

- Specific statement of intent to comply with all requirements of OSHA, 2007; ESMP and EIA Licence issued for this Project and all other pertinent laws of the land.
- That, in line with Bullet One above, the Contractor will obtain all necessary permits and licenses as required.
- A statement that all requirements of the plan apply to all lower tier subcontractors and must be flowed down to all subcontractors at all levels.
- Statement of employee's rights and responsibilities regarding a safe and healthful work environment in accordance with the work site OSHA poster (as issued under Cap 514).
- Statement of Stop Work Authority for all workers

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 1

SECTION 3 - ACKNOWLEDGMENT of OSHA 2007 REQUIREMENTS

As a subcontractor to KENHA , while your workers are physically located at site, you must meet the requirements of OSHA 2007, EMCA 1999 and its regulations, the ESMP and EIA Licence Conditions.

Acknowledgment	I, (the author of this EHSP), certify that that I have read the requirements of OSHA 2007, EMCA 1999 and its regulations, the ESMP and EIA Licence Conditions .and attest that my firm and its sub-tier contractors will comply with all require stipulated.
-----------------------	---

Signature Required:	
----------------------------	--

MEDICAL SURVEILLANCE AND QUALIFICATION

Occupational Medicine	Will you have any employees that will work on-site for 30 days in a 12-month period, or are enrolled for any length of time in a medical or exposure monitoring program	Yes <input type="checkbox"/>	No <input type="checkbox"/>
------------------------------	---	---------------------------------	--------------------------------

If yes, you will need to:

Comply with the occupational medicine requirements of Part IX of OSHA 2007 and its regulations thereof.

Provide your occupational medicine provider contact information

Clinic / Physician	Enter the name and address of your company's medical provider for this project	Enter telephone number: xxx-xxx-xxxx	Enter e-mail address: user@domain
---------------------------	--	--------------------------------------	-----------------------------------

Required Medical Surveillance

- | | |
|---|--|
| <input type="checkbox"/> Vision capacity | <input type="checkbox"/> Blood Lead |
| <input type="checkbox"/> Hearing Conservation | <input type="checkbox"/> Respirator User |
| <input type="checkbox"/> Fit For Work Examination | <input type="checkbox"/> Silica |
| <input type="checkbox"/> Substance Abuse Testing | <input type="checkbox"/> Other(s): List other(s) |

Task-specific medical testing

List specific task(s) requiring medical surveillance

SECTION 4 - ACKNOWLEDGEMENT of CONSTRUCTION ENVIRONMENTAL, HEALTH and SAFETY MANUAL

Acknowledgment	I (the Project Manager or Superintendent of this project), certify that that I have read and understand the requirements of the KENHA Construction Environmental, Health & Safety Manual.
-----------------------	---

Signature Required:	
----------------------------	--

SECTION 5 - SAFETY BRIEFINGS AND INSPECTIONS

Safety Briefings:

Discuss the conduct of safety briefings on your project at KENHA

Safety Inspections:

Discuss your conduct of safety inspections during this project at KENHA

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 2

SECTION 6 – PROJECT CHARACTERIZATION

Identify the project's Definable Work Activities.

(e.g., welding, excavations, concrete, structural steel erection, architectural finishes, electrical install, roofing, landscaping, testing and startup)

Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date
Enter Activity	Anticipated Start Date

Check all hazards/activities below that apply to this Project. Refer to the Second Schedule to OSHA 2007.

Yes	No	Hazard/Activity with specific KENHA -based control measures.	KENHA Construction ESH Manual Chapter(s)	KENHA issued Permit	Subcontractor Program or Project Plan required
<input type="checkbox"/>	<input type="checkbox"/>	Asbestos use, alteration, removal or storage (Identify your Supervisor for Asbestos Work here)			
<input type="checkbox"/>	<input type="checkbox"/>	Blocking exits or exit pathways			
<input type="checkbox"/>	<input type="checkbox"/>	Building surface penetration			
<input type="checkbox"/>	<input type="checkbox"/>	Confined spaces			
<input type="checkbox"/>	<input type="checkbox"/>	Crane Use (Identify your Lift Supervisor here)			
<input type="checkbox"/>	<input type="checkbox"/>	Discharges to sanitary/septic system will occur			
<input type="checkbox"/>	<input type="checkbox"/>	Electrical work (LOTO and >50 v or > 50 mA)			
<input type="checkbox"/>	<input type="checkbox"/>	Excavation/Trenching (Identify your Competent Person for Excavation/Trenching here)			
<input type="checkbox"/>	<input type="checkbox"/>	Earth disturbance of greater than one acre			
<input type="checkbox"/>	<input type="checkbox"/>	Falls from elevation (work at heights of 6 feet or more above the lower level) (Identify your Fall Protection Equipment Competent Person here)			
<input type="checkbox"/>	<input type="checkbox"/>	Fire protection system outage or modification			
<input type="checkbox"/>	<input type="checkbox"/>	Flushing of waterlines, storm/sanitary lines, fire suppression systems or fire hydrants			
<input type="checkbox"/>	<input type="checkbox"/>	Hazardous Waste Storage or generation on construction site			

Yes	No	Hazard/Activity with specific KENHA -based control measures	KENHA Construction ESH Manual Chapter(s)	KENHA issued Permit	Subcontractor Program or Project Plan required
<input type="checkbox"/>	<input type="checkbox"/>	Hoisting/Rigging			

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 2

		(Identify your Hoisting/Rigging Qualified Person here)		
<input type="checkbox"/>	<input type="checkbox"/>	Hot work		
<input type="checkbox"/>	<input type="checkbox"/>	Lockout/Tagout (Control of Hazardous Energy)		
<input type="checkbox"/>	<input type="checkbox"/>	Night work		
<input type="checkbox"/>	<input type="checkbox"/>	Outdoor work to be performed between mid-March and mid-September		
<input type="checkbox"/>	<input type="checkbox"/>	Radioactive materials or Ionizing radiation-generating devices		
		(Identify your Radiation Safety Officer here) and provide a copy of the Radioactive Materials License and/or Device Registration		
<input type="checkbox"/>	<input type="checkbox"/>	Scaffolding		
		(Identify your Scaffolding Competent Person here)		
<input type="checkbox"/>	<input type="checkbox"/>	Building structural modifications		
<input type="checkbox"/>	<input type="checkbox"/>	Traffic Control		
		(Identify your Competent Person here)		
<input type="checkbox"/>	<input type="checkbox"/>	Excavation near underground Utilities		
<input type="checkbox"/>	<input type="checkbox"/>	Wetlands, drainage channels, streams, groundwater seeps occurring within construction site		

SECTION 7 - PROJECT SUPPORT FEATURES, SITE CONTROL & LOGISTICS

Check all of the following facilities and equipment that are required for safe completion of work.

Facility/Equipment	Description
<input type="checkbox"/> Project Office	Describe office to be used (room/trailer, location, etc.)
<input type="checkbox"/> Materials Receiving Location	Describe (location, size, delivery times, etc.)
<input type="checkbox"/> Portable Restrooms/wash stations	Describe (number, location, etc.)
<input type="checkbox"/> Supplementary Illumination	Describe Supplementary Illumination (Type(s), indoor/outdoor, distribution, etc.)
<input type="checkbox"/> Emergency Eyewash/Shower	Describe (type, location, distribution, etc.)
<input type="checkbox"/> First Aid Supplies	Describe (type,size, location,etc.)
<input type="checkbox"/> Fire Extinguishers	Describe (type,size, location,etc.)
<input type="checkbox"/> Hazardous Material Storage	Describe (materials, amounts, location, etc.)
<input type="checkbox"/> Spill Containment/Clean-up	Describe (materials, location, etc.)
<input type="checkbox"/> Other: Enter Other Type	Describe item, location, number, etc.
<input type="checkbox"/> Other: Enter Other Type	Describe item, location, number, etc.

Site Control / Logistics

Task / Location	Specify your task-specific site control/access control measures below.
Enter work task and location	Enter specific site/area control procedure
Enter work task and location	Enter specific site/area control procedure
Enter work task and location	Enter specific site/area control procedure

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 2

☐ Check here if you are ALSO attaching a Logistics Plan for your activities. Logistics Plan is attached in Appendix #____

SECTION 8 – REQUIRED TRAINING/QUALIFICATIONS SUBMITTALS

Training Records Location:

Identify where you will maintain training/certification records related to your Project at KENHA :

Identify (from the below list) the activities/personnel involved with your project and separately submit appropriate documentation for each worker engaged in that respective activity. The documentation submitted shall confirm that each worker has the required license, certification, training or medical clearance appropriate to the scope of work, before they begin work at KENHA .

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Asbestos activities (licensed abatement contractor, workers minimum CDPHE and OSHA required credentials)
<input type="checkbox"/>	<input type="checkbox"/>	Aerial Lift, Powered Platforms Man lifts and Vehicle Mounted Platform Operation
<input type="checkbox"/>	<input type="checkbox"/>	Confined Space Entry – (Entrant, Attendant and Entry Supervisor)
<input type="checkbox"/>	<input type="checkbox"/>	Control of Hazardous Energy (lockout/tagout)
<input type="checkbox"/>	<input type="checkbox"/>	Crane Operation (NCCCO license)
<input type="checkbox"/>	<input type="checkbox"/>	Fall Protection – Authorized Worker (work performed 6-feet or more above the lower level)
<input type="checkbox"/>	<input type="checkbox"/>	Fall Protection – Competent Person
<input type="checkbox"/>	<input type="checkbox"/>	Fall Protection – Qualified Person
<input type="checkbox"/>	<input type="checkbox"/>	Forklift/Telehandler/Powered Industrial Truck Operation
<input type="checkbox"/>	<input type="checkbox"/>	Hoisting & Rigging Personnel
<input type="checkbox"/>	<input type="checkbox"/>	Qualified Electrical Worker – (provide copy of business license and active Apprentice, Journeyman or Master Electrician License and documentation of NFPA 70E training)
<input type="checkbox"/>	<input type="checkbox"/>	Respiratory Protection – (provide medical evaluation, fit test and training documents)
<input type="checkbox"/>	<input type="checkbox"/>	Scaffolding – Competent Person
<input type="checkbox"/>	<input type="checkbox"/>	Silica – Competent person and authorized workers
<input type="checkbox"/>	<input type="checkbox"/>	Steel Erection (29 CFR 1926.761) Connector
<input type="checkbox"/>	<input type="checkbox"/>	Trenching and Excavation – Competent Person
<input type="checkbox"/>	<input type="checkbox"/>	Welding/Orbital of Stainless steel and/or Vessels – (provide appropriate American Welding Society (AWS) welding certification).
<input type="checkbox"/>	<input type="checkbox"/>	Other: (List...)

SECTION 9 - HAZARD COMMUNICATION (HAZCOM)

SDS Location:

Identify where you will maintain your Project Chemical list and Safety Data Sheets (SDS) at KENHA

Method of notifying affected KENHA employees:

Describe the method used for notifying affected KENHA employees and subcontractor workers of any chemicals planned to be used on the project any how they will be made aware of the hazards, precautions, personal protective equipment required,

CONSTRUCTION PROJECT-SPECIFIC SAFETY PLAN - PART 2

safe use and storage. Describe your method of instructing others about your labelling system, if it is nonstandard.

SECTION 10 - PLAN ATTACHMENTS

For each activity or hazard checked in Sections 6, and 8, list and attach your additional corporate, site- or project-specific programs/plans, training documentation, resumes, etc.

Attachment	Reference Procedure or Program
1	Project safety representative, Statement of Qualifications for: (insert name)
2	Training documentation for: (insert name)
#	List Reference Procedure or program
#	List Reference Procedure or program

1.1 ACTIVITY HAZARD ANALYSIS

PART 3 – ACTIVITY HAZARD ANALYSES				
<p>Complete an Activity Hazard Analysis for each of your project's Definable Construction Activities</p> <p><i>Refer to the <u>CESH Manual</u>, Section 4.0 for additional information.</i></p>				
<p>Note: A completed, signed AHA must be submitted to KENHA ESH for review prior to the start of each phase of work, in order to proceed with that phase.</p>				

AHA Tracking Table				
(use is non-mandatory unless required by ESH contact)				
1	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
2	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
3	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
4	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
5	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
6	Enter Activity Anticipated Start Date	Responsible subcontractor	AHA Submittal Date	Date AHA accepted by KENHA
	(Add others as necessary)			

Condition / Exposure	Description of Hazards	Control Methods
General Construction Activities	<ul style="list-style-type: none"> • Eye/head/foot injuries from work activities • Hand injuries • Slips, trips, or falls on walking and working surfaces 	<ul style="list-style-type: none"> • In all construction areas, the following minimum PPE must be worn: • Safety glasses with rigid side shields meeting ANSI Z-87 standards. • Hard hats of ANSI Z 89.1 Class 1, Type E or better.

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<ul style="list-style-type: none"> • Safety boots/shoes (ANSI Z-41 composite or steel-toed) • Maintain clean work areas by following good housekeeping procedures. • Store materials and tools in proper storage areas. • Watch where you are walking - be alert for debris, projections, uneven terrain, and slopes. • Inspect all equipment, tools, and electric cords prior to each day's use. • Defective or damaged tools/equipment must not be used – it must be removed from service and tagged for repair or removed from the job site. • Obtain and use the proper tool for the job. • Use tools only for their intended purpose.
Walking and Working Surface	<ul style="list-style-type: none"> • Workers tripping over objects already in the work area • Tripping over equipment and materials brought onto the job • Lack of focus / Multitasking 	<ul style="list-style-type: none"> • Inspect the work area to identify existing trip and fall hazards. Remove or flag to increase hazard visibility • Stage materials in an organized and safe manner • Walk around objects as opposed to climbing over
Aerial Lift/Scissors Lift Operation	<ul style="list-style-type: none"> • Operator error • Tip over • Basket overload • Falls from height • Dropped equipment and tools • Wind loading • Equipment malfunction 	<ul style="list-style-type: none"> • Persons operating an aerial lift shall be qualified and properly trained. (Proof of Training must be provided). • Operate the lift in accordance with the manufacturer's instructions. • Conduct daily inspection and document prior to use. • The work area shall be inspected to verify safe surface and terrain conditions. • Do not override safety systems. • Employees shall always stand firmly on the floor of the basket and shall not sit or climb on the toe boards, mid rails, or top rails of the work platform or ladders to gain additional elevation. If gaining additional elevation is necessary, contact ESH POC. • In articulating and straight boom aerial lifts occupants must wear fall restraint system attached to the platform's anchorage points.

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<ul style="list-style-type: none"> • Fall protection is not required on vertical or scissor lifts, unless required by employer or manufacturer. • ALWAYS read and heed the manufacturer's operating manual prior to operating. • When workers transition out of the basket, they must be 100% protected from falls. • Discontinue aerial lift operation when winds of > 25 mph or the manufacturers requirements. • Operator shall verify the area beneath the lift is clear before moving it. As necessary, cordon off the work area to prevent access.
Working from Ladders	<ul style="list-style-type: none"> • Falls from height • Dropped equipment and tools • Wind loading • Equipment malfunction Fall • Strain carrying or setting up ladder • Electrocution • Injuries to head 	<ul style="list-style-type: none"> • Commercial grade ladders (Type I or better) are required. Household and light duty ladders are prohibited. • Painted ladders not allowed. • Self-supporting ladders must be properly sized and used in accordance with the manufacturer's requirements. • Do not lean self-supporting ladders against the wall. Self-supporting ladders must be fully opened. • Workers shall not stand or work from the top two steps. • Ladders are inspected daily prior to use for any visual defects. • Extension ladders must be secured. • Do not work outside the boundary of the ladder (that means do not reach out where your center of gravity is outside the footprint on the ladder). Utilize 3 points of contact whenever ascending or descending a ladder. • No aluminum ladders allowed around electrical equipment. • Wear hard hats meeting ANSI Z89.1 requirements.
Working from Height	<ul style="list-style-type: none"> • Fall protection equipment failure or improper use • Anchor point failure 	<ul style="list-style-type: none"> • Verify all Personal Fall Arrest System (PFAS) equipment must be of current design and in good condition. • Inspect all fall protection equipment prior to each use. Suspect or damaged equipment must be

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
	<ul style="list-style-type: none"> • Improperly donned equipment • Walk off unprotected edge • Trips and falls 	<p>removed from service.</p> <ul style="list-style-type: none"> • Use of appropriate fall-protection equipment (PFAS) during elevated work where there is fall potential of 6-ft or more. • All personnel using PFAS must be properly trained and Proof of Training is required prior to use. • All non-certified anchorages, used for fall protection, must be reviewed by contractor FP Competent Person and concurred with by KENHA ESH&Q in advance • 100% Fall Protection is required. At no time shall a worker be unprotected. • Fall Hazard Analysis may be required.
Scaffold Erection and Use	<ul style="list-style-type: none"> • Scaffold tips over due to base instability or uneven loading • Walk off unprotected edge • Trips and falls • Improperly assembled scaffold collapse 	<ul style="list-style-type: none"> • Competent person to erect and inspect all scaffolding in accordance with OSHA (CFR 1926 Subpart L) requirements. • Competent person to inspect daily / every shift or after a weather occurrence. • Scaffolds must be erected on stable footing. • Load scaffolds evenly. Avoid cantilevered loads. • Assemble and erect the scaffold in accordance with the manufacturer's instructions. • Employ a tag system to verify daily inspection and approval for use. • Immediately remove from service any scaffold that fails inspection. • Install ladder of adequate length for mounting and dismounting the scaffold. Secure it against displacement or have a second worker brace the ladder when used. • Do not overload scaffold systems. • Keep operating equipment and vehicles away from scaffold systems to prevent damage.
Manual Material Handling – Lifting	<ul style="list-style-type: none"> • Musculoskeletal injury due to improper lifting • Dropped loads due to lack of 	<ul style="list-style-type: none"> • Use mechanized lifting aids where possible • Employ proper manual lifting techniques and body mechanics.

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
	<p>handholds and slippery surfaces.</p> <ul style="list-style-type: none"> • Objects in path Workers caught between moving or shifting loads and stationary objects • Unsteady or unsecured load moves unexpectedly 	<ul style="list-style-type: none"> • Avoid single person lifts of heavy objects. • Evaluate all lifts in advance to identify good hand holds. • Plan your route, eliminate objects in your path of travel. • Proper footwear • Avoid working positions where unexpected load movement can pin or injure a worker.
Use of Hand Tools	<ul style="list-style-type: none"> • Abrasions or cuts to hands 	<ul style="list-style-type: none"> • Utilize the correct tool for the job. • Inspect all hand tools prior to use. • Wear protective gloves where applicable. • Remove and/or tag any defective or altered tools
Use of Power Tools	<ul style="list-style-type: none"> • Items and or clothing being caught in power tools • Eye or facial injuries • Abrasions or cuts to hands due to improper tool use • Electrical Shock/Arc and/or electrocution • Strains due to poor body positioning and use of excessive force 	<ul style="list-style-type: none"> • Secure long hair, jewelry, loose clothing from contact with power tools. • Wear proper gloves, goggles, or face shield. • Commercial grade power cords rated for heavy duty service are required minimum 14 AWG. • Cords must be inspected daily and shall be removed from service if damaged or suspect conditions are identified. • All power tools must be UL listed and be in good condition. • Power tools must incorporate point of operation and power transmission machine guarding. • Contractor shall comply with requirements set forth in OSHA 29 CFR 1926 Subpart I – Tools Hand and Power. • Ground fault circuit interrupters (GFCIs) shall be used on circuits at the source. • Ensure proper tool is selected for the work activity being conducted (don't use a file or a screwdriver as a pry bar); inspect tools for damaged parts • Stop working if irregular torque pattern, shaking, or rocking occurs when using tools.

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
Use of Pneumatic Equipment and Tools	<ul style="list-style-type: none"> • Facial and body injuries • Being struck by a tool in an over pressurization situation • Hearing loss 	<ul style="list-style-type: none"> • All pneumatic hoses connection shall be secured with pins and whip-checks to prevent disconnect of couplings and whipping lines. • Pneumatic hand tools using 1/2" or greater ID hoses must have a check valve at the source to automatically shut air pressure off. • Worker shall wear hearing protection if monitoring determines exposures > 85dBA.
Sharp, Hot or Abrasive Surfaces	<ul style="list-style-type: none"> • Abrasions, cuts, or burns to hands due to sharp edge exposure • Hearing loss 	<ul style="list-style-type: none"> • Inspect equipment and materials prior to handling to identify sharp edges. Remove or protect edges to prevent contact. • Use cutting implements (e.g. box cutters) safely. Always cut away from your body. Do not rest objects you are cutting against your body. • Wear task specific work gloves.
Lockout/Tag Out (LOTO)	<ul style="list-style-type: none"> • Injury due to exposure to any energy sources (steam, water, electrical, chemicals, etc.) 	<ul style="list-style-type: none"> • LOTO is required during work activities where the unexpected energization or start-up of equipment or release of stored energy could cause injury. All LOTOs shall be coordinated with the KENHA FM or designee. • All individuals working under a LOTO shall have completed LOTO Training (proof of training required) • All individuals working under a LOTO shall install their personal locks on the system. A zero-energy check is required prior to working on the system which has been placed under LOTO. • All LOTO shall be evaluated as to "Simple" or "Complex". • If Complex, an MOP is required. • MOP must be reviewed and accepted by KENHA AHJ or designee. • Adhere to the Two-Worker Rule: This requires a second qualified electrical worker to be present when work is performed within the shock restricted approach boundary or the arc flash boundary of an exposed energized electrical conductor or circuit part. An example of the work would be zero energy verification and voltage measurement. The second qualified electrical worker functions as a safety observer and does not participate in the actual work. This worker must be trained in cardiopulmonary

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		resuscitation and be prepared to initiate other emergency response procedures.
Cutting / Stripping Wire	<ul style="list-style-type: none"> • Cuts • Pinched fingers within the hand cutter tool 	<ul style="list-style-type: none"> • Cut away from the body. • Wear gloves. • Don't use body part or leg as backdrop to cut against. • Be aware of personnel or property surrounding the area so the knife does not strike and cut anything else. • Retract knife blade when not in use. Replace knife blade when worn.
Bending Conduit / Using Reamer	<ul style="list-style-type: none"> • Cuts • Abrasions from reaming • Trips and falls • Injury to self or others while carrying long sticks of pipe around blind corners • Sprains and strains 	<ul style="list-style-type: none"> • Wear gloves. • Use dunnage to block and keep piles on the ground organized. • Keep end of pipe lower than head level and call out when approaching a blind corner or use a spotter. Carry shorter pieces vertically through doors. • Bend conduit with proper technique and body movement to prevent muscle strains and injury.
Wire Pulling and Using Tugger	<ul style="list-style-type: none"> • Trips from excess coils of wire on the ground or near ladder rungs • Pinch Hazard while pushing wire into conduits • Strains, sprains • Cuts to hands • Falls from ladder while pulling wire 	<ul style="list-style-type: none"> • On large conduit and wire always use wire pulling equipment. • Keep wire reels neatly organized and pull pathway up out of the boxes to the ceiling level right away to keep trip hazard off the floor. • Wear gloves when pushing / pulling wire around pinch points or sharp edges. • Stop pushing or pulling a safe distance prior to reaching the conduit entrance. • Use a helper on longer pulls and coordinate the effort of pushing and pulling. • Keep wire neatly dressed, coiled, and organized at both ends. • When pulling wire, keep good communication with the team feeding the wire on the other end. • When moving spools or feeding wire into the conduit, use proper lifting techniques, do not twist or

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<p>bend at the back.</p> <ul style="list-style-type: none"> • Employees must be trained on the tugger. • Inspect the equipment before use. • Verify the anchor points are rated and secure. • Wear gloves and keep hands clear from all moving parts. • When moving spools or feeding wire into the conduit, use proper lifting techniques, do not twist or bend at the back.
Welding	<ul style="list-style-type: none"> • Burns • Injury to eyes of workers and co-located workers from the exposure Inferred light (IR) generated from welding arc • Inhalation hazards associated with welding activities • Fires and explosions 	<ul style="list-style-type: none"> • HOLD POINT: Obtain Hot Work Permit from Department of Occupational Health and Safety • Only trained workers can conduct welding. • Welding PPE will be worn to protect exposed skin, i.e. welding gloves, welding sleeves, or welding jacket. • Hardhat mounted face shield with welding shade for the type of welding being conducted must be worn along with safety glasses. • Welding screens or shields must be used to protect co-located workers from the exposure to the welding arc flash. • Verify fire watch has been trained and has appropriate fire extinguisher(s) available. • Appropriate environmental controls (e.g. ventilation) shall be established as necessary to prevent the accumulations of welding fumes. • Respiratory protection will be required if the local ventilation is proven by IH air monitoring not to sufficiently protect the worker from the welding fumes. • If combustibles or flammables cannot be removed, they must be covered with fire resistant welding blankets. • The Hot Work Permit Checklist shall be used daily to evaluate the hazard controls established in the work area.
Hot Work – Grinding	<ul style="list-style-type: none"> • Burns to skin due to exposure to 	<ul style="list-style-type: none"> • HOLD POINT: Obtain Hot Work Permit from

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
	<p>thermally hot surfaces</p> <ul style="list-style-type: none">• Fires• Abrasions to face• Cuts to hands	<p>Department of Occupational Health and Safety</p> <ul style="list-style-type: none">• The Hot Work Permit Checklist shall be used daily to evaluate the hazard controls established in the work area.• Guards must be adjusted properly. Replace damaged guards.• Remove or cover combustibles and flammable materials prior to starting.• Verify fire extinguisher is located at the work area and functioning.• Before use, check the manufacturer's stated running speeds, or markings on the grinder, and grinder wheel.• Ensure tool will not operate when unattended by checking the dead-man (constant pressure) switch.• Wear safety glasses, goggles, or face shield (with safety glasses or goggles) to protect against flying particles. Gloves may be required, depending on the work.• Do not use wheels that are cracked or those that excessively vibrate.• Use both hands when holding the grinder.
Pressure Testing	<ul style="list-style-type: none">• Injuries to workers or others• Damage to equipment	<ul style="list-style-type: none">• Verify the pressure relieving device is set at maximum allowable pressure for weakest portion of the segment to be pressure-tested.• Barricade the area and post signage.• Keep away from the pressurized segment of the system being pressure-tested.• Never increase the test pressure more than the maximum allowable pressure for the weakest portion in the segment or pressure rating of the hose & coupling.• Do not leave the pressurized hose unattended when the pressure-test is going on.• Verify the gauges have been calibrated within the past year and are working properly• Isolate the equipment from all source of

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<p>energy when not in use.</p> <ul style="list-style-type: none"> • Do not change (exceed / decrease) the duration of pressure test without permission from the Engineer. • Ensure the safe depressurization of air.
Start Up / Testing of Equipment	<ul style="list-style-type: none"> • Electric shocks, arc flash injuries • Damage to equipment 	<ul style="list-style-type: none"> • Construction of equipment is in accordance with design specifications. • Follow manufacturers or factory start up procedures. •
Refrigerant Recovery	<ul style="list-style-type: none"> • Leaks • Electrical shocks 	<ul style="list-style-type: none"> • Establish controlled access zone, and ensure only individuals associated with the recovery activities are in the area. • Only certified and trained technicians may recover refrigerants. • Do not leave any refrigerant recovery machine ON and unsupervised. • Check the hoses and the shut off valves before starting the process. • Check the power cord for any nicks.
Pressure Washing Surfaces	<ul style="list-style-type: none"> • Facial and eye injuries • Foot injuries • Slips and falls 	<ul style="list-style-type: none"> • Worker must be trained to operate pressure washing equipment. • Wear face shield – contact subcontractor safety representative and DOHS for exemption if face shield creates a greater hazard. • Inspect equipment and verify safety devices are functioning properly. • Never point the pressure wand in the direction of coworkers. • Wear rubber boots (preferably safety toed) with slip resistant soles.
Installing insulation	<ul style="list-style-type: none"> • Irritation to skin • Particles in eyes • Cramping of muscles 	<ul style="list-style-type: none"> • Wear long sleeve shirt or coveralls. • Wear safety glasses or goggles. • If working in confined or tight area, leave frequently to stretch.
Painting / Caulking	<ul style="list-style-type: none"> • Slips and falls 	<ul style="list-style-type: none"> • Good Housekeeping – Workers must quickly wipe

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
	<ul style="list-style-type: none"> • Skin and eye Irritation 	<ul style="list-style-type: none"> up spills. • Wear appropriate PPE per the SDS. • If contact with eyes or skin occur, flush immediately.
Drywall Patching and Sanding	<ul style="list-style-type: none"> • Silica exposure • Debris in eyes 	<ul style="list-style-type: none"> • Hold Point: Follow Silica Task Specific Plan. • Wear proper PPE, goggles if working overhead and ANSI rated safety glasses with sturdy side shields
Excavating	<ul style="list-style-type: none"> • Hitting and damaging an existing underground utility service • Silica exposure • Falls 	<ul style="list-style-type: none"> • Hold Point: Obtain Excavation Permit from State Department of Mines and Geology. • Hold Point: Follow Silica Task Specific Plan • All underground utilities shall be located and identified prior to the start of work. • If utilities within 5' of the excavation cannot be locked out, hydro vacuuming will be required. • Fall protection required if within 6' of excavation and it is > 6' in depth. • All trenching and excavating shall be conducted in accordance with OSHA 1926 Subpart B "Excavations". • Mark the construction area (e.g. barricades, signs, fence) to delineate the work boundary and prevent entry by authorized personnel. • Cover / or delineate excavated area if left open overnight.
Pouring and Finishing Concrete	<ul style="list-style-type: none"> • Material in eyes • Strains • Concrete burns • Skin irritation • Cuts and abrasions on legs and arms 	<ul style="list-style-type: none"> • 15-minute eyewash must be readily available. • Wear ANSI rated safety glasses with sturdy side shields, and waterproof gloves. • Use proper lifting techniques and avoid repetitive motion injuries. • Employer must implement Hazard Communication Program and provide worker training. • Long-sleeved shirt and pants. • Eyes and skin that come in contact with fresh concrete must be flushed thoroughly with clean water.

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<ul style="list-style-type: none"> Do not clean trowel on pants.
Concrete Core Drill	<ul style="list-style-type: none"> Silica Inhalation Electrocution/ shock Slips from slurry Dropped core slug Head injuries 	<ul style="list-style-type: none"> Hold Point: Obtain Surface Penetration Permit from Department of Mines and Geology. Hold Point: Follow Silica Task Specific Plan. Follow manufactures requirements for operating tool. Use a wet vac to vacuum slurry. Use proper lifting methods to handle the concrete slug once cut and avoid a musculoskeletal injury. Wear hard hat and barricade area below coring area.
Operating Machinery and Heavy Trucks	<ul style="list-style-type: none"> Workers near operating equipment could be struck and injured Operating equipment tips overs Operating equipment hits vehicles Fires to equipment Pedestrians struck by equipment 	<ul style="list-style-type: none"> Equipment operators must be properly trained for the equipment they will operate. Documentation of such training shall be provided to the KENHA ESH POC. Operating equipment shall be inspected daily. Damaged equipment shall not be used. Operating equipment must be equipped with the Roll Over Protection System (ROPS). Operating equipment must be equipped with a functioning backup alarm. Operators must wear seat belts while the equipment is operating. Operating equipment shall be equipped with fire extinguishers that are fully functional and properly maintained. Wear reflective, high-visibility traffic safety vests (minimum American National Standards Institute [ANSI] Class 2). Organize jobsite to avoid operating equipment in proximity to parked vehicles and other equipment. Install construction fencing or barricades to delineate the construction zone. Use flaggers as necessary to control construction area traffic. The operator must inspect the work area prior to operating the equipment to assure stable and safe conditions. Wet and soft ground conditions will

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		compromise stability.
Hoisting and Rigging Operations	<ul style="list-style-type: none"> • Operator error results in dropped load • Overload condition resulting in dropped load • Crushing and shifting suspended loads resulting in injury 	<ul style="list-style-type: none"> • Operate the hoist apparatus in accordance with the manufacturer's recommendations and load charts. • At no time shall any worker be allowed to stand or work beneath a suspended load. • Conduct Pre-Lift Safety meeting to review the sequence of work, assignments, and responsibilities. • Inspect all rigging and hardware prior to the lift. Suspect and damaged equipment shall not be used. • De-rate slings and hardware to reflect the hitch configuration and sling angles. • Workers providing signaling and rigging services shall be qualified and certified.
Crane Operations	<ul style="list-style-type: none"> • Operator error results in dropped load • Tip over resulting in operator injury or death • Overload condition resulting in dropped load • Crushing and shifting suspended loads resulting in injury • Wind loading resulting is shifting or dropped load • Electrocution from lightning • Crane tip over due to unstable ground conditions or voids under the concrete slabs 	<ul style="list-style-type: none"> • Verify lifting plan has been reviewed and accepted by KENHA. • All two-crane lifts and single crane lifts exceeding 75% of the crane's lifting capacity will require an engineered "lift plan". Lift Plans must be reviewed and accepted by KENHA. • Crane operators shall be properly trained, qualified and licensed. The license must reflect crane type. • Crane Operators must have proof of medical "fitness for duty". A current DOHS medical card or equivalent medical card is required. • Crane Company must provide evidence of frequent and periodic inspections. A copy of the last Annual Crane Inspection must be furnished to the RE. • Crane company workers must employ fall protection during rig up/down of crane booms. • Operate the crane in accordance with the manufacturer's recommendations and load charts. • Conduct inspection or work area to verify ground and terrain conditions. Ground must be stable to assure safe operation. • Cordon off crane's swing radius to exclude entry while cranes are operating. • At no time shall any worker be allowed to stand or

1.1 ACTIVITY HAZARD ANALYSIS

Condition / Exposure	Description of Hazards	Control Methods
		<p>work beneath a suspended load.</p> <ul style="list-style-type: none">• Employ tag lines as necessary to properly control the load.• Conduct Pre-Lift Safety meeting per RE requirements. Conduct radio check.• A designated "lift master" shall direct the lift.• Inspect all rigging and hardware prior to the lift. Suspect and damaged equipment shall not be used.• De-rate slings and hardware to reflect the hitch configuration and sling angles.• Workers providing signaling and rigging services shall be qualified and certified.• Do not override safety systems.• Discontinue crane operations if winds exceed the limits stated from the crane manufacture or at lower speeds based on the discretion of the operator. No lifts if wind speed is sustained at 25mph.• Anemometer is required to be installed on the crane.• Discontinue use of the crane in the event of threatening weather (lightning is seen, or thunder heard) or if notified of a threat based on the local weather websites lightning detection system.• Verify the crane placement location is stable and free of unseen voids.

