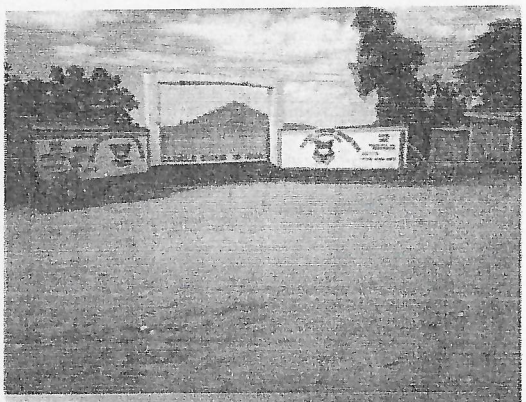
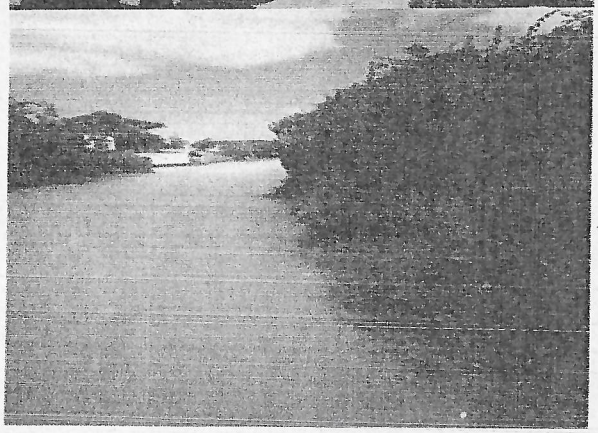
NGONG/PR/KJD/5121 4774

Environmental and Social Impact Assessment (ESIA) for the Proposed Construction of Parking Lots, Storm Water Drainage Systems, NMTFs and Improvement of Total Junction-Catholic Church-KCB Junction Road (Kajiado Municipality), Kobil-Ololua -Cathedral-Junction B50 Road , Junction B50-Kiserian Primary School-Magadi Rd Junction Road and Kobil/Kenol-Wama Dispensary-Mechanic Parking Lane Road all in Ngong Municipality





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RECEIVED
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COUNTY DIRECTOR OF ENVIRONMENT
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SUBMISSION OF DOCUMENT

Eng. Meshack M. Mavuti hereby certify that this ESIA Report was prepared based on the data collected from primary and secondary sources and on the best understanding and interpretation of the facts by the Environmental and Social Impact Assessment team.

The report complies with the EIA/EA regulations (NEMA, 2003) and is therefore submitted to the authority for interrogation and onward approval and licensing of the proposed projects for implementation.

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ACKNOWLEDGEMENTS

This work could not have been successfully undertaken without the input of several persons especially officers in the Kajiado and Ngong Municipalities management. The consultants appreciate the role played by the following officers in ensuring that the proposed works comply with existing public participation regulations:

1) Eng. Jacob Alandaro -The county Engineer for roads
2) Mr: David Kobia . -Municipal manager ,Ngong
3) Ms Loise Matiko Ward administror,-Olkeri
4) Mr: Samuel Muchiri Ward administrator , Ongata Rongai
5) Mr: William Ketuta Ward administrator-Ngong
6) Mr. Abdirahman Awadh Ali DalaleKutuk - Kajiado central

The consultants would also like to appreciate Hon. Mr. Njuguna Gitau (MCA, Olkeri Ward) for sparing time from his very busy schedule to grace the Public Participation Forum at Kiserian Primary School.

Your efforts not only went a long way to ensure compliance but also ensured that the proposed works will be implemented in a socially and environmentally sustainable manner:

Thank you

ACRONYMS

ADP	Annual development Plan
Am	Short dry season
BPS	Borrow Pit Sites
CFCs	Chloro-Fluoro- Carbons
CIDP	County Integrated Development Plan
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA (2015)	Environmental Management and Coordination Act (387)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GHGs	Green House Gases
GoK	Government of Kenya
KeNHA	Kenya National Highways Authority
KNBS	Kenya National Bureau of Statistics
MoI	Ministry of Interior
NEMA	National Environment Management Authority
PAP	Project Affected Persons
PLWD	Persons Living With Disabilities
PP	Public Participation
PPM	Public Participation Meeting
SDGs	Sustainable Development Goals
SP	Sessional Paper
TOR	Terms of References
UNCCD	United Nations Convention to Combat Desertification
UNFCC	Unite Nations Framework Convention on Climate Change
WRA	Water Resources Authority

LIST OF TABLES

Table 1 : Summary of Site Analysis xvi

Table 2 : summary of ESMP xvii

Table 3: Structure of the report 6

Table 4: Brief description of key pillars of Kenya' Vision 2030 8

Table 5: Population breakdown of the municipalities (Note that Ongata Rongai is part of Ngong municipality) 12

Table 6: Three pillars of Kenya' Vision 2030 24

Table 7 Analysis of the Project triggers to the EMCA and its tools 31

Table 8 Other applicable laws 37

Table 9: An analysis of WB safeguards vs. project activities' 41

Table 10 : Description of key institutions relevant to the proposed project 42

Table 11: Responsibility sharing in conducting Public participation meetings 44

Table 12 : Schedule of Barazas' 44

Table 13: Environmental and Social Management Plan -ESMP 51

Table 14: Environmental And Social Management And Monitoring Plan (EaSMMP) 54

LIST OF FIGURES

Figure 1 : Key objectives and strategies of the Kenya Urban Program(*The World Bank 2012)* 3

Figure 2: Map of Kenya showing Kajiado county 10

Figure 3: Map of Kajiado county, location of Kajiado town 10

Figure 4: Annual rainfall spread, Ngong 19

Figure 5: Average monthly rainy days ,Ngong 19

Figure 6 : Maximum-minimum monthly temperature 20

LIST OF PLATES

Plate 1: Existing solid waste disposal point at Ngong municipality, *Eng. Mavuti (2019)* 14

Plate 2: section of the Total Junction-Catholic Church-KCB Junction-Nyambene-Backyard road, *Eng. Mavuti (2019)*..... 16

Plate 3: The proposed site for parking on Kenol/Kobil-Wama dispensary-Mechanic–Parking road, *Eng. Mavuti (2019)*..... 17

Plate 4: Section of the road, *Eng. Mavuti (2019)*..... 18

Plate 5: Encroachment (extended corridors), *Eng. Mavuti (2019)*..... 18

Plate 6: These two KPC poles will have to be removed, Eng. Mavuti (2019) 33

TABLE OF CONTENTS

SUBMISSION OF DOCUMENT ii
ACKNOWLEDGEMENTS iii
ACRONYMS iv
LIST OF TABLES v
LIST OF FIGURES vi
LIST OF PLATES vii
TABLE OF CONTENTS viii
DEFINITION OF TERMS xiv
EXECUTIVE SUMMARY xv
CHAPTER 1: INTRODUCTION 1
1.1 Project background 1
1.2 KenUP 1
1.3 Kenya Urban Support Program (KUSP) 1
1.3.1 Municipalities 2
1.3.2 Urbanization in KENYA 2
1.4 The objectives of ESIA study 3
1.5 ESIA scope 4
1.5.1 The mandate of the National Environment Management Authority 5
1.6 Structure of the report 6
1.6.1 Terms of Reference 6
CHAPTER 2: PROJECT JUSTIFICATION 7
2.1 Project components 7
2.2 Project justification 7
2.2.1 Project need 7
2.2.2 Economic Recovery Strategy 7
2.2.3 Poverty Eradication Plan (PEP) 7
2.2.4 Sessional Paper Number 10 of 2012 (The Kenya Vision 2030) 8
2.2.5 Vision 2030 Vs. The Environment 8

2.2.6 The Constitution of Kenya (2010) 9
2.2.7 Sustainable Development Goals (SDGs) 9
CHAPTER 3: Project LOCATION AND description 10
3.1 Introduction 10
3.1.1 Project Location 10
3.1.2 Understanding Kajiado County 10
3.2 Geographical and Topographic Features 11
3.2.1 Geographical features 11
3.2.2 Topography 11
3.2.3 Soils and geology 11
3.2.4 Climate 11
3.3 Economic activities 12
3.3.1 Population dynamics 12
3.3.2 Poverty levels 12
3.3.3 HIV/AIDS 13
3.4 Environment and Global Warming 13
3.5 Infrastructure 13
3.6 Water resources 14
3.6.1 Waste management 14
3.7 Cities and urban areas act (2011) 15
3.8 Project Description 15
3.8.1 Road 1: Total Junction-Catholic Church-KCB Junction Road 15
3.9 Understanding Kajiado town 15
3.9.1 Road 2: Kenol/Kobil-Wama dispensary-Mechanic parking lane 16
3.10 Ongata Rongai 16

3.10.1 Economy 17
3.10.2 Administration 17
3.11 ROAD 3: B50 road Junction-Kiserian Primary School-Mgadi road Junction 17
3.11.1 Location 17
3.12 Road 4: Kobil-ololua rd junction-Cathedral-Junction B50 Road 18
3.12.1 Location 18
3.12.2 Components 18
3.12.3 Traverse 18
3.12.4 Ngong town 19
CHAPTER 4: POLICY, LEGAL AND REGULATORY FRAMEWORK 21
4.1 Introduction 21
4.1.1 Policy Framework 21
4.1.2 Sessional Paper Number 10 of 2012 (The Kenya Vision 2030) 24
4.1.3 Vision 2030 Vs. the Environment 25
4.1.4 Sessional Paper No 1 of 1996 on Environment and Development 25
4.1.5 Sessional Paper Number 1 of 2002 on sustainable development 26
4.1.6 The National Poverty Eradication Plan (NPEP) 26
4.1.7 The Land Policy 2007 27
4.1.8 The Poverty Reduction Strategy Paper, PRSP (1999) 27
4.2 Legal Framework 28
4.2.1 The Constitution of Kenya (2010) 28
4.3 The Environment Management and Coordination Act, EMCA (amended 2015) and its relevant tools 29
4.3.1 Requirement for Environmental Impact Assessments for all new projects 30
4.3.2 Requirement for Annual Environmental Audits 30
4.3.3 Gazettement of Environmental Regulations: 31

4.3.4 National Sand Harvesting Guidelines, 2007 32
4.3.5 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61 32
4.4 The Kenya Roads Act (2007) 32
4.4.1 Road way-leave vs. public utility installation 33
4.5 The County Government Act (2012) 33
4.6 The Occupational Health and Safety Act, OSHA (2007) 34
4.7 The Water Act (2002, Amended 2016) 34
4.8 The Kenya Roads Board Act, 1999 35
4.9 Public Roads and Roads of Access Act Cap 399 35
4.10 The Traffic Act Cap 403 (2013) 36
4.11 Work Injury Benefit Act, WIBA (2007) 36
4.12 The Public Health Act Cap 242 (Revised, 2012) 37
4.13 Conclusion on legal framework 38
4.14 International Conventions 38
4.14.1 Vienna Convention on the Protection of the Ozone Layer 38
4.14.2 United Nations Convention to Combat Desertification (UNCCD) 39
4.14.3 The 1992 United Nations Framework Convention on Climate Change (UNFCCC) 39
4.14.4 Earth Summit on Sustainable Development Agenda 21 39
4.14.5 Sustainable Development Goals (SDGs) 40
4.14.6 Convention on the Rights of the Child (CRC) 1989 40
4.14.7 Convention on the Elimination of all forms of Discrimination against Women (CEDAW) . 40
4.14.8 World Bank Environmental and Social Safeguard Policies 41
4.15 Project Environmental and Social Administration 41
4.15.1 Establishment of an Environmental, Health and Safety (EHS) Office 41

4.15.2 Environment Supervisor (Monitoring and evaluation) 42
4.16 Institutional/regulatory Framework 42
CHAPTER 5: STAKEHOLDER AND PUBLIC PARTICIPATION 43
5.1 Introduction 43
5.2 Consultation and Public Participation 43
5.2.1 The benefits of participating in public consultations 43
5.2.2 Stakeholder consultations 45
5.2.3 Benefits of the proposed KUSP projects in the targeted municipalities 45
5.3 Future consultations 46
5.4 ESIA Report writing and submission 46
CHAPTER 6: PREDICTED ENVIRONMENTAL AND SOCIAL IMPACTS 47
6.1 Introduction 47
6.2 Positive Impacts 47
6.2.1 Enhanced Conservation 47
6.2.2 Economic and Social Development 47
6.2.3 Growth of markets 47
6.2.4 Reduced cost of transportation of goods and persons 47
6.2.5 Sale of land to exploit building materials 47
6.2.6 Employment opportunities- 47
6.2.7 Revitalization of the agricultural production in rural areas- 48
6.3 Negative Impacts 48
6.3.1 Vegetation Loss Impact 48
6.3.2 Solid Waste 48
6.3.3 Generation of Dust 48
6.3.4 Noise and vibrations 48
6.3.5 Disruption and Loss of Businesses 48

6.3.6 Increase in the spread of STD, HIV and AIDS 49
6.3.7 Insecurity 49
6.3.8 Teenage delinquency, drug and substance abuse 49
6.3.9 Demolition of assets 49
CHAPTER 7: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN [ESMP] 51
7.1 Introduction 51
CHAPTER 8: CONCLUSION AND RECOMMENDATIONS 57
8.1 Conclusion 57
8.2 Recommendations 57
PHOTOGRAPHIC EVIDENCE OF PUBLIC PARTICIPATION EXERCISE 59

DEFINITION OF TERMS

When used in this ESIA report, the following terms shall retain the meaning allocated in this herein.

Analysis	The testing or examination of any matter, substance or process to determine its composition or qualities or its effect (whether physical, chemical or biological) on any segment of the environment or examination of emissions or recording of noise or sub-sonic vibrations to determine the level or other characteristics of the noise or sub-sonic vibration or its effect on any segments of the environment;
Ambient air	Means the atmosphere surrounding the earth. It does not include the atmosphere within a structure or within any underground space
Bitumen	Means a sticky black & highly viscous liquid or semi-solid form of petroleum. It may be found in natural deposits or refined and used in road construction.
Environment	The physical factors of the surroundings of human beings including land, water, atmosphere, climate, sound, odor, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment
Gravel	The natural material used for road construction, sometimes referred to as murram
Host community	Refers to the community within which the project will be located. This community is the immediate direct beneficiaries or losers due to the project implementation
Maintenance	Activities required or undertaken to conserve as nearly, and as long, as possible the original condition of an asset or resource while compensating for normal tear and wear
Murram	A form of lateritic [clayey material] used for paving minor road surfaces
Project report	A summarized statement of the likely environmental effects of a proposed development referred to in section 58 of the Environmental Management and Co-ordination Act, CAP 387
Pavement	A hard yet smooth surface especially a thoroughfare that will bear travel durable.
Road	A thoroughfare, route or way on land between two places that has been paved or otherwise improved to allow travel by foot or some form of conveyance including motor vehicle
Road maintenance	All the technical and associated administrative functions intended to retain a road or restore it to a state in which it can perform its required function
Rural road	Low traffic roads located in forested, agricultural or rangeland settings that serve residential, recreational and resource management purposes
Shoulder	Paved or unpaved part of the roadway next to the outer edge of the pavement. The shoulder provides the side support for the pavement and allows vehicle to slip or pass in an emergency case

EXECUTIVE SUMMARY

The Government of Kajiado County through its implementing ministry, (the Ministry of Roads, Public Works, Transport, Housing and Energy,) has contracted Eng. Meshack M. Mavuti to undertake an Environmental and Social Impact Assessment for the proposed development works located within KAJIADO AND NGONG municipalities within Kajiado County. The scheduled projects include: (i) improvement of selected roads form earth to bitumen standards (ii) improvement of road side storm water drainage system (iii) installation of street lights on selected roads (iv) construction of NMTF and (v) construction of parking slots in selected places within the urban area. These projects are part supported under the Kenya Urban Support Program (KUSP) which is a project of the World Bank in partnership with the national government and the government of Kajiado County.

The roads, NMTF and parking lots are critical to promote and facilitate traffic movement within and around Kajiado, Kiserian, Ongata Riongai and Ngong urban areas. While the roads, parking and NMTF facilities are meant to enhance mobility and to serve the expansion needs of the urban areas, the storm water drainage system is meant to ease or eliminate flooding and ponding problems experienced during the rain seasons.

The award for this consultancy was granted to Eng. Meshack M. Mavuti and became effective on 17th June 2019. The ESIA study was carried out by Mr. James Kitonga (NEMA, 7105) and Dr. Christine Majale (NEMA, 0345)

This report constitutes the draft Environmental Impact Assessment (ESIA) for the proposed development works. The report describes the potential environmental and social impacts likely to occur during the proposed project implementation, (construction, operation and decommissioning). It also prescribes adequate measures to ensure proper mitigation of all negative socio-environmental impacts and proposes enhancement measures for the positive impacts. This study was undertaken for the purposes of (i) compliance (with EMCA cap 387 laws of Kenya, World Bank project operational safeguards, NEMA EIA/EA regulations (2003) (ii) Sustainable Development Goals (SDGs).

The purpose of this study and its overall objective was to ensure the proposed works are implemented in an environmentally and socially sustainable manner. The most important aim of the report is to ensure that the activities of the projects will comply with the existing legal statutes (and safeguards) and institutional frameworks within which the works will be executed.

The ESIA team adopted a participatory approach in undertaking consultations and public participation. Individual stakeholders including county administration, road users, traders, Government officials, and the local community were involved in the study process at various levels. Public participation meetings/barazas were held in Kajiado town (at the public park), Kiserian (at Kiserian Primary School grounds, Ongata Rongai (at the Mechanic place) and Ngong (at the road site). These centers were selected in consultations with local ward administration and leaders as they are strategic for the study objectives.

Facilitating economic growth in Kajiado County is in line with the National Government's strategy for economic recovery and National Poverty Eradication Plan in the area and contributes to the overall development of the Kenyan economy. The development forms part of the Vision 2030 aspirations.

The project and its activities have predictable positive and negative environmental, social and economic impacts. The impacts are anticipated in the construction, operational and the decommissioning phases of the project cycle. The identified negative socio-environmental and economic impacts are mostly limited and spatio-temporal when the mitigation measures proposed are applied. The mitigation measures were incorporated to the Bills of Quantities to ensure that impact mitigation is provided for in the budget for project. The proposed measures include provision of safety measures in the design, provision of drains, re-vegetation and rehabilitation of material borrow areas, HIV/AIDS awareness campaign, trainings on occupational health and safety, wet curing to minimize dust, protection of water supply systems, among other measures. The mitigation measures are specified in the ESMP. The proposed works do not have any adverse social, environmental or economic impacts.

Table 1 : Summary of Site Analysis

No	Description	Yes	No
1.	The site or part of site is a game park, reserve, conservancy or gazette for special purpose		✓
2.	The sites or section of the sites is classified as riparian		✓
3.	The site is endemic to known flora and or fauna species		✓
4.	The works will cause relocation of persons		✓
5.	The works will cause deforestation		✓
6.	Work will lead significant loss of livelihoods		✓
7.	Work will cause demolition of permanent structures		✓
8.	The project has potential to increase teenage delinquency	✓	
9.	The project has potential to increase incidence of HIV transmission	✓	
10.	The project can help fight poverty (creation of employment)	✓	
11.	The works will generate significant solid waste	✓	
12.	The project can be used as conduit for drug transmission and use	✓	
13.	The project can support local economy by purchase of materials locally	✓	

The Consultant (2019)

This ESIA Report concludes that the proposed project works and related activities have positive socio-environmental and economic impacts locally in the urban areas, municipality, and the county at large. All the negative socio-environmental and economic impacts are temporary, mainly occurring during the construction phase. The mitigation measures proposed will adequately address the identified negative impacts in the project cycle

Table 2 : summary of ESMP

Ref	Affected Environment ASPECT	Predictable impact	Objective for addressing impact	Mitigation/ enhancement Measures	Responsibility	Frequency	Monitoring Activity	Indicator
PHASE 1: CONSTRUCTION								
C1	Air Quality	Dust nuisance and air pollution by dust	To minimize dust nuisance and air pollution by dust	-Sprinkle active sites with water per need	-Contractor	Continuous	Routine inspection	Minimal release of dust to air
C2	Air Quality	Emissions nuisance and air pollution by emissions	To minimize exhaust emission and air pollution by emissions	Use well serviced and maintained equipment	-Contractor	-Continuous	Routine inspection of equipment	Minimal emissions releases
C3	Land surface quality	Landscape disfiguration	To minimize landscape degradation	✓ Adequate Backfilling ✓ Re-vegitate stripped areas	Contractor	After completion of use	Routine supervision	Restoration plan for BPS Restored BPS/Site
C4	Land quality	Landscape degradation	To ensure minimal soil erosion	Restrict excavations, earthworks to specified areas, routes and depth only	Contractor	Continuous	Routine supervision	Backfilled excavation sites Level ground "as was" or better
C5	Land quality	Loss of Aesthetic value of land	To reduce solid waste at the site and work areas	-Use debris to backfill -Re-use re-usable waste -Dispose solid waste appropriately	Contractor	Regular	Routine supervision	No strewn waste on land Smart land surfaces
C6	Land quality	Degradation of material source areas	To minimize degradation of land in material source areas	Material source areas must be approved by NEMA	contractor	Once	NEMA permit	License from NEMA
C7	Flora	Reduction of flora cover on cleared sites	To minimize loss of flora	-Keep clearance within alignments only	Contractor	After completion	Routine supervision	Restored vegetation

				-Re-vegetate reserves				
C8	Surface Water	Soil erosion	To avoid erosion by surface run-off	Road drainage to natural system	Contractor	As per the Design	Routine	Rds
C9	Water resource	Overuse, abuse and misuse of water	To prevent misuse, over-use or abuse of water	-Abstract required quantities only -Control water access by metering , lock and key taps	Contractor	Continuous	Routine supervision/ meter reading	No leaking tanks, pipes
C10	Water	Water-borne diseases	To ensure workers use safe use water	Chemical test Coliform test	Contractor	Continuous	Regular	Laboratory result
C11	Public Health and safety	Incidents of accidents	To prevent accident or injury	-Regulate site visitors -Provide and ensure use of full PPE by site visitors	Contractor	Continuous	Visitors registration log	Minimal injuries or accidents
C12	Water and sanitation	Incidence of water pollution	To ensure clean and safe water and sanitation	-Provide mobile toilet -Empty toilet as prescribed	Contractor	Continuous	Regular inspection	Working clean and well kempt mobile toilets
C13	Health and safety at the camp and "active" sites	Incidents of accidents	To ensure Health and Safety	-Provision of full PPE. -Train workers on first aiders -Prepare and enforce PPE policy	Contractor	Continuous	Site inspection	Workers on FPPE Workers able to administer 1st aid
C14	Health and safety along the work areas	Accidents due to disrupted traffic flow	To avoid / minimize accidents and ease traffic flow	-Set speed limits -Guide road users to diversions -Condone "active "areas -Active signage (clear, visible)	Contractor	Continuous	Routine supervision	Minimal accidents due to project activities
C15	Project Neighborhood	Loss of business due to blocked	To Minimize interruption to	✓ Provide alternate entry-exit route	Contractor	As required	Supervision	Minimal time blocking

		entry-exit points	business and access to business points	when excavating existing in-out route ✓ Reinstate excavated pavements and entry-exit routes to business ✓ Relate well with project neighbors to ensure total cooperation and minimal project interruptions				business
C16	**Neighborhood security**	Loss of security due to influx of "strangers" Loss of project property to thieves and vandalism	✓ To minimize incidences workers accessing in neighborhoods ✓ Minimize incidences of theft and vandalism of project property	✓ Establish register of workers. Workers to sign in and out daily ✓ Limited personal movements of Workers within neighborhood ✓ Keep contact of ward administrators, area assistant chief and local police station to report cases	Contractor	Daily	Registration	Minimal cases of reported insecurity
C17	**Project-host community**	Benefit sharing	To enhance project acceptability	-Give host-community priority in employment -Create a project-PAPs committee to solve issues related	Contractor	Regular	Work with local ward administrator	At least 70% unskilled jobs given to locals

				to project				
D1	**Disaster preparedness**	Fire, terrorism disasters	To be prepared for any incidences of disaster	-Install FFE in visible areas, train fire marshals, vet camp visitors, set aside fire assembly point,	Contractor	Continuous	Physical availability of all mitigation measures.	Available FE, trained FFs, visitor logs
	HIV AIDS	Spread of HIV/AIDS	To ensure minimal new infections within work areas	✓ Provide protection ✓ Provide information ✓ Allow leave	Contractor	Continuous	Protective aids	Minimal HIV-AIDS transmission by the project
D2	**Drugs and substance abuse**	Increased use abuse of drugs	To ensure that workers and neighbors do not trade in or use drugs	✓ No drug user worker ✓ Drug users to be reported ✓ Workers not to interact with local youth	Contractor	Continuous	Inspection and enforcement of anti-drug use policy	No drug abuse cases
PHASE 2: OPERATIONAL								
O1	**Safety and health**	Increased accidents	To Ensure speed limit regulations	-Adequate speed limit signage -Install bumps	Contractor	Continuous	Inspection	Visible signs and bumps
02	**Maintenance cost**	Axle load limits	To life span of the road is achieved	-Signage for Allowable axle limits in clear visible signs -Regular supervision	PAPs Administration	Continuous	Routine maintenance	Road/parking not used by heavier than allowable axle load
04	**Water**	Road surface run-off	To ensure that road surface run-of does not cause erosion	-Ensure drainage is maintained well	Contractor Proponent	Continuous.	Observation	Functional drains
PHASE 3: DECOMMISSIONING								
D1	**Land quality**	Below surface materials	To ensure all below surface	Remove all undersurface	Contractor	At once	Site inspection	Removed BS materials

			materials are removed	materials from the site. Re-use what is re-usable and dispose the rest				
D2	**Land quality**	Aesthetic value of land	To clear site from all debris	Remove debris from site Backfill any excavations Remove equipment from site	Contractor	At once	Site inspection	No strewn debris on site
D3	**Vegetation**	Destruction of vegetation	To restore flora	The site to be landscaped by flattening the mounds of soil and planting indigenous trees and grass	Contractor	At once	Site inspection	Vegetate site

CHAPTER 1: INTRODUCTION

1.1 Project background

The government' overall response to Kenya' urban development challenges is articulated in the National Urban Development Policy (NUDP, 2016). NUDP' (2016) main objective is to contribute towards the realization of the broader development goals articulated in Vision 2030 by addressing the key challenge of urban development. NUDP (2016) envisages secure, well governed, competitive and sustainable urban areas. These will be delivered through good governance and accessible, quality and efficient infrastructure services. To implement the NUDP (2016), the State Department of Housing and Urban Development (SDHUD) designed the Kenya Urban Program (KenUP). KenUP is formulated in the context of the existing legislation on urban development as found in the context of the County Government Act (2012) and the Urban Areas and Cities Act (2011).

1.2 KenUP

The total KenUP budget is estimated at US$1 billion, 30% to be provided under the Kenya Urban Support Program (KUSP). The Operation will be implemented over a period of six years. IDA funds will be allocated to the three windows. The majority of the Operation's funds will be used to finance sub-national activities (windows 2 and 3). The Government's contribution will consist of approximately US$20 million, in the form of SDHUD current expenditure (e.g. payroll, operating costs, and office space) for urban development. The objective of the Urban Support Program Project is to establish and strengthen urban institutions to deliver improved infrastructure and services in participating counties in Kenya. Although the economic growth in Kenya has been accompanied by rapid urbanization, Kenya remains under-urbanized. This means Kenya can still leverage the benefits of urbanization for improving economic opportunities and living conditions. The Government of Kenya has recognized the need to manage urbanization as part of its overall development strategy.

1.3 Kenya Urban Support Program (KUSP)

KUSP is anchored on KenUP (and KUP) and has an objective of establishing and strengthening urban institutions to deliver improved infrastructure and services in participating counties such as Kajiado. Kenya can still leverage the benefits of urbanization for improving economic opportunities and living conditions. The Government of Kenya has recognized the need to manage urbanization as part of its overall development strategy. Kenya Vision 2030 highlights rapid urbanization as one of four key challenges facing the country. Within the over-arching framework of vision 2030, the urbanization component of the Second

Medium Term Plan (MTP2) 2013-17 aims to facilitate a sustainable urbanization process through an integrated urban and regional planning management framework of Kenyan urban centers and towns. Aligned to that goal, the MTP identifies a series of investment programs to enhance infrastructure, connectivity and accessibility, safety and security. Developing the basic institutions required for effective urban management is critical to deliver these investments and for urbanization to contribute to sustainable growth in Kenya. Thus over all the Kenya Urban Support Program represents a significance slice of the KenUP, The KUSP supports the development of municipalities, cities and urban areas as defined under the Urban Areas and Cities Act ,UACA (2011, amended 2016).

1.3.1 Municipalities

According to UACA (2011) Municipalities are urban areas that are eligible for granting of a municipal charter. They are urban areas with a population greater than 70,000 residents. In addition, any urban area designated to be the county capital was enlisted in the municipality class irrespective of its total resident population. By virtue of being county capital, Kajiado qualifies to be a municipality while by virtue of population, Ngong urban area (capturing Ngong town, Ongata Rongai and Kiserian) qualify as a municipality and thus a beneficiary of KUSP funding.

1.3.2 Urbanization in KENYA

In 2014, over 25 percent of the Kenyan population lived in urban areas and the total urban population was estimated to be about 15.2 million people. Based on a correlation of GDP per capita and urbanization for several countries, about 40 percent of Kenyans (given their current GDP of US$1,200) should be living in urban areas, against the actual 27 percent. On the other hand, Kenya is urbanizing faster than countries like Vietnam and India, which have a similar population share in urban areas but higher per capita incomes. By 2050 about half of the Kenyan population will be living in urban areas. Fortunately, Kenya is at an early stage of urbanization, which offers the potential to drive economic growth. This will depend on the efficiency of public investments in cities to create the economies of agglomeration and amplify the productivity of workers. As a result, investment in cities, combined with moderate levels of rural to urban migration may be the most effective way to raise welfare and reduce total poverty in the medium to long run. That notwithstanding, the existing Kenyan urban areas are not currently able to meet the rapidly increasing demands for critical urban infrastructure and basic services due to limited investment among other reasons. This constrains the productivity of business and negatively impacted the quality of life of residents. All

projects implemented under the Kenya Urban Support Program are expected to enhance public (citizen) participation in environmental and social management, the purpose for which this ESIA report is undertaken.

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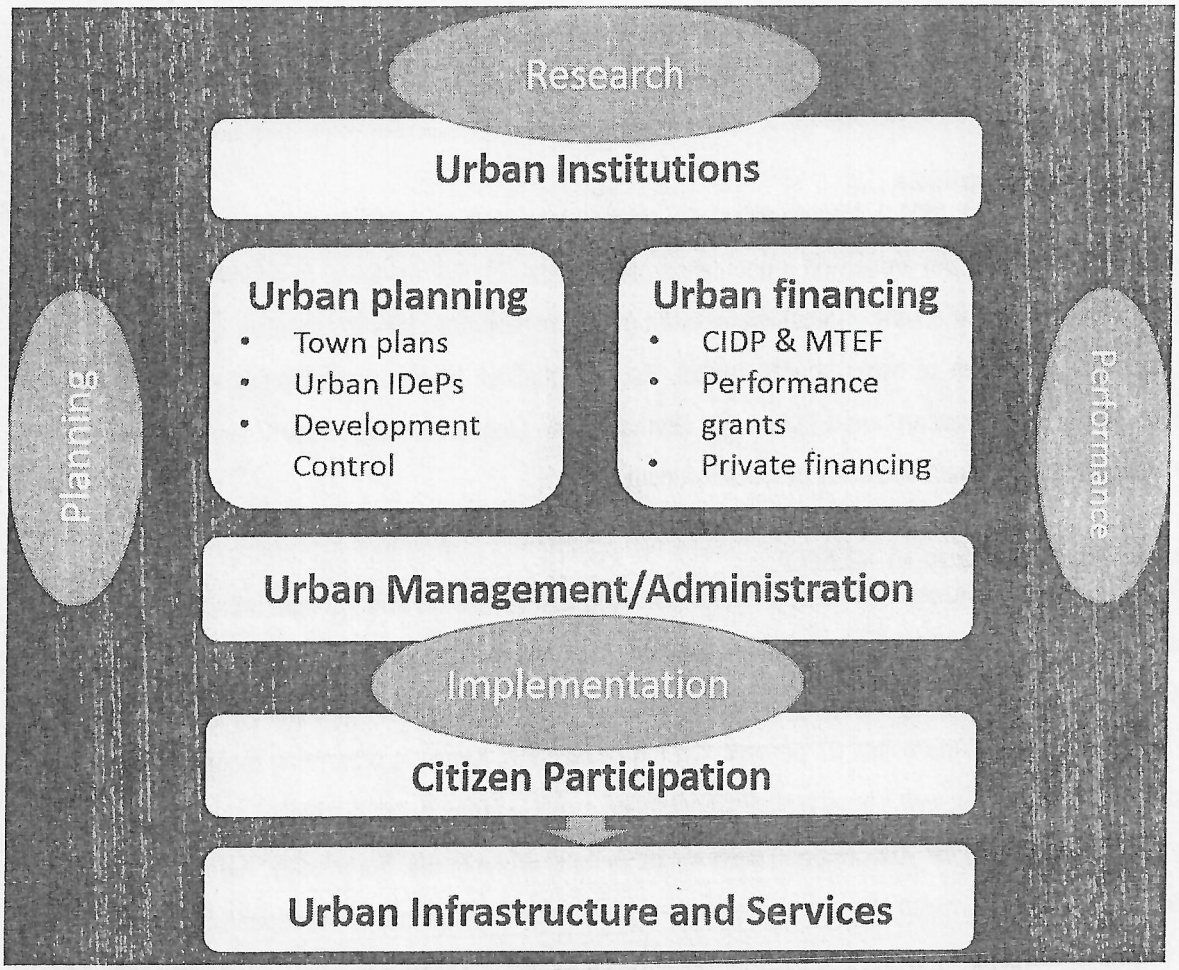


Figure 1 : Key objectives and strategies of the Kenya Urban Program(*The World Bank 2012)*

1.4 The objectives of ESIA study

The basic objective of the Environmental and Social Impact Assessment (ESIA) was ***to develop suitable recommendations to be integrated in the project design and implementation for mitigation of anticipated negative impacts to the environment and social setting by the proposed road improvements and associated works (project components).*** An evaluation of public opinions and

stakeholders attitude towards the proposed improvement was captured through in-depth interviews barazas and consultative forums conducted throughout the project area variously during the study period. The ESIA study covered the following issues among others.

- The alternative and design analysis of the proposed improvements with a focus on the environmental friendliness especially in terms of most efficient, safe and compatible with the motorized infrastructure
- Evaluation of the physical layout of the projects with respect to access roads and the key social and economic locations
- Identification (and locations) of the existing public amenities with potential conflicts with the proposed improvements
- Needs evaluation based on the public consultation outcomes of both the relevant stakeholders
- Assessment of the status of the road reserves with respect to encroachments and other social and economic activities along the project route.
- Social acceptability and harmony of the of the proposed road improvements

1.5 ESIA scope

The general scope of the ESIA is to undertake an Environmental and Social Impact Assessment for the proposed road improvements and all its associated facilities. It is designed to comply with the current requirements of international financing agencies in addition to the EIA Regulations of 2003 (revised in 2017) as established under the EMCA, CAP 387. The scope can be broken down thus:

- Provision of background information, objectives of the project with respect to environmental and social aspects of the proposed improvements
- Review of the existing baseline conditions within project areas
- Review and analysis of policies, legal and regulatory framework within which the proposed improvements will be implemented
- Identification of all environmental and social impacts [positive and negative] associated with the proposed road improvements in all its implementation lifecycle viz. construction, Commissioning and decommissioning and appropriate mitigation and enhancement measures
- Provision of a comprehensive Environmental and Social Management Plan (ESMP) for integration into the improvement process throughout its life cycle

1.5.1 The mandate of the National Environment Management Authority

Established under the Environmental Management Coordination Act (CAP 387), The National Environment Management Authority (NEMA) is mandated handle all matters environment in the republic of Kenya with the objective and purpose of exercising general supervision and co-ordination over all matters relating to the environment. NEMA is the principal instrument of government in the implementation of all policies relating to the environment. The mandated of NEMA is outlined below:

- Co-ordination of environmental management activities as undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programs and projects with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya
- To carry out surveys for the purpose of will assisting in the proper management and conservation of the environment;
- Undertake and co-ordinate research, investigation and surveys in the field of environment and collect, collate and disseminate information about the findings of such research investigation or survey
- Identify projects and programs or types of projects and programs, plans and policies for which environmental audit or environmental monitoring must be conducted under the Act;
- Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given;
- Undertake, in co-operation with relevant lead agencies, programs intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard
- Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation;
- Render advice and technical support, where possible, to entities engaged in natural resources management and environmental protection so as to enable them carry out their responsibility satisfactorily.

1.6 Structure of the report

The structure of the report is based on that proposed in the NEMA EIA Guidelines (2003)

Table 3: Structure of the report

Section	Title	Content
1.	Executive summary	Summary of the whole project report as presented here
2.	Introduction	Background information, objectives and scope of ESIA ,
3.	Project description and justification	Project description, justification and baseline conditions
4	Policy legal and institutional framework	Laws, policies , conventions and institutions within
5	Stakeholder participation	Responsibility, consultation, baraza, questionnaires
6	Impact prediction	Positive, negative, mitigation
7	ESMP	ESMP and ESMMP
8	Conclusion	Recommendation, conclusions
9	Photographs	Photographic evidence of participation

1.6.1 Terms of Reference

The Terms of Reference for the ESIA study are annexed as appendix 1

CHAPTER 2: PROJECT JUSTIFICATION

2.1 Project components

The KUSP projects considered for Kajiado and Ngong municipalities include (i) storm water management (ii) non-motorized transport facilities (iii) Improvement of selected roads from earth to bitumen standards (iv) parking lots in selected portions of the selected roads.

2.2 Project justification

2.2.1 Project need

The proposal to improve the roads is driven by the desire to improve the environmental conditions within the municipalities in preparation for expected growth of the urban area. The prediction that by 2050 almost 50% of the population will be residing in urban area drives the desire to improve basic infrastructure. Improved roads are intended to transform business conditions and environments while storm water drainage systems will help ensure preparedness to any form of flooding.

The project is also good news in terms of job creation. There are many unemployed youths (both young men and women) who lack income and who may benefit from this project through employment. Many people may get casual employment during the planning stage of the project, the construction stage and when the project will be operational. Secondly the portion of youth who may not get jobs directly in the project will also be able to earn income by selling materials, meals to the project or project workers.

2.2.2 Economic Recovery Strategy

Launched in 2003 by the Government of Kenya, The Economic Recovery Strategy outlines development strategies that the government hopes to implement in order to reduce poverty by providing citizens with income generating activities. Key to this paper was the rehabilitation and expansion of physical infrastructure, a factor which was identified as responsible for high primary production costs. Thus the proposed works have the capacity to lower cost of maintenance of vehicles and motor cycles using the road thereby affecting positively the costs of travel and transportation of goods thereby reducing cost of living significantly. The works also have the capacity to safe stock of many businesses persons whose wares are destroyed whenever it rains.

2.2.3 Poverty Eradication Plan (PEP)

PEP was a government's initiative whose aim was to reduce poverty by at least 50% by 2015, and strengthen the capabilities of the poor to earn income. It invites the civil society, NGOs, and government

agencies such as the county governments to partner in the war against poverty especially in urban and rural areas. This strategy paper explains macroeconomic, structural, and social policies in support of growth and poverty reduction. The proposed project can comply with this paper by:

- ✓ Giving jobs for willing, available and able persons in Gem
- ✓ Creating investment fora far capacity building to help workers invest from their earning
- ✓ Purchasing building materials such as cement from local dealers
- ✓ Allowing medically certified food peddlers to sell food etc to workers

2.2.4 Sessional Paper Number 10 of 2012 (The Kenya Vision 2030)

This is the National Blueprint for economic advancement of Kenya. It is also called as the Vision 2013 and it is the long term development strategy for Kenya towards achieving a "globally competitive and prosperous country [economy] with a high quality of life by 2030. The key objective of the Vision 2030 is to transform Kenya into a new industrializing middle income country by the year 2030 AD. It envisions a high quality of life for the majority of Kenya citizens in a clean and health environment as contemplated in the Sustainable Development Goals [SDGs]. Vision 2030 is anchored on 3 pillars:

Table 4: Brief description of key pillars of Kenya' Vision 2030

Pillar	Description
Economic	To achieve a sustained annual economic growth rate of 10% to 2030
Social	To create a just, cohesive and equitable social development
Political	To build an issue, people centered democratic system that is result oriented and accountable to the public

Adopted from Kenya; Vision 2030

The Vision 2030 is being implemented in five-year Medium Term Plan. The proposed project falls within the second five year plan (2013-2017) and is likely to flow over to the next five year MTP (2018-2022) which each MTP drawing lessons from previous MTPs.

2.2.5 Vision 2030 Vs. The Environment

Vision 2030 anticipates a Kenyan nation characterized by a clean, secure and sustainable environment by 2030 and sets the goals towards that namely:

(i) to increase forest cover from less than 3% at present to 4% and

(ii) to lessen by half all environment-related diseases.

2.2.6 The Constitution of Kenya (2010)

The CoK (2010) recognizes issues about environmental management. Article 42 of the bill of rights, provides for a "clean and healthy environment for every" Kenyan which includes environmental protection for both presents and future generations benefits through legislation and other measures.

In its chapter 5, the CoK (2010) provides for equitable, efficient, productive and sustainable use of land as a natural resource while article 69 gives the state the responsibility to encourage efforts towards sustainable utilization of natural resources by ensuring Environmental Impact Assessments and Audits are undertaken before projects commence, protection of genetic resources, and monitoring and evaluation of ongoing projects.

The proposed projects should ensure compliance with the constitutional requirements in as far as equitable sharing of the resources between various stakeholders is concerned on matters of sustainability of livelihoods and biological resources public participation, resettlement plans for borrow pits in addition to EIA/EA annually etc.

2.2.7 Sustainable Development Goals (SDGs)

The proposed projects will play their role in Kenyas' contribution towards the achievement of the following SDGs fully or in part as described below:

- ✓ End extreme poverty in all form by 2030 by ensuring storm water does not disrupt normal business in the two municipalities as has been happening leading to loss of stock and loss of income
- ✓ Improve community health by controlling flow of storm water within Kajiado and Ongata Rongai thus enhancing sanitation
- ✓ Achieve gender equality and empowerments of women by ensuring women are not unfairly discriminated when it comes to recruitment for jobs associated with this project.
- ✓ Fight Climate change by ensuring that equipment and machines do not emit GHGs during construction while the traffic department should ensure users do not operate vehicles which emit GHGs towards limiting global mean temperature to two degrees Celsius above pre-industrial levels—and thus avoid the worst effects of climate change.

CHAPTER 3: PROJECT LOCATION AND DESCRIPTION

3.1 Introduction

This section describes the details of each project including its location, size and components.

3.1.1 Project Location

All The proposed works are located within Kajiado County, in Kajiado and Ngong municipalities. Other details are described below:

3.1.2 Understanding Kajiado County

Headquartered in Kajiado town, Kajiado County is located in the southern part of Kenya. It borders Nairobi County to the North East, Narok County to the West, Nakuru and Kiambu Counties to the North, Taita Taveta County to the South East, Machakos and Makueni Counties to the North East and east respectively, and the Republic of Tanzania to the South. It is situated between Longitudes 360 5" and 370 5" East and between Latitudes 10 0" and 30 0" South. The county covers an area of 21,900.9 square kilometers (Km^2).

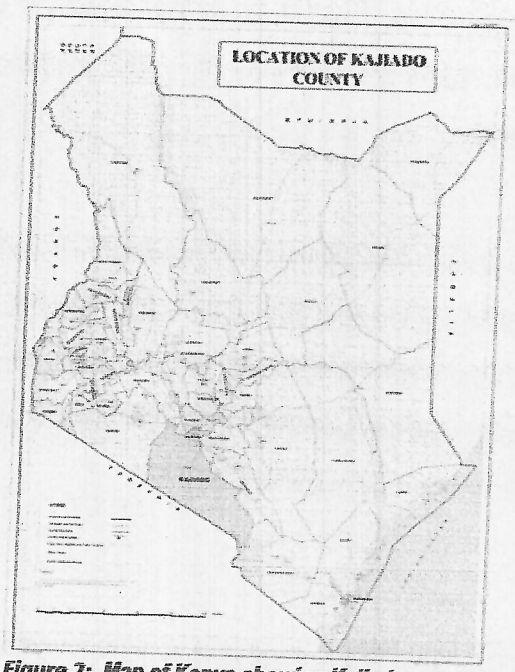


Figure 2: Map of Kenya showing Kajiado county

CIDP, Kajiado (2018-2022)

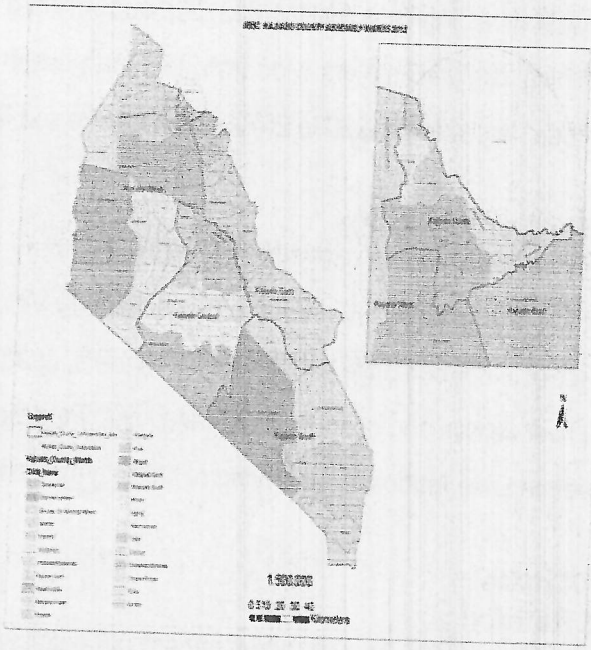


Figure 3: Map of Kajiado county, location of Kajiado town

IEBC (2012)

3.2 Geographical and Topographic Features

3.2.1 Geographical features

According to the Kajiado CIDP (2018-2022) the main geographical features that constitute Kajido county are (i) plains (ii) valleys (iii) hills whose altitude range from 500 m (around L. Magadi up to 2500 m above sea level in Ngong hills.

3.2.2 Topography

Topographically, Kajiado county can be classified into three areas thus (i)_ the rift valley (ii) Athi kapiti plains (iii) central broken ground. The rift valley forms a depression that traverses the western part of the county from North southwards. It presents deep faults which give rise to plateaus, escarpments and plains. At the basin of the valley are interesting geographical features such as lakes (e.g. Suswa, Magadi and Natron), hot water springs and flat plains such as found in Pakase, Shompole and Oloika.

The Athi Kapiti Plains consist mainly of gently undulating slopes, which become rolling and hilly towards the Ngong hills. The altitude ranges from 1580 to 2460 meters above sea level. The hills are the catchment areas for Athi River, which is fed by Mbagathi and Kiserian tributaries. The Central Broken Ground is an area stretching 20-70 kilometers wide from the north-eastern boarder across the county to the southwest where altitude ranges from 1220 to 2073 meters above sea level.

3.2.3 Soils and geology

The county consists of three geological regions: quaternary volcanic, Pleistocene and basement rock soils. Alluvia soils are also found in some areas. Quaternary Volcanic soil is found in the Rift Valley. Basement System Rocks which comprise various gneisses, cists, quartzite and crystalline limestone, are found mainly along the river valleys and some parts of the plains. Pleistocene soils are found in the inland drainage lake system around Lake Amboseli. Quarrying of building materials is also done within the county.

3.2.4 Climate

3.2.4.1 Rainfall

Kajiado County experiences a bi-modal pattern of rainfall with long rains occurring between the months of October and December (OND) while the long rains occur between the months of March and May (MAM). Although Kajiado is generally classified as ASAL area, rainfall amounts show a gradient influenced by attitude so that higher places like Ngong experience more rainfall while areas around the Kapiti plains experience least amount of rainfall. The rainfall amount ranges from as low as 300mm in the Amboseli basin to as high as 1250 mm in the Ngong hills and the slopes of Mt. Kilimanjaro.

3.2.4.2 Temperature

Temperatures vary both with altitude and season. The highest temperatures of about 34°C are recorded around Lake Magadi while the lowest of 10° C is experienced at Loitokitok on the eastern slopes of Mt. Kilimanjaro. The coolest period is between July and August, while the hottest months are from November to April.

3.3 Economic activities

The main economic activities include agriculture (food crop farming, live-stocking, horticulture), Tourism (Amboseli National park) forestry (about 6,866.88 ha of forest cover) and trade (in many upcoming urban area such as Ngong, Kiserian, Ongata Rongai, Loitoktok among others). Mining is a key activity in the Magadi area where L .Magadi is exploited for the valuable soda ash

3.3.1 Population dynamics

The county has a total population of 807,070, 401,785 of which are female and 405,245 male (KNBS, 2013) with a growth rate of 5.5%. It was projected to hit 1m by 2017. The main urban areas in the county are Kitengela, Ongata Rongai, Kiserian, Ngong, Loitokitok, Namanga, Isinya and Kajiado. The 2012 projected urban population in the county stands at 191,827 which is 23.8 percent of the total population. The population of Kajiado' major urban centers (in this study) is as shown in table 3-1 below.

Table 5: Population breakdown of the municipalities (Note that Ongata Rongai is part of Ngong municipality)

Urban area	Male	Female	Total
Ongata Rongai	19,271	20,907	40,178
Ngong	54,353	51,620	10,4073
Kajiado	7,458	7,173	14,631
Total	81,082	79,700	158,882

Adopted from KNBS (2013)

3.3.2 Poverty levels

There are high levels of poverty in the county with more than 47 percent of the population living below the poverty line. Major causes of poverty include illiteracy, frequent droughts, poor infrastructure and inadequate water resources. A major effect of poverty is high rate of school dropouts as parents are unable to raise school fees. The high dropouts subsequently result to child labour as the school going children work to supplement family income. In addition, the poor often experience nutrition related conditions that contribute to high morbidity rate among children and women. Poverty has also forced some people into

commercial sex work thus exposing them to HIV/AIDS especially in the urban areas. This may result to increased number of orphaned and vulnerable children and high dependency rates. Thus the project should not take advantage of the many needy children (minors) who are common in all sites but more common in Ngong town around the dumpsite. The workers must not even engage in any act sexual harassment otherwise the consultants recommends full legal action against any worker who is found guilty of such offense.

3.3.3 HIV/AIDS

HIV prevalence in the county stands at 6.1 percent compared to the national prevalence of 6.3 percent. The contributing factors to the high prevalence rate are alcohol and drug abuse, rapid urbanization and cross border movements. Preventive activities and support for those infected and affected should be focused at the family unit. The project should be encouraged to support the war against HIV-AIDS by training workers, provision of protective devices and promoting testing and counseling in addition to provision of free and honest information about HIV –AIDS to the project neighboring community.

3.4 Environment and Global Warming

Global warming has led to adverse climatic changes. There is need to carry out environmental screening before implementation of projects and programs in order to assess the likely environmental and socio-economic effects.

3.5 Infrastructure

The dilapidated physical infrastructure in the county is one of the major impediments to trade and investment. The county's poor and inadequate infrastructure (road, water supply, and electricity telecommunications/ICT among others) has led to high cost of doing business and hindered harnessing of local potential and access to markets.

Out of the County's 2,344.2 Km road network, only 300 km or 13% is tarmacked. Majority of the roads even within the municipalities are of earth standards and many of them are impassable during rainy seasons. This hampers movement of persons, goods and services thus impending development and service delivery to many.

3.6 Water resources

The county is water deficient as most rivers are seasonal. The major sources of underground water are boreholes and springs but in some areas borehole water is saline. The county does not have adequate water harvesting structures. There has been low community involvement in construction and rehabilitation of water supply facilities.

3.6.1 Waste management

3.6.1.1 Solid waste management

Solid waste management in Kajiado is poor. Many households and business premises just dump their waste along the back-streets while others employ burning of waste. In Ngong municipality and more specifically Ngong town, solid waste is dumped in a dumpsite which is already full and "overflowing",. The burden of solid waste in the municipalities is heavy and the project should not make it heavier. All waste generated by the project should be separated at source, stored carefully, transported according to the laid down procedures and disposed of in appropriate places. This can work better when solid waste management for the project is undertaken by licensed waste handlers.

Uncontrolled disposal site (dumpsite)

Solid waste blocks culvert

Plate 1: Existing solid waste disposal point at Ngong municipality, *Eng. Mavuti (2019)*

3.6.1.2 Sanitation and waste water management

The county does not have an established sewerage system. Majority residents in urban areas use pit latrine while the elite among them have built homes with standard septic tank system. 19% of the participants in the study have adopted the bio-digester method of managing household wastewater but this is still low compared to the many in the rural areas who continue to use open bush defecation as their sanitation strategy

3.7 Cities and urban areas act (2011)

According to the Cities and Urban Areas Act, 2011; an urban area qualifies to be a town if it has a population of at least 10,000 people. According to this criterion, Ongata Rongai, Ngong, Kiserian and Kajiado are towns based on the 2009 Kenya Population and Housing Census. Population projections for 2012 show increase in population thus Isinya, Namanga and Loitokitok join the list of towns in the county. By 2017 it is projected that the population in each of these urban areas will increase but would still be less than the required number to qualify as a municipality which requires a minimum population of 250,000 (*Cities and Urban Areas Act, 2011*).

However the KUSP accepted all county headquarters to be promoted to municipality status despite population figures. Thus Kajiado qualifies as municipality by this criterion while Ngong adopted Kiserian and Ongata Rongai (because of their close proximity to the city of Nairobi and created the Ngong municipality

3.8 Project Description

3.8.1 Road 1: Total Junction-Catholic Church-KCB Junction Road

3.8.1.1 Size

The total length of the he proposed road is approximately 1.2 Km. It has a reserve of twelve (12 no.) meters

3.8.1.2 Proposed works and components

The proposed works on this road include (i) improvement of the whole length of the road from existing earth to bitumen standards and create a six (6 no.) meters double lane carriageway (ii) Construction of a 1.2 M wide walkway (NMTF) on each side of the road (iii) construction of a 0.6 m wide storm water road side drainage channel on both sides (iv) installation of solar powered street light and (iv) creation of parking lots on selected areas subject to availability of space.

3.8.1.3 Location

This project road is located within Kajiado town. It is that road that starts from the Total Petrol Station through Kenya Commercial Bank to Nyambene Butchery and the proceeds from Cooperative bank to join the tarmac road at the Backyard club.

3.9 Understanding Kajiado town

Kajiado town is located at Latitude 1 51' 0.000" S and Longitude 36 46'59.880"E and 1710 m above sea level, about eighty (80 no.) km. south of the capital city of Kenya Nairobi, along the Nairobi-Arusha (via

Namanga) highway (A104). The town is named Kajiado after an old Maasai word "Olkeju-ado, which means "the long river" a name referring to "a seasonal river" which flows west-east of the town. It was originally called "Olpurapurana" which is Maasai for "a round elevation". It has an urban population of about **Kajiado** has an urban population of 11,999 (KNBS 2013)

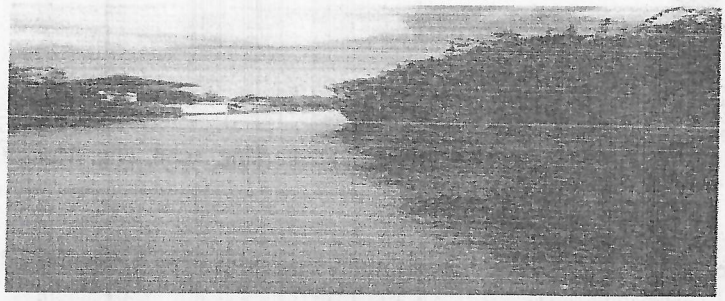


Plate 2: section of the Total Junction-Catholic Church-KCB Junction-Nyambene-Backyard road, *Eng. Mavuti (2019)*

3.9.1 Road 2: Kenol/Kobil-Wama dispensary-Mechanic parking lane

3.9.1.1 Description

This refers to that urban road that stretches from Kenol/Kobil-Wama dispensary-Mechanic–Parking lane. It is one (1) km in length and nine (9) m in breadth. The carriage way is expected to be 6 meters with a 0.6 m drainage channel on both sides and 1.2 m wide walkway (NMTF).

3.9.1.2 Project components

The proposed project includes a carriage way, NMTF (on both sides), road side drainage channel (on both sides) and a parking as space allows.

3.9.1.3 Location

The road is located within Ongata Rongai urban area within Ngong municipality

3.10 Ongata Rongai

Situated about seventeen 17km south of Nairobi, Ongata Rongai is a town west of the Ngong hills. It is approximately 1731 m above sea level. Ongata Rongai is a fast growing urban area with a total population estimated at 66,042 (KNBS, 2013).

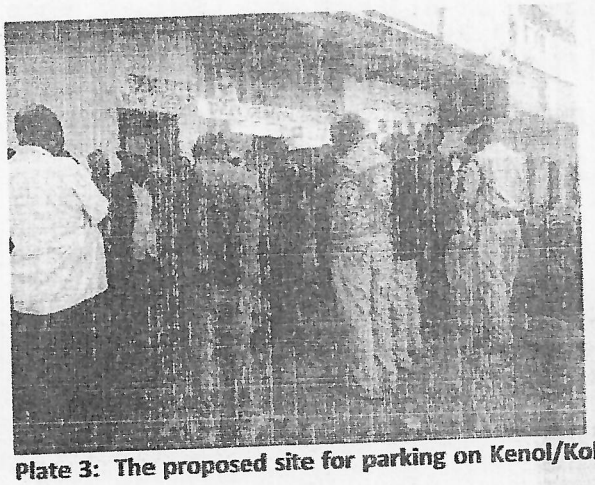


Plate 3: The proposed site for parking on Kenol/Kobil-Wama dispensary-Mechanic–Parking road, *Eng. Mavuti (2019)*

Ongata Rongai is indigenously inhabited by Kenyans of the Maasai community and grew from a meeting of a cattle market in the northern most tip of Kajiado County. Booming real estate market created a major opportunity for business and settlement in Ongata Rongai creating the present day urban area almost 16km^2 . Due to its close proximity to the capital city, the town has evolved to a cosmopolitan area hosting Kenyans of middle to upper income category.

3.10.1 Economy

It is a dominated by middle class residents. The main economic activity is trade with real estate taking the lead. Many banks exist here as well as upper class educational institutions and privately owned health centres. Modern shopping centers are also evolving in Ongata Rongai such as the Maasai mall, Bees park, Times arcade among others.

3.10.2 Administration

It is divided to two (2) administrative locations namely: Nkaimurunya and Rongai separated by the Magadi road.

3.11 ROAD 3: B50 road Junction-Kiserian Primary School-Mgadi road Junction

3.11.1 Location

B50 road junction-Kiserian primary school-Mgadi road junction road is located in Kiserian, Ngong municipality. Kiserian (Maasai for "place of peace) town lies at the foot of the Ngong Hills along the Magadi road on 1.430^{0}S 36.678^{0}E within the larger Kajiado county.

3.11.1.1 Project description

The proposed project is about 1.3 km and starts from the Damal petrol station through Kiserian primary school to the Magadi road. The project components include a 6m wide carriageway, 1.2m NMTF on both sides and 0.6m wide roadside drainage channel on both sides.

Plate 4: Section of the road, *Eng. Mavuti (2019)*

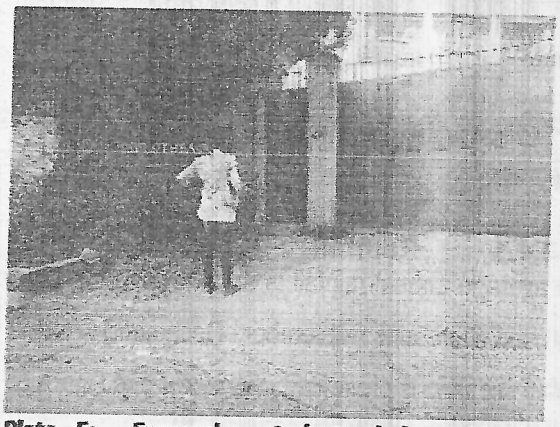


Plate 5: Encroachment (extended corridors), *Eng. Mavuti (2019)*

3.12 Road 4: Kobil-ololua rd junction-Cathedral-Junction B50 Road

3.12.1 Location

This road is located within Ngong town. It is that road that stretches from the Kobil petrol station down to cross the Ololua road and proceeds to the Catholic Church (cathedral) to link up with the B50 road. It passes between the cemetery and the dumpsite.

3.12.2 Components

The project components include a 6m wide carriageway, 1.2 m NMTF on sides, 0.6 m roadside drainage channel and parking in selected places as space allows.

3.12.3 Traverse

This road traverses a highly populated informal settlement area and the PAPs requested for a design factor that considers increasing the number of speed bumps designed for this road to at least six. This is justifiable because the area has a lot of institutions of mass-use such as schools, churches, dumpsite and cemetery. The consultants walked along the road route and identify with the PAPs that there is need to control speed in more than one place .This will help reduce accidents or injuries associated with speed of traffic.

3.12.4 Ngong town

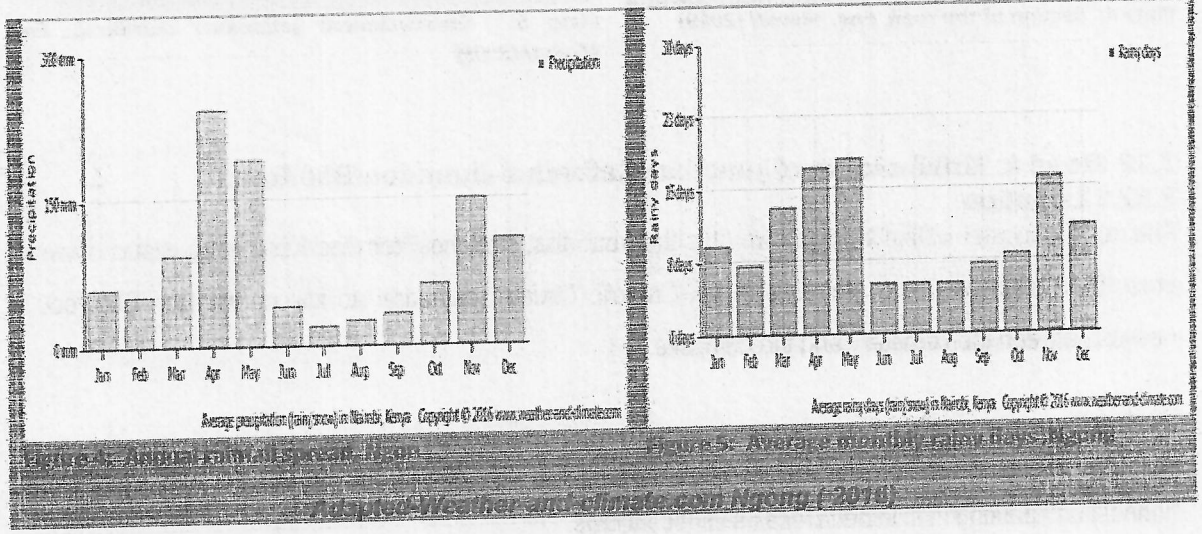
Ngong town is located near the Ngong hills within the greater Kajiado County. The town is Maasai for "knuckles" referring to the four (4) peaks of the ridge which standalone rising from the plain around Nairobi. Ngong town stands at 1961m above sea level and has a population of about 104,073 (KNBS 2014). The larger Ngong encompasses the division ns of Kiserian, Ongata Rongai and Matasia

Climate

According to the Koppen-Geiger climate classification system, the climate of Ngong is warm and temperate.

3.12.4.1 Rainfall

The average annual rainfall is about 865 mm. This occurs in a bimodal structure with long rains (April - May) and short rains (November –December) . April is the wettest month while the driest month is July. The rainfall scenario is presented in Figure 4 and Figure 5



Adapted Weather and climate.com Ngong (2016)

3.12.4.2 Temperature

The average annual temperature is about 16.7°C.

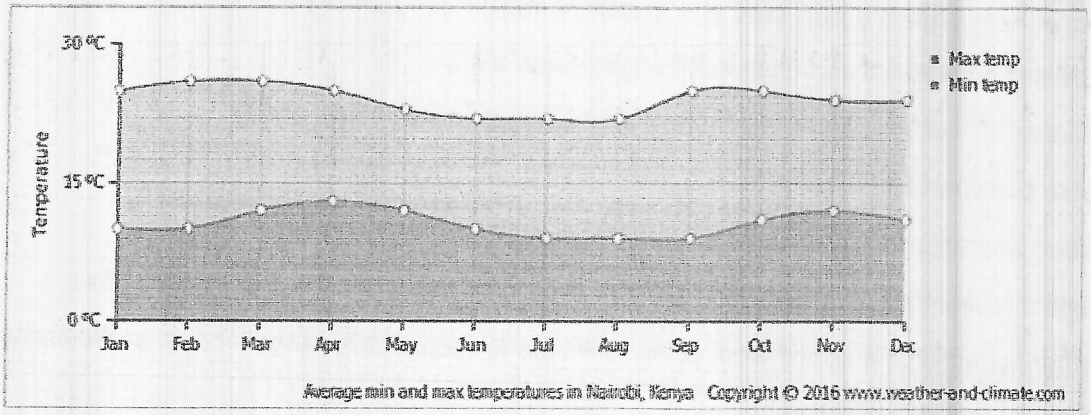


Figure 6 : Maximum-minimum monthly temperature

CHAPTER 4: POLICY, LEGAL AND REGULATORY FRAMEWORK

4.1 Introduction

The Republic of Kenya has a policy, legal and regulatory framework for environmental management. The broad objectives of the national environmental policy in Kenya are to-

- ✓ Ensure optimal use of natural resources while improving environmental quality.
- ✓ Ensure sustainable development
- ✓ Develop awareness that inculcates environmental stewardship among the citizenry
- ✓ Integrate environmental conservation and socio-economic aspects in the development process.
- ✓ Ensure that national environmental goals contribute to international obligations on environmental management and social integrity.

To achieve the above policy objectives, appropriate reviews and evaluations of all forms of development project plans and operations are carried out to ensure compliance with the environmental policy and legal frameworks. The following section provides details on the policies relevant to the proposed road improvements.

4.1.1 Policy Framework

Recent policy and legislative developments have been substantially directed at redefining the role of the state with separation of policy and regulation (state responsibility) from implementation (private sector and/or statutory bodies). At the same time, there has also been movement to redefine the role of the state vis-à-vis the individual and/or community groups. The new constitution and policies such as the National Land Policy have considerably strengthened the community rights. This is critically important as developments such as the proposed project components can create social conflicts with the affected communities or individuals effectively delaying the project. This implies a need to engage the affected communities from the earliest stages of project planning.

4.1.1.1 Objectives of Kenya road policies

The Kenya road policies are based on the following objectives:

- Integration: ensuring that all roads decisions are taken in the context of a coherent, integrated transport policy covering all modes of road transport modes
- Accessibility: making it easy to reach the places we wish to get to
- Safety: making travel safer

- Economy: getting good value for money and supporting sustainable economic activity in appropriate locations
- Environmental impact—both positive and negative, on both the built and the natural environments, and at the global, regional and local levels
- Tackling road congestion

The proposed road improvement project is bound by the provisions of the Kenya road policies above in order to attain the policy-specific goals and the wider national goals for the road sector.

4.1.1.2 Environmental impacts and Kenya road policies

All projects works and road improvements need to be sustainable. This is critical to ensure that short-run gains from of the envisioned infrastructure do not obscure wider or long-run damage that may be associated with it. The objective should be to limit and where possible reduce environmental damage at local, regional and global levels, taking account of all relevant environmental policies such as those on climate change, local air quality and biodiversity. It is also important to acknowledge positive environmental benefits that the infrastructure can bring to the local environment and look for ways to enhance the positive impacts.

For instance, infrastructural improvements have a mixed effect on emissions. By easing congestion they could help reduce emission of some pollutants, but they increase emission of others. Environmental impacts arising from road development projects can be categorized into direct, indirect, and cumulative impacts. These categories can be further broken down according to their nature, into positive or negative impacts, random or predictable impacts, local or widespread impacts, temporary or permanent impacts, and short- or long-term impacts.

Direct impacts are caused by the project itself—that is, by infrastructural building processes such as land consumption, removal of vegetation, and severance of farmland. An example of this is removing gravel material from a borrow pit for use in surfacing a road. In this case, the land area where the pit is located is affected directly by activities associated with the project. Direct impacts are generally easier to inventory, assess and control than indirect ones, since the cause–effect relationship is usually obvious.

On the other hand, indirect impacts (also known as secondary, tertiary, or chain impacts) are usually closely linked to the project and may have more profound consequences on the environment than do direct impacts. Indirect impacts are more difficult to measure, but can ultimately be more important. Over time

they can affect larger geographical areas of the environment than anticipated. Examples include degradation of surface water quality by erosion of land cleared for a new road, urban growth near a new road, and increased deforestation of an area stemming from easier (more profitable) transportation of logs to market or the influx of settlers. In areas where wild game is plentiful, such as Africa, new roads often lead to rapid depletion of animals due to poaching.

Environmental impacts should be considered as they pertain not only to Road Rights-of-Way (RROW) but also to sites associated with the road project, which include debris deposit and borrow sites, materials treatment areas, quarries, access roads, and facilities provided for project workers. These 'off-RROW' areas are often where indirect impacts appear.

Environmental Impact Assessment practitioners predict and evaluate the significance of possible indirect effects by taking a holistic approach to impact assessment. It is especially important that any synergetic relationships between impacts be closely examined, since indirect effects frequently lead to synergetic ones.

It is with indirect impacts that linkages between the natural and social environment are most pronounced. For example, the appropriation of land for a road may displace farmers or interfere with their cropping patterns forcing them to use a different water supply. This change could result in the depletion of a groundwater aquifer, intensification of new land clearing, erosion, and contamination of water with fertilizers and pesticides carried in runoff.

The process of cumulative environmental change can arise from any of the following types of events: i) single large events such as a large project, ii) multiple interrelated events such as road projects within a region, iii) catastrophic sudden events such as a major landslide into a river system, and iii) incremental, widespread, slow-change events such as a poorly designed culvert or drainage system along a road passing through a watershed.

Cumulative impacts can generate additive, multiplicative or synergetic effects, which may damage the functioning of one or several ecosystems (for example, impairing the water regulating and filtering capacity of a wetland system by constructing a road across it), or the structure of an ecosystem (for example, placing a new road through a forest would lead to migration or land clearing, which results in severe structural loss to the forest). Assessing cumulative effects is a complex process requiring extensive

knowledge of ecological principles and ecosystem-response mechanisms (Preston and Bedford 1988; Spaling and Smit 1994, 1993).

Technically a subset or variant of cumulative impacts, ecosystem function impacts that disable or destabilize whole ecosystems are the most dangerous and often the least likely to manifest themselves over a short period of time. Many of these cases deal with roads that traverse watersheds in which surface and subsurface water movement are complex.

Important examples are a highway constructed across a mangrove forest, a road bisecting wildlife migration routes, and the linkage of road construction with the social environment. It is not enough to qualify environmental impacts by the type of effect they have on the environment: they must also be categorized according to their seriousness. The most damaging and longest lasting impacts will obviously be the first to be avoided or mitigated (World Bank 1991).

4.1.2 Sessional Paper Number 10 of 2012 (The Kenya Vision 2030)

This is the National Blueprint for economic advancement of Kenya. It is also called as the Vision 2030 and it is the long term development strategy for Kenya towards achieving a "globally competitive and prosperous country [economy] with a high quality of life by 2030. The key objective of the Vision 2030 is to transform Kenya into a new industrializing middle income country by the year 2030 AD. It envisions a high quality of life for the majority of Kenya citizens in a clean and health environment as contemplated in the Sustainable Development Goals [SDGs]. Vision 2030 is anchored on 3 pillars:

Table 6: Three pillars of Kenya' Vision 2030

Pillar	Description
Economic	To achieve a sustained annual economic growth rate of 10% to 2030
Social	To create a just, cohesive and equitable social development
Political	To build an issue, people centered democratic system that is result oriented and accountable to the public

Adopted from Vision 2030

The Vision 2030 is being implemented in five-year Medium Term Plans. The proposed project falls within the second five year plan (2013-2017) and is likely to flow over to the next five year MTP (2018-2022) with each MTP drawing lessons from previous MTPs. Economic advancement is among the three pillars of Vision 2030. It promotes investment to enhance income generation. The proposed project is relevant because the proposed projects are relevant to economic development and income generation for all the urban areas. Thus the project is very relevant towards the achievement of Vision 2030.

4.1.3 Vision 2030 Vs. the Environment

Vision 2030 anticipates a Kenyan nation characterized by a clean, secure and sustainable environment by 2030 and sets the goals towards that:

(iii) to increase forest cover from less than 3% at present to 4% and

(iv) to lessen by half all environment-related diseases.

It recommends specific strategies to promote environmental conservation in order to provide better support to the economic pillar flagship projects and for the purposes of achieving the SDGs. The implementation of the proposed project should not create room for breeding of mosquitoes which spread malaria plasmodium; neither should it lead to contamination of water [which increases incidence of water borne diseases]. The implementers must be careful on maintaining air quality [avoid air pollution] and enforce sound policies on waste management.

4.1.4 Sessional Paper No 1 of 1996 on Environment and Development

Crafted in 1996, the Sessional paper no. 1 (1996) is the official statement on national policy on environment and development. It was created out of the recommendations of the National Environmental Action Plan [NEAP] of 1994 which was based on the Agenda 21 (1992) which called upon nations of the world to pay attention to their environment and development objectives. S.P NO. 1 (1996) guarantees Kenya citizens a right to a clean and health environment and commits the nation to pursue a policy strategy of integrating environmental sensitivity into national development planning process and sets broad policy objectives as follows:

- ✓ Optimal use of natural resources in improving the quality of human environment
- ✓ Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations
- ✓ Integration of environmental conservation and economic activities into the process of sustainable development
- ✓ Meeting of national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth
- ✓ Among other provisions, Sessional Paper No. 1 of 1996 also sets out sectoral priorities for environmental sustainability which in most cases have been operationalized through formulation of guidelines for quality and environmental management in respective sectors. The Environment

Management and Coordination Act EMCA, 1999(amended 2015) has since also been enacted to secure implementation of the national policy on environment.

Thus the proposed project, though extremely important for the local as well as regional development, its execution must be within the guidelines of S.P NO.1 (1996). The contractor must follow Water Resource Authority (WRA) guidelines to access water as well as NEMA guidelines to restore all borrow pits before handover.

4.1.5 Sessional Paper Number 1 of 2002 on sustainable development

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. It is relevant to the proposed project in the following ways:

(i) Empowerment of women and gender equity: The project players should consider both gender for employment without any form of discrimination whatsoever.

(ii) Inclusion of persons with disabilities in employment opportunities so long as they are willing, available and able

(iii) Provision of free, accurate and information about fighting HIV-AIDS to workers and the project neighbors

4.1.6 The National Poverty Eradication Plan (NPEP)

The key objective of the NPEP was to reduce the incidence of poverty in both rural and urban areas by 50 percent by the year 2015; as well as strengthening the capabilities of the poor and vulnerable groups to earn income. It also aims to narrow gender and geographical disparities and create a healthy, better-educated and more productive population. This plan was prepared in line with the goals and commitments of the World Summit for the Social Development (WSSD) of 1995. The plan focuses on the four WSSD themes of the poverty eradication; reduction of unemployment; social integration of the disadvantaged people and the creation of an enabling economic, political, and cultural environment. This plan is to be implemented by the Poverty Eradication Commission (PEC) formed in collaboration with Government Ministries, community based organizations and private sector.

The proposed project should involve rural youth in employment as well as encourage those who may not get employment directly to indirectly undertake business with the project in areas such as sale of land for burrow pits, sell of meals to project workers, among other project related income generation opportunities.

4.1.7 The Land Policy 2007

This policy has a vision of "efficient, sustainable and equitable use of land resource". Under this Policy, the environmental management principles with respect to land will entail the following: (i) restoration of affected environmental such as borrow pits by application of soil conservation methods (ii) improvements shall come with a comprehensive land use policy especially the way-leave land (iii) Ensure that the exercise of development control takes into account local practices and community values on land use and environmental management (Section 51(f)), (iv) Ensure effective public participation in the exercise of development control (Section 51 (g)), and (iv) Strategies for sharing benefits should be developed taking into account the nature of the resources involved and the contribution that diverse actors make to the management of the resources (Section 98)..

4.1.8 The Poverty Reduction Strategy Paper, PRSP (1999)

PRSP was published by the Government of Kenya in 2001. The two key goals of the strategy is (i) poverty reduction and (ii) economic growth. The document outlines the priorities and measure necessary for poverty reduction and economic growth. The objectives of economic growth and poverty reduction are borne out of realization that economic growth is not a sufficient condition to ensure poverty reduction. In this regard, measures geared towards improved economic performance and priority actions that must be implemented to reduce the incidence of poverty among Kenyans have been identified. With respect to the environment the paper proposes that adequate awareness be created among stakeholders regarding environmental costs and benefits. It further calls for community involvement and participation in environmental management and conservation. Thus in pursuit of the PRSP (1999), the community should be involved in decision making on the implementation of the road improvement project in areas such as:

- ✓ Creation of local employment especially for women and persons with disabilities
- ✓ Opportunity for business opportunities arising from the road improvement project
- ✓ Creation of awareness on challenges that accompany road construction projects such as prostitution, unwanted pregnancies and spread of sexually transmitted infections and HIV –Aids
- ✓ Capacity building for workers on financial integrity to enable workers to save and invest earnings for future personal financial development

4.2 Legal Framework

4.2.1 The Constitution of Kenya (2010)

The Constitution of Kenya (2010) takes supremacy over all aspects of life and activity in the Republic. With regard to environment, article 42 of the CoK (2010) states as thus:

> Every person has a right to a clean and health 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 the obligations relating to the environment fulfilled under article 70 of CoK (2010)

The provisions of article 69 and article 70 of the CoK (2010) are enumerated hereunder.

4.2.1.1 Article 69

Article 69, subsection (1): The State shall— (a) ensure sustainable exploitation, utilization, 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) utilize the environment and natural resources for the benefit of the people of Kenya

By this article, public participation is encouraged and noncompliance is a violation of the constitution. Trees are protected by this section and the policy to be applied is thus:

"All mature indigenous trees should not be cut down. But when the best route for project implementation must affect the tree, then the project implementers must considers trimming the branches as the best option before considering cutting it. To cut mature trees especially indigenous trees should be the last option." These provisions are very relevant to the proposed project especially that the proponent is the Government of Kajiado County and thus must portray the face of a government committed to enforcement of all constitutional provisions especially where the obligations are laid upon the state and it's implementing agencies.

Subsection (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".

This obligation will be laid upon every stakeholder in the implementation process in order to maintain harmony in the development process. Key stakeholders targeted by this include the proponent, contractor and the host community. The following state organs may seek to inspect contractor' premises and should be allowed access; (i) NEMA (ii) DOSH (iii) Public health (iv) The proponent ministry

4.2.1.2 Article 70

This section 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. This means that the project players must be cognizant of the fact that the public has been empowered by this article and can "interrupt" work progress through the court process and therefore implementers should respect the environmental regulations especially to ensure the community right to a clean and health environment is honored. The provisions for a clean and healthy environment notwithstanding, the ARTICLE 41 (1) on labor relations states thus: Every person has the right to fair labor practices WHICH include the right to fair remuneration and the right to reasonable working conditions. The contractor will be bound by this requirement to ensure that his workers remuneration is within the minimum wage provisions and that the working conditions (which include the equipment and sanitation) are reasonable. Each worker should be provided with Personal Protective Equipment during working hours. The contractor will develop a safety management policy and enforce it.

All Kenyan policies, regulations, and legislations relevant to sustainable development are anchored in the CoK (2010) and some are discussed below.

4.3 The Environment Management and Coordination Act, EMCA (amended 2015) and its relevant tools

The most pertinent and overriding statute that will be evoked in the implementation of this project in its entire lifecycle is the Environmental Management and Coordination Act, EMCA 1999 **(amended 2015)**.

This Act harmonizes environmental legislation previously scattered among 77 sectoral laws. It is the principle legislation governing conduct of EIA/EA/ESIA in Kenya. Section 58 of the Act 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 specifies projects that require to be subjected to EIA studies. Under this schedule, the proposed road improvement is expected to undergo an ESIA and get it approved by the National Environmental Management Authority (NEMA) and get clearance [permit] from NEMA before the project commences. To commence this project without an ESIA and Permit from NEMA is an offence. Indeed, an appraisal of the proposed road upgrading project triggers requirements for an EIA under this Second Schedule. This ESIA report is an attempt towards complying with this law and the consultant will produce an authentic ESIA acceptable to both the client and the authority in order to acquire a permit for implementation. By the same law, this project will be subject to an annual Environmental Audit [EA] to ensure compliance with the ESMP recommended by the consultant in consultation with other stakeholders in the project implementation. Guidelines for environmental management provided by EMCA 1999 are described below

4.3.1 Requirement for Environmental Impact Assessments for all new projects

Section 58 of the EMCA cap 387 requires that an Environmental Impact Assessment (EIA) study be undertaken before commencement of projects of this magnitude the National Environmental Management Authority according to 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). This ESIA is strictly being undertaken in accordance to these regulations.

4.3.2 Requirement for Annual Environmental Audits

In order to mitigate and control environmental damage from ongoing projects, Sections 68 and 69 of 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. This project will undergo the initial EA after 12 months of its commissioning and thereafter an EA will be undertaken after every 12 months until the project is decommissioned.

4.3.3 Gazettement of Environmental Regulations:

Under EMCA, cap 387 NEMA has gazetted legal tools that govern conduct of EIAs and general environmental protection. The Proposed KUSP projects have been screened against these tools with results that (table 4-2 below) five of the tools will be triggered. Detailed analysis of the trigger mechanism and modalities for mitigation are provided in Table 7.

Table 7 Analysis of the Project triggers to the EMCA and its tools

Legal Tool	Status	Trigger mechanism
EIA and Audit regulations	Triggered	EIA Study has to conform to these rules
Waste Management Rules	Triggered	Water for construction will be drawn from rivers There is potential to pollute water sources/bodies
Conservation of Biodiversity regulations	No	These regulations focus more on benefit sharing in biodiversity
National Sand Harvesting Rules	Triggered	Road works will require concrete mixture which shall include sand. NSHR will apply at the source of sand
EMCA (1999) (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 L.N.No. 61:	Triggered	Both construction equipment and construction crew likely to generate noise which could be a nuisance to neighboring households, institutions and businesses
Air Quality Regulation (2014)	Triggered	Construction activities and equipment have potential to generate air pollution by dust, smoke or emissions
Environmental Impact Assessment/Audit regulations[2003) :legal notice no.101 : Kenya Gazzette supplement no 56. of 13th June 2003	Triggered	The proposed project is likely to have negative environmental impacts and thus these rules demand an EIA- ESIA before commencement and a regular EA after commissioning
EMCA (1999) [Waste Management) Regulations 2006 L.N. no 121 of the Kenya Gazette supplement no. 16 of 2006	Triggered	Proposed project activities are likely to generate both solid waste and waste water as well as oil spills. The law requires compliance with these regulations.
EMCA (WQR) 2006. L.N no. 120 , Kenya gazette supplement no 68 of September2006	Triggered	These regulations exploitation of water for all purposes. The proposed project will require water and will interact with water bodies such as rivers, streams and wetlands.

Eng.Mavuti and (2019)

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 projects sections are briefly reviewed below.

4.3.4 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 DECs to regulate sand harvesting within areas of jurisdiction implying that, sand should only be sourced from approved sites and by approved dealers. The NMTFs, parking lots and road upgrading will require sand for manufacture of concrete for use in the process. The contractor is bound by law to observe the National Sand Harvesting Guidelines (2007).

4.3.5 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, these regulations give the noise limits applicable at different times of the day and has provisioned for issuance of licenses 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 [maximum 84 dB and where excess of this is produced, wearing appropriate PPE for noise protection] 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. Since these works will happen in urban areas, they have the capacity to trigger this regulation and it must be observed.

4.4 The Kenya Roads Act (2007)

The main product of the Kenya Roads Act (2007) which came into effect in September 2007 was the creation of three autonomous Authorities [Kenya Rural Roads Authority (KeRRA), Kenya Urban Roads Authority (KURA) and Kenya National Highways Authority (KeNHA)] which were mandated to manage rural, urban and national roads respectively. Other key inputs of the Road Act (2007) relevant to the proposed works are described.

4.4.1 Road way-leave vs. public utility installation

(i) Any public infrastructure service provider intending to utilize a road way-leave will require consent of the respective road authority. The proposed improvement on the roads will affect public infrastructure like Electricity transmission lines operated by the Kenya Power Company limited Thus discussions will be necessary between the proponent and the Kenya Power Company so that they may remove their infrastructures in affected areas to avoid destruction of poles and cables.

Plate 6: These two KPC poles will have to be removed, Eng. Mavuti (2019)

Further, under Section 27, the respective road authority has power to cause relocation of infrastructure from the road reserve thus:- (a) Where any infrastructure utility is located within a road reserve, the provider or operator of such infrastructure utility shall, upon written request by the relevant Authority, relocate such infrastructure utility to a location or alignment approved by the Authority at no cost to the Authority. Thus the Kenya Power Company limited will be expected to relocate and OR re-align their infrastructure to give way for the road associated works and improvement at their own cost. However Sub-section 2 demands that the relevant authority will issue reasonable notice to the operator of the targeted infrastructure and the operator shall cause the removal of such facility within sixty (60) days to allow for road improvement.

When the operator of such facility does not remove it within the stated 60 day notice, the relevant authority is empowered under sub-section 4 to remove such facility at the cost of the owner.

4.5 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 (2012) declares the County Integrated Development Plan (CIDP) to be central to the County's administration and prohibits any public spending outside of the plan. The Act clarifies that the County Integrated Development Plan (CIDP) 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 the (i) County Integrated Development Plan (ii) County Sectoral Plans (iii) County Spatial Plan (iv) Cities and urban areas plans as stipulated by Urban Areas and Cities Act.

4.6 The Occupational Health and Safety Act, OSHA (2007)

OSHA (2007) provides for safety, health and welfare of workers and all other persons legally present in workplaces including project work areas and camp sites. The Act is applicable to all work places and workers associated with it in order to ensure the safety, health, and welfare of both workers and non-workers in a work place. Part 9 demands that an employer of twenty (20) or more employees shall constitute a Health and Safety Committee. The employer shall prepare a written statement of his general policy with respect to the safety and health at the work place. Further, the occupier shall cause to be undertaken by a qualified individual an annual health and safety audit of his work places and submit audit report to the Directorate of Safety and Health Services (DOSHS).

Other provisions are that (i) A workplace accident, event or incident should be reported to the nearest DOSH offices within 24 hours (ii) A risk assessment should be undertaken every year and its results form part of annual safety and healthy audit (iii) The project should be registered as a work place before commencement. The consultant is aware that areas related to provision and enforcement of use of personal protective equipment, provision of clean drinking water, insurance cover, and sanitation facilities among other will be provided for by the contractor for the purpose of compliance with the requirements of this Act.

4.7 The Water Act (2002, Amended 2016)

The Water Act (2002, amended 2016) provides the legal framework for the management and conservation of water resources in Kenya including the acquisition and regulation of the rights to use water. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, and requirement for permits, state schemes and community projects. Part III, section 11, of the Water Act 2016 provides for regulation of the management and use of water resources. Following on this, sub-section 12 allows the Water Resources Authority (WRA) to demand from any person

or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information thereof furnished to the Authority. The contractor shall ensure proper water use, management and conservation. The contractor shall apply to the WRA to be granted permit to abstract road construction water from water sources available. In the event of borehole drilling WRA will expect a Hydro-geological survey report submitted to the area office for authorization to drill, and later after drilling WRA shall require a Borehole Completion Report (BCR) for the purpose of issuing of water abstraction permit.

4.8 The Kenya Roads Board Act, 1999

The Kenya Road Board Act (1999) establishes a board with a mandate to oversee Kenya' road network, coordinate its development, rehabilitation and maintenance and to be the principal adviser of government on all matters related to road development. It prescribes the Standard specifications for road and bridge construction in Kenya and has guidelines for environmental protection and mitigation. Standard Specification Clauses 116,117,125,135,137 specifically address protection of the environment with regard to water use and supply , health, safety and accidents .The provisions of these standards and codes must not be contravened during project implementation. These provisions are largely supportive of EMCA cap 387 and forms part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement.

4.9 Public Roads and Roads of Access Act Cap 399

The Public Roads and Roads of Access Act Cap.399 states that a public road is any road which the public has a right to use immediately before the commencement of this Act, or all proclaimed or reserved roads and thoroughfares being or existing on any land sold or leased or otherwise held under the East Africa Land Regulations, 1897, the Crown Lands Ordinance,1902, or the Government Lands Act at any time before the commencement of this Act and all roads and thoroughfares hereafter reserved for public use. The construction of the proposed road will need to take note of the provisions of this Act. All roads proposed for improvement in this project are public roads and thus are subject to the Public Roads and Roads of Access Act (1999). The roads are public roads and the county government is justified to invest in them.

4.10 The Traffic Act Cap 403 (2013)

The Traffic Act reserves the use of the road corridor for road facilities only. Any vegetation grown to protect the road edges should not cause problems during maintenance or improvement. Encroachment along the road corridor will have to be checked especially during the operational phase of the project. The Act also spells out conditions for use of roads by motorists, among others. However the existing roads have a lot of encroachment cases and by this Act, Any structure or facility within the beaconed carriageway will have to be removed by the owner [upon receipt of adequate notice] failure to which the contractor should be empowered to remove it at the owners' cost. Traffic Act (2013) 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 vapor is emitted there-from. Pollution of the atmosphere occurs on the highway either by use of adulterated petroleum products or non-road-worthy 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. That notwithstanding, the contractor will be expected by this law to only operate machines and vehicles which are well serviced and which to do not emit smoke.

4.11 Work Injury Benefit Act, WIBA (2007)

The Work Injury Benefits Act, WIBA (2007 provides guideline for compensating employees on work-related injuries and diseases contracted in the course of employment. The Act also requires provision of compulsory insurance for all employees. The Act defines an employee as any worker on contract of service with employer. It will be important for the Contractor of the proposed project to ensure that all workers contracted during the project implementation phase are provided with appropriate insurance covers so that they can be compensated in case they get injured while working. An employee can only be subject to incentives provided by this regulation upon injury or disablement only if the employer has registered their workplace with the Work Injury Benefit Administration.

4.12 The Public Health Act Cap 242 (Revised, 2012)

The Public Health Act (Chapter 242) provides for securing and maintaining good health of citizens. The Act contains directives that are focused on ensuring protection of human health. There are provisions within the Act that deal with water, air and noise quality as they pertain to human health. An environmental nuisance includes the emission from premises of waste waters, gases and smoke which could be regarded as injurious to health. The owner and/or occupier of premises responsible for such nuisances are liable to prosecution under the Act. The proposed project has potential pollution risks related to water, sanitation and air. Air pollution by dust will be controlled by regular sprinkling with water and sanitation management will be enhanced by provision of pit latrines on camp site or mobile latrine along the active work areas. Other laws which are relevant to the proposed improvements are described in Table 8. The consultant recommends that the contractor and other project implementers should comply with the laws especially on the highlighted areas.

Table 8 Other applicable laws

Law	Main Objective
The Environment and Land Court Act No.19 of 2011	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. It is applicable in the project cycle especially on matters touching land
The Agriculture Act, Cap 318	It covers inter-alia, soil conservation and agricultural land use in general. The proposed improvement should not encourage soil erosion
Physical Planning Act (No. 6 of 1996)	To approve plans, designs and drawings. Section 36 of the Act provides for Environmental Impact Assessments in projects such as proposed project.
Penal code (cap 63) laws of Kenya	Prohibits release of GHGs into the environment. Lists (i) loud noise (ii) offensive smell as offences punishable for as common nuisance,
The Employment Act, 2007	✓ Defines fundamental rights of employees ✓ Illegitimates employment of children ✓ Stipulates statutory deductions and submissions to prescribed institutions
HIV and AIDS prevention and control Act no. 14 (2006)	✓ Requires contractor to educate his workers, and public on combating spread of HIV aids ✓ This is relevant because HIV-Aids infection rate in Kenya MUST be brought down
The National Gender and Equality Act, 2011	✓ To promote gender equality and freedom from discrimination in employment ✓ Gender mainstreaming. ✓ Ensures that women and men benefit equally, from projects
The Sexual Offences Act, 2006 amended 2012	To ensure persons are not subjected to sexual offences.
Persons with Disability Act, Chapter 133	• To protect PLWD from discrimination in job opportunities • To promote access of PLWD to quality lives
Malaria prevention Act cap 246 laws of Kenya	• Binds developers to manage drainage professionally so that no stagnant water is created by the project activities [or blockage of drains systems].

4.13 Conclusion on legal framework

The proposed KUSP works will affect road reserve, parking spaces in the municipalities. Based on physical site observation, it is true that:

- ✓ The roads and reserve areas targeted for the works were communicated clearly in all Public participation meetings
- ✓ That once the dimensions of the road were communicated to the stakeholders and PAPs, the experts did not sense any form of Project rejection in all sub locations where the public participation meetings were held.
- ✓ That the road from Damal petrol station-Kiserian primary school-B50 may affect privately owned land in a non-significant portions. The project neighbors have already written a consent to give way and portion of land for the road works where need arises.
- ✓ There is encroachment in the form of structures (mostly temporary and extended shop corridors)
- ✓ Although the encroachment was evident in several places, the community valued the works over what a few of them had put up within road reserve land
- ✓ The only request from the community adequate time to rescue whatever can be rescued. The experts assured the PAPs that that will be granted and that since road construction is a slow moving process, each PAP should be able to "see it coming" and take action.

4.14 International Conventions

There are number Multi-Lateral Environmental Agreements (MEAs) that are relevant to the proposed project. These are described in the following section

4.14.1 Vienna Convention on the Protection of the Ozone Layer

The Vienna Convention is Multilateral Environmental Agreement whose objective is to phase out ozone depleting substances. It was concluded in March 1985 and saw the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages inter-governmental cooperation on research, systematic observation of the ozone layer, monitoring of CFC production, and the exchange of information.

By this convention, the contractor and the proponent are expected to monitor, identify and eliminate production of any CFC gases and other GHGs by the project equipment during construction and by any users during operationalization of the project outcome.

4.14.2 United Nations Convention to Combat Desertification (UNCCD)

The above Convention was adopted on 17th June 1994 in Paris and came into force on 26th December 1976.Kenya ratified the Convention in 24th June 1997. The purpose of the UNCCD is to address the problem of the degradation of land by desertification and the impact of drought particularly in arid and dry semi-humid areas. NEMA is the focal point for the Convention. Project related activities that could trigger desertification include (i) unsustainable harvesting of sand (ii) uncontrolled road water drainage causing erosion (iii) Mismanagement of flat terrain such as the landscape within Kajiado municipality.

4.14.3 The 1992 United Nations Framework Convention on Climate Change (UNFCCC)

The primary purpose of the convention is to establish methods to minimize global warming and in particular the emission of the greenhouse gases (GHGs) . The UNFCCC was adopted on 9th May 1992 and came into force on 21st March 1994. The Convention has been ratified by 189 states. Kenya ratified the Convention on 30th August 1994. NEMA is the focal point for the Convention and will monitor the project equipment to ensure that no GHG emissions are produced by them. Any complains submitted by the public to NEMA will be taken seriously and will invoke the wrath of NEMA. By this Convention, The contractor will have to maintain his plant and equipment to standards that do not allow emissions of fumes and smokes.

4.14.4 Earth Summit on Sustainable Development Agenda 21

Agenda 21 is a non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development. It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992. It is also regarded as an action agenda for the UN, other multilateral organizations, and individual governments around the world that can be executed at local, national, and global levels. The "21" in Agenda 21 refers to the 21st Century. Agenda 21 Section I on Social and Economic Dimensions is directed toward combating poverty, especially in developing countries, changing consumption patterns, promoting health, achieving a more sustainable population, and sustainable settlement in decision making. Section II on Conservation and Management of Resources for Development Includes atmospheric protection, combating deforestation, protecting fragile environments, conservation of biological diversity (biodiversity), control of pollution and the management of biotechnology, and radioactive wastes.

Section III focuses on strengthening the Role of Major Groups including the roles of children and youth, women, NGOs, local authorities, business and industry, and workers; and strengthening the role of

indigenous peoples, their communities, and farmers. Kenya continues to implement Agenda 21 to support sustainable development through the integration of environmental concerns into the national development policies, plans, and programmes. Also relevant is the implementation of Agenda 17. The implementation of the proposed project will need to be consistent with the objectives of Agenda 21 in areas such as proper management of all forms of waste, avoidance of pollution of all forms and payment of equitable wages and salaries. It is for this reason that the consultant has proposed a dispute resolution mechanism to ensure all issues are handled amicably.

4.14.5 Sustainable Development Goals (SDGs)

The SDGs include 17 Sustainable Development Goals and 169 targets. They seek to build on the Millennium Development Goals and complete what the MDGs did not achieve by 2015. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental. Women who are willing, able and available should be given priority in employment in this project. By the same while school going girls should be advised to give their education first priority to avoid indulgencies which could lead to early marriages, unplanned and unwanted pregnancies as well as issues of sexually transmitted infections including HIV-AIDS. This will remain a concerted effort for parents, communities, contractors and project workers

4.14.6 Convention on the Rights of the Child (CRC) 1989

The Convention acknowledges children as individuals with rights and responsibilities according to their age and development (rather than the property of their parents or as victims), as well as members of a family and community. Underlying the Convention are four main principles: non-discrimination, the best interests of the child, the right to life, survival and development and the right to participation.

By this convention, the project shall ensure non- employment of children (child labor), safety of children by adequate signage and adequate delineation of active work areas to deter children from accessing dangerous site or keep them at bay.

4.14.7 Convention on the Elimination of all forms of Discrimination against Women (CEDAW)

CEDAW places explicit obligations on states to protect women and girls from sexual exploitation and abuse. Universal Declaration of Human Rights (Article 7), the UN Charter (Articles 1, 13, 55, and 76) and

the International Covenant on Civil and Political Rights (Article 24) reaffirm the freedoms and rights of all children, including internally displaced children.

No women should be denied employment in the project by the simple reason that they are women. No women will be sexually assaulted to procure a job or get promotion. Cases of women sexual assault should be reported to the nearest police station or labor office for appropriate legal action.

4.14.8 World Bank Environmental and Social Safeguard Policies

The Operational Procedures (OPs) of the World Bank that are relevant to the proposed works are discussed in table 9. The consultants recommend that each of the triggered parameters under this project must be investigated and acted upon. The proposed works are under class B of the World Bank operational manual

Table 9: An analysis of WB safeguards vs. project activities'

OP	Title	Triggered?	Comments
4.01	Environmental Assessment	Yes	The purpose for which this ESIA was undertaken
4.04	Natural Habitats	No	All project activities are on inhabited lands
4.09	Pest management	No	Project not likely to cause infestation of pests
4.10	Indigenous peoples	No	The PAP's are not pastoralist populations
4.11	Physical cultural resources	Yes	Purpose for ESMP section of this ESIA
4.12	Involuntary settlement	No	No need for land acquisition
4.36	Forests	No	No project activity affects any forest/forests
4.37	Safety of dams	No	The project has no capacity to hurt dams
7.50	Projects on international waterways	No	All project activities are on dry land
7.60	Projects in disputed areas	No	No part of the project route is disputed

4.15 Project Environmental and Social Administration

4.15.1 Establishment of an Environmental, Health and Safety (EHS) Office

This ESIA report contains a well formulated and comprehensive Environmental and Social Management Plan (ESMP). In order to ensure the latter is fully implemented, the Contractor should establish an Environmental, Health and Safety (EHS) office that will continuously advise on EHS components of the project implementation. Elements in the Environmental and Social Management Plan are expected to be integrated in the project with appropriate consultations with county administration through the supervising environmental and social expert.

The EHS officer of the contractor will also be expected to have reasonable understanding of the implication of different design concepts of the project works and their implications to safety, health and the environment. This is helpful in the interpretation and implementation of the ESMP.

4.15.2 Environment Supervisor (Monitoring and evaluation)

The ministry will be expected to engage the services of a environmental supervisor to ensure effective implementation of the ESMP against recommended timeframes, targets and linkages. The environmental expert should be the liaison person between the contractor and the ministry on the implementation of environmental concerns as well as issues of social nature associated with the implementation of the project.

4.16 Institutional/regulatory Framework

Kenya has many institutions and departments which deal with environmental issues within its borders. Table 4-4 identifies the most relevant institutions to this project and describes their role in the diverse project aspects under which each is mandated. However, the project contractor and the proponents' environmentalist shoulder the most responsibility since they will be on the ground daily to ensure harmony, acceptability and sustainable implementation of the project. A list of relevant institutions and offices is presented in table 4-4 below.

Table 10 : Description of key institutions relevant to the proposed project

Institution	Relevance to the project
Ministry of Roads, Public Works, Transport, Housing and Energy; Kajiado county government	✓ Project proponent ✓ Overall supervisor of ESMP implementation ✓ Define, communicate and ensure enforcement of axle load limit ✓ Implementing rural road policies inter alia
The National Environmental Management Authority, NEMA	✓ Receives and reviews project ESIA ✓ Issues permit to progress with work ✓ Receives annual Environmental audits about the projects ✓ Advisory role on project activities vs. environment
Public Complaints Committee	✓ Investigation of any allegations about environmental mismanagement
The National Land Commission	✓ Controls registration of interest and rights to land ✓ Ensures management of public land ✓ Ensures proper management of land under any state agencies ✓ Regulates county land management boards
Water Resource Authority	✓ Regulation of access to and use of project water
The County Government of Kajiado	✓ For the purposes of project support and political goodwill
The Kenya National Highway Authority	Manages the road earmarked for NMTF and on side parking lots

Eng. Mawuti (2019)

CHAPTER 5: STAKEHOLDER AND PUBLIC PARTICIPATION

5.1 Introduction

This chapter describes the process of public consultation and participation that was employed in order to identify the key issues and impacts of the proposed project. The chapter also demonstrates compliance with EMCA (cap 387). In principle, stakeholder engagement should be an ongoing process in a structured and culturally appropriate manner with affected communities and, where relevant, other Stakeholders. Views from the local residents, local leaders, surrounding institutions and development partners for the proposed road improvement who in one way or another would be affected or have interest in the proposed project were sought through interviews and public meetings as stipulated in the Environment Management and Coordination Act, cap 387.

5.2 Consultation and Public Participation

The general objectives of the consultation and public participation were:

- ✓ Disseminate and inform the stakeholders about the project with special reference to its key components and location.
- ✓ Create awareness among the public on the need for the ESIA for the proposed project.
- ✓ Gather comments, suggestions and concerns of the interested and affected parties.
- ✓ Incorporate the information collected in the ESIA study

In addition, the process enabled the establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government; and the concerns of the stakeholders to be known to the decision making bodies at an early phase of project development.

5.2.1 The benefits of participating in public consultations

The benefits Community/individual participation in project public participation meetings are wide and varied. They include:

- ✓ To ensure a healthy local environment [water sources, aesthetic values, etc]
- ✓ Improved human health and lifestyles
- ✓ Reduction of resource use conflict
- ✓ Increased community skills
- ✓ Project harmony and acceptability

5.2.1.1 Consultation Process

The general objectives of the consultation and public participation were

- ✓ Disseminate and inform the stakeholders about the project with special reference to its key components and location.
- ✓ Create awareness among the public on the need for the ESIA for the proposed project.
- ✓ Gather comments, suggestions and concerns of the interested and affected parties.
- ✓ Incorporate the information collected in the ESIA study

Table 11: Responsibility sharing in conducting Public participation meetings

Co-Convener	Responsibilities
Area ward administration (Co –convener no 1)	✓ Mobilization of PAPs ✓ Call the meeting to order ✓ Coordinate introductions for community members ✓ Provide the general agenda for the meeting ✓ Maintain order, focus and relevance through the meeting ✓ Conclude the meeting and give vote of thanks ✓ Approve minutes of the baraza
Co-Convenor No. 2 (The county officers)	✓ Provide information about the size of the road ✓ Provide technical information about road building in relation to the proposed works ✓ Respond to technical issues, concerns, fears and questions raised by the community to the team
Co-convenor no. 3 (the consultants)	✓ Provide detailed description of the agenda of the meeting ✓ Provide free, accurate, relevant socio-environmental information to the community about project related activities ✓ Respond to socio-environmental issues, concerns and fears raised by the community ✓ Document all concerns raised by attendants and responses provided by the conveners ✓ Coordinate registration of attendees and write minutes of the meeting ✓ Write minutes of the baraza

Eng.Mavuti (2019)

5.2.1.2 Venue of the Public participation meetings

The public participation exercise was organized by the respective Area Ward Administrators who did an excellent mobilization work. The meetings were held on the following schedule

Table 12 : Schedule of Barazas'

S/No	Municipality	Date	Venue	Time
1.	Kajiado	10-07-2019	Kajiado, Public park	9:00 am- 12:30 hrs
2.	Ngong	10-07-2019	Ongata Rongai, parking zone	14:00 -17:00hrs
3.	Ngong	11-07-2019	Kiserian, Kiserian Primary School	9: 00 am-12: 30 hrs
4.	Ngong	11-07-2019	Ngong, site	14:00-17:00 hrs

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5.2.2 Stakeholder consultations

The views from the general public/local communities, local leaders, relevant institutions who in one way or the other would be affected by the proposed project were sought as stipulated in the Environment Management and Coordination Act, (cap 387) and the NEMA EIA/EA regulations of 2003. The consultations and participation was facilitated via public meetings, in-depth household interviews and round table discussions with the following key stakeholders, each at their own level..

- ✓ National Environment Management Authority (NEMA)
- ✓ Public administration officer from affected location and WARD
- ✓ Community members
- ✓ Potentially affected households and businesses along the roads

5.2.3 Benefits of the proposed KUSP projects in the targeted municipalities

5.2.3.1 Creation of Employment Opportunities

The respondents who were consulted were optimistic that the project will create numerous employment opportunities for both skilled and unskilled labor alike during the construction and operational phases. Despite the fact that most of the project will need skilled labor force during operation, people expressed hope that they will be able to access employment once the project commences mostly as casual workers. The respondents were also optimistic that they will take up relevant training to take up jobs during operation stage. Job opportunities will arise at the toll stations which will be established, as well as vehicle maintenance garages. These will be sources of income for several individuals and households and hence is expected to boost the GDP and improve the living standards of Kenyans.

5.2.3.2 Increased Business Opportunities

The respondents were optimistic that there will be an increase in business opportunities during the construction and operation of the works. Small scale business people such as food vendors and kiosk owners will benefit greatly during construction. Once the construction of the roads is complete, dust (and mud) pollution will have been addressed in urban areas fully. The final product will ensure transportation of materials and stocks to shops within the project areas easily. Ability to park easily will ensure more vehicles are parked as the owners purchase goods and services in a cleaner and coordinated environment.

5.2.3.3 Transfer of Skills

The members of the public suggested that with the road being a source of employment. Many different skilled workers will be employed from within and without the area. This will lead to a transfer of skills and gaining of experience during the construction period.

5.2.3.4 Social Inclusiveness

The community will feel "included "in the development programs of Kenya rather than the feeling of "exclusion "which many hold.

5.2.3.5 Improved surface

The proposed improvement of the roads will ensure a firm road surface which is both dust and mud free. It will also have a road side drainage system to collect and direct storm water to natural drainage system for onward transmission downstream.

5.3 Future consultations

The consultant established reliable channels with the administrators and other key stakeholders in the field for future consultations.

5.4 ESIA Report writing and submission

The issues and concerns raised by the stakeholders were captured in this ESIA report which is the final output after the preliminary and draft final phases of the ESIA methodology applied in this project. This is the product required by the Terms of References of this assignment. It will be presented to NEMA to seek authorization, approval and permit to progress with the proposed improvement of the identified project roads

CHAPTER 6: PREDICTED ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 Introduction

This chapter brings out the potential positive and negative environmental and socio-economic impacts that would arise out of implementation of the road project. In general, the potential environmental and social impacts that may arise during the construction phase of the project may include:

6.2 Positive Impacts

6.2.1 Enhanced Conservation

The proponent will ensure spectacular landscaping which will uplift the general aesthetic outlook of the affected routes. The proponent should also support re-vegetation and town beautification and greening of in the area as part of proposed CSR program so as to provide adequate supply of wood and timber for local uses through working with relevant stakeholders.

6.2.2 Economic and Social Development

Overall, the roads will be part of the economic pillar for realization of the Kenya's Vision 2030 by enhancing efficient transportation and movement of people and goods.

6.2.3 Growth of markets

Growth of businesses and affected urban areas will be witnessed at the improved road routes, NMTF, storm water management and parking leading to growth of the local economy. All the businesses which are perennially swept away by storm waters every year will be able to grow and expand.

6.2.4 Reduced cost of transportation of goods and persons.

This will lead to saving and investment of the surplus cash which could have otherwise be paid for maintenance of SME transporters such as probox, light trucks and boda bodas which utilize the roads regularly.

6.2.5 Sale of land to exploit building materials

Material site owners will benefit from the sale of construction materials.

6.2.6 Employment opportunities-

The project will provide temporary employment for many of the local people such as casual laborers during construction works and allow for the trade of food and basic supplies to workers.

6.2.7 Revitalization of the agricultural production in rural areas-

The upgrade to bitumen standards will motivate people to work from the neighboring shops because of less air pollution by dusts and increased flow of customers. This will in turn enhance income generation through trade.

6.3 Negative Impacts

This section outlines the key predictable negative socio-environmental impacts that could be associated with the projects.

6.3.1 Vegetation Loss Impact

Construction works will require all the vegetation to be removed from the site (especially to pave way for NMTF and Storm water channel) to pave way for the construction of the road, walkways and other facilities.

6.3.2 Solid Waste

During the construction phase, three types of solid wastes will be generated: Debris from demolitions, spoils and domestic refuse. During operations the waste will be mainly paper and plastic. Apart from visual impacts, debris can affect water quality.

6.3.3 Generation of Dust

Air pollution result from construction activities such as excavation, earthmoving and land filling, stone cutting and concrete processing as well as the loading and unloading of construction material and waste. Impacts include increased dust and airborne particulate matter caused by grading, filling, removals and other construction activities. This may affect peoples' health, hygiene and aesthetics values.

6.3.4 Noise and vibrations

The magnitude of the nuisance caused by the increased noise levels produced during this phase will depend on the duration of the construction phase, the time of day when activities are undertaken, the attitude of the contractor and the receivers to the noise.

6.3.5 Disruption and Loss of Businesses

The squatters who have established businesses in the road reserve especially in the market places were concerned that they will be evicted from the road reserve in order to pave way for the construction works. Some business people who depend on squatters operating businesses on the road reserves expressed concern that there would be low turnover for their sales. However, it was noted that only a few of the

establishments will be affected and adequate notice will be given to allow them to move out without loss to assets.

6.3.6 Increase in the spread of STD, HIV and AIDS

The residents along the proposed roads corridor expressed concern that there may be an increase in incidences of sexually transmitted diseases including HIV and AIDS especially during construction of the road as a result of increased number of active men with money and prostitution. The project proponent will need to work jointly with the appropriate county and national government public health agencies in order to come up with a comprehensive STD, HIV and AIDs control programme during the construction and operational phases of the project.

6.3.7 Insecurity

There was concern that many individuals coming to the site as workers could pose a security risk to the neighborhoods. The administration vowed to never play with security of citizens and that anyone caught in the wrong side of the law will as it were "face the music"

6.3.8 Teenage delinquency, drug and substance abuse

The project road selected within Kiserian urban area (Ngong municipality) traverses a portion of land occupied by Kiserian Primary School and Kiserian Mixed Day Secondary School. Thus there is need to ensure limited to non-interaction of the project workers with the pupils and students. The contractor should develop and enforce such a policy. This policy will ensure that the project is not accused of the following social misdemeanors:

- Teenage pregnancies and marriages
- Drug and substance abuse among the learners
- Transmission of STI and HIV among leaners
- Child labor and child abuse

6.3.9 Demolition of assets

There are several PAPs who are affected because of their encroachment unto roads land. Evidence to this has been provided elsewhere in this report. Key activities that have been undertaken on road reserves on this road are (i) Constructions such as business premises (ii) Walls –circumference walls (iii) Crop farming

(iv) fence such as life fences around homes and farms and entry/exit points to places which begin within road reserve land (v) Kiosks.

CHAPTER 7: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN [ESMP]

7.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESMP) that will need to be implemented by the proponent/contractor to prevent or reduce significant negative impacts to acceptable levels. All the project components support infrastructure are all considered when this ESMP was developed. The Environmental and Social Impact Assessment plan covers construction, commissioning and decommissioning stages of this project.

Table 13: Environmental and Social Management Plan -ESMP

IMPACT	NATURE	PHASE	RESPONSIBILITY	PROPOSED MITIGATION [ENHANCEMENT]
Slope failures and rolling rocks	-Negative -Direct -Irreversible - Local	Construction Decommissioning	Contractor Proponent	• Adopt gentle angle earth cuts • Create Soil holding structures in areas with loose soils. • Line culvert outfall
Visual intrusion (landscape disfigurement)	-Reversible -Limited -Direct	Construction Commissioning	Contractor Proponent	• Re-vegetate cleared sites • Restoration of BPSs • Back-fill excavations fully • Dispose solid wastes at designated sites only • Do not keep molds of material on roads or market
Soil and Water pollution by hazardous materials and petroleum products	-Unlimited -Direct -Indirect -irreversible	Construction Commissioning Decommissioning	Contractor	• Proper service of equipment • Designate and design store for hazardous and petro-chemical products • Service machines on a non-permeable surface with receptor
Increased water demand for road construction	-Short term -Direct -Unlimited	Construction Decommissioning	Contractor	• Design entry points to water source to control erosion • Water access routes should be made to murram standards so
Quarries and borrow pits sites	-Direct -Limited -Reversible	Construction	Contractor	• Acquire borrow pit site legally • Compensate land owners adequately and promptly • Condone borrow pits and restrict accessibility to project workers only • Rehabilitate pits after exhaustion

				• Each borrow pit site should have a NEMA permit issued
Risk of unabated spread of HIV & AIDS, teenage delinquencies , drug and substance use and unwanted pregnancies	-Negative -Irreversible sometimes reversible	Construction Commissioning Decommissioning	Contractor	• Create community awareness on prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community Barazas. • Mobile signage to encourage preventive/responsible behavior. • Organize regular free voluntary HIV & AIDS testing and counseling • Promote abstinence but also provide protection measures to workers • Provide workers with leave to visit spouses • Limited/controlled to non-interaction between minors and project workers • No minor should be engaged in project work as worker
Ambient air pollution Particularly dust and emissions	-Negative -Unlimited -Irreversible	Construction Commissioning Decommissioning	Contractor	• Regular sprinkling with water. • Communicate speed limits which do not generate unnecessary dust • Properly maintain equipment to standards
Biodiversity loss (flora and fauna)	-Negative -Limited -Reversible	Construction Decommissioning	Contractor	• Limit site clearance to road reserve only. • Protect immature indigenous trees • Project should not introduce any species without express authorization from NEMA. Invasive species should not be introduced. • Materials that can be consumed by animals should not be left unguarded and dump site should not expose animals to danger of eating poisonous project related substances in any form.
Incidence of accidents at the work place	-Negative -Direct -Sometimes irreversible	Construction Decommissioning	Contractor	• Provide Personal Protective gear. • Enforce use of PPE by policy • Install appropriate road marks • Install firefighting equipment on site camp and on each equipment

				• Train fire marshals among workers • Avail first aid kit materials at the workplace. • Recruit and train first aid crew among workers • Contractor should undertake risk assessment • Register project as a work place with DOSHS
Increased noise levels and Generation of vibrations	-Negative -Limited -Sometimes irreversible	Construction Commissioning Decommissioning	Contractor	• Use of machines which generate acceptable noise level • Ensure proper usage and maintenance of equipment • Limit construction works to the hours of day light. • Operators should use protective personal equipment (PPE).
Generation of solid waste.	-Negative -Sometimes unlimited	Construction Commissioning Decommissioning	Contractor	• Separate solid waste at source • Collect and store SW until disposal in designated point • Re-use reusable waste materials • No use of polythene carrier bags
Disaster incidences	-Negative -Limited -Sometimes not reversible	Construction	Contractor	• Install fire fighters in camp, vehicle • Train users on site
Disaster preparedness	Negative	Operation	Proponent	• Condone-off active work areas • Condone off BPSs
Slow flow of traffic	-Negative. -Limited -Reversible	Construction	Contractor	Create, announce and maintain diversions in working order
Disruption of traffic within and around on going works	-Negative -Limited -Reversible	Construction	Contractor	Provide for traffic smooth passing within and around ongoing works
Blocked access to entry-exit points to places	-Negative -Limited -Reversible	Construction decommissioning	Contractor	Provide clear, adequate and visible signage • Create alternative entry-exit points to affected places • Reinstate disrupted entry-exit points to original state
Increased rate of road accidents during and after works	-Negative	Construction Operation	Contractor	Provide and erect road safety signs throughout project cycle [warning, mandatory, informatory signs etc]

Table 14: Environmental And Social Management And Monitoring Plan (EaSMMP)

Ref	Affected environmental aspect	Predictable impact	Objective for addressing impact	Mitigation/ enhancement Measures	Responsibility	Frequency	Monitoring Activity	Indicator
PHASE 1: CONSTRUCTION								
C1	Air Quality	Dust nuisance and air pollution by dust	To minimize dust nuisance and air pollution by dust	-Sprinkle project dust-generating surfaces with water regularly to arrest dust	Contractor	Continuous	Routine inspection of worksites	Minimal release of dust to air
C2	Air Quality	Emissions nuisance and air pollution by emissions	To minimize exhaust emission and air pollution by emissions	Use well serviced and maintained equipment	Contractor	Continuous	Routine inspection of equipment	Acceptable missions releases
C3	Land quality	Landscape disfiguration	To minimize landscape degradation	Back fill BPS Revegitate cleared sites	Contractor	After completion	Routine supervision	Restored BPS
C4	Land quality	Landscape degradation	To minimize landscape degradation by earthworks	Restrict excavations, earthworks etc to specified route/depth only	Contractor	As per design	Routine supervision	Back filled excavation sites Backfilled excavation sites
C5	Land quality	Loss of Aesthetic value of land due to accumulation of solid waste on site	To reduce solid waste at the site	-Back-fill using excavation debris -Re-use some form of waste -Dispose solid waste appropriately	Contractor	Regular	Routine supervision	Re-vegetated road sites, restored BPS, No strewn solid waste
C6	Land quality	Degradation of material source areas	To minimise degradation of land in material source areas	Water, sand, stones and aggregates shall be sourced from NEMA approved sites	contractor	As per the works programme	Routine supervision	Restored BPS
C7	Vegetation	Reduction of vegetation cover on cleared sites	To minimise loss of vegetation after completion of works	-Keep clearance within alignments only -Re-vegetation of sites	Contractor	After completion	Routine supervision	Restored vegetation
C8	River bank-river beds especially the R. Ngong along the K-O-C-B50 road	Weakened river bank/beds	To minimise erosion on river banks and beds	Install erosion control gabions to strengthen walls and beds	Contractor	After installation	Supervision	Stabilised riverbanks with gabions

C9	Surface Water	Soil erosion due to surface increased run-off from road surface	To avoid erosion by surface run-off	Install appropriate road drainage system emptying to natural rivers/streams	Contractor	As per the Design	Routine supervision/inspection	Working road drainage
C10	Water resource	Overuse, abuse and misuse of water resource	To prevent misuse, over use or abuse of water	-Abstract required quantities only -Metered access to water ,	Contractor	Continuous	Routine supervision/meter reading	No wastage of water
C11	Water	Water pollution	To Ensure delivered water for use is fit for human consumption	Regular testing of water for quality	Contractor	Continuous	Microbial chemical Ph TDS tests	Laboratory result-records of water tests
C12	Public Health and safety	Incidents of accidents to visiting members of the public	To prevent accident or injury to members of the public / visitors	-Regulate site visitors -Provide and ensure use of full PPE by site visitors -Provide mobile toiletry	Contractor	Continuous	Visitors registration log Accident log	No accidents
C13	Water and sanitation	Incidence of water related epidemics	To ensure provision of adequate water and sanitation	-Provide mobile toiletry facilities on site -Empty toilet as prescribed	Contractor	Continuous	Regular inspection	Working mobile toilets
C14	Health and safety at the camp and "active" sites	Incidents of accidents within the camp and "active " sites	To ensure Health and Safety on the construction site	-All workers to be in full PPE. -Train workers on first aid administration -Provide on-site first aid kit	Contractor	Continuous	Joint site inspection by relevant authorities	Workers on FPPE
C15	Health and safety along the work areas	Accidents due to disrupted traffic flow	To avoid / minimize accidents and ease traffic flow	-Set speed limits -Guide road users to diversions -Condone "active "areas	Contractor	Continuous	Routine supervision	Minimal accidents due to project activities
C16	Project Neighborhood	Loss of business due to blocked entry-exit points	To Minimize interruption to business and access to household	-Provide alternate entry-exit route when excavating existing in-out route -Reinstate excavated pavements and entry-exit routes to business	contractor	As required	Supervision	Minimal time blocking business
C17	Neighborhood security	Loss of security due to influx of "strangers"	To minimize incidences of unwanted persons in neighbourhoods	-Daily register of workers. -Limited Workers personal movements within work area only	Contractor	Daily	Registration	Minimal cases of reported insecurity

C18	Project-host community	Benefit sharing	To enhance project acceptability	-Give host-community priority in employment especially non specialized jobs	Contractor	Regular	Work with local administration	Grant locals room for jobs
C19	Fauna	Wildlife hunting and game meat	Zero-tolerance to game hunting and game meat	Discourage any form of wildlife hunting and game meat consumption by workers	Contractor	Continuous	Policy against hunting and game meat consumption	No reported cases of workers hunting game
D	Disaster preparedness	Fire, terrorism/insecurity disasters	To be prepared for any incidences of disaster and to safe as much property /lives as possible	-Install FFE in visible areas, train fire marshals among workers, vet camp visitors, set aside fire assembly point,	Contractor	Continuous	Physical availability of all mitigation measures.	Available FE, trained FFs, visitor logs
	HIV AIDS	Spread of HIV/AIDS	To ensure minimal new infections	-Provide protection -Provide information Allow leave	Contractor	Continuous	Protective aids	Minimal HIV-AIDS transmission
PHASE 2: OPERATIONAL								
O1	Safety and health	Increased accidents on paved road	To Ensure compliance with speed limit regulations	-Communicate speed limit controls by clear, visible speed signs	Contractor	Continuous	Routine maintenance	Bumps, speed limit signs
02	Maintenance cost	Traffic outside prescribed axle load limits	To ensure only vehicles within prescribed axle limit use road	-Communicate allowable axle limits in clear visible signs -Regular supervision	Contractor	Continuous	Routine maintenance	Observed axle limits
03	Water	Road surface run-off	To ensure that road surface run-of does not cause erosion on receiving site	-Ensure drainage is maintained well	Proponent	Regular especially during rain seasons.	Routine observation	Well lined outpours
PHASE 3: DECOMMISSIONING								
D1	Land quality	Below surface materials	To ensure all below road surface materials are removed	Remove all underground materials from the site	Contractor	At once	Site inspection	Removed BS materials
D2	Land quality	Aesthetic value of land	To clear site from all debris and excavations	Remove debris from site Backfill any excavations	Contractor	At once	Site inspection	No strewn debris on site
D3	Vegetation	Destruction of vegetation	To restore flora	Remove equipment from site Landscape site Plant trees /grass after works	Contractor	At once	Site inspection	Revegetate site

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

The proposed KUSP projects in Kajiado and Ngong municipalities are acceptable to the host communities. However for the sake of long term harmony, acceptability and sustainable implementation the consultant makes the following recommendations:

8.2 Recommendations

1. The proposed alterations to the road side drainage system should be adopted so that storm water is not directed to private farmlands, homes or institutions
2. The proposed speed control bumps especially in the heavily populated area of the Kobil/kenol-Ololua rd-Cathedral-ujunB50 Rd in Ngong urban area should be incorporated in the design of the road
3. Design and contract should provide for road marks, signs, bus bays and speed bumps (Reflective materials should be used to mark the road because darkness is a major environmental challenge in the project area especially in Kiserian and could hinder visibility of some signages)
4. All stakeholders should be involved throughout the project lifecycle. The proposed dispute resolution mechanism should be instituted as proposed
5. The contractor should have an office of Project Environmentalist/sociologist who will monitor the implementation of the ESMP at the contractor level
6. Borrow Pit Sites (BPS) within Kajiado county: (i) Each contractor' Borrow Pit Site should have an Environmental Impact Assessment undertaken by a lead expert, submitted to NEMA office in Kajiado and a permit issued before extraction of material commences (ii) Each Borrow Pit Site should have a Restoration Plan undertaken by a lead expert, submitted to NEMA office in Kajiado for approval for implementation after exhaustion (iii) Each Borrow Pit should be condoned–off (to reduce incidents and accidents) and access restricted to authorized persons only.(iv) In cases where contractors use BPSs operated by other persons, the BPS should have NEMA license and a copy should be presented to the contractor as evidence of compliance
7. Solid Waste Management strategy: Significant quantities of solid waste will be generated from the proposed development. An integrated solid waste management system is recommended. The contractor should develop a Solid Waste Management Policy [SWMP] with the following key strategies:
   (i) Waste reduction at source

(ii) Re-use of all re-usable materials after their initial use before final disposal. Cement bags have been donated in the past to community to erect shelter for some purpose.

(iii) Recycling of recyclable materials can be achieved by partnership with collectors who sell these to recyclers hence earn income and enhance the ideals of a clean and health environment. This will require the policy to have a waste separation clause which will enable provision of different collection points for recyclable from non-recyclable solid waste materials

(iv) Disposal :All non-recyclable waste should be disposed appropriately within the provided infrastructure and designated places

(v) Solid waste materials should not be burned on site

(vi) The use of polythene carrier bags by any project staff should be firmly discouraged as these stand condemned in Kenya and their usage is an offense punishable by law

(8) Upon completion, traffic using the parking lots and the roads should be routinely monitored to ensure compliance with axle load limitations to avoid damage to the improved road surface before expected lifespan and costly maintenance

(9) Upon completion, the projects will be subject to an Annual Environmental Audit which should be submitted to NEMA for annual reviews and subsequent authorizations.

PHOTOGRAPHIC EVIDENCE OF PUBLIC PARTICIPATION EXERCISE

FORM 7

nema

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/9912

Application Reference No: NEMA/EIA/13/13563

M/S **Christine Majale**
(individual or firm) of address

P.O. Box 4788-00506, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) Lead Expert

registration number 0345

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: 7/28/2019

Expiry Date: 12/31/2019

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

MINUTES OF PUBLIC PARTICIPATION MEETINGS HELD ON 10TH AND 11TH JULY IN THE MATTER OF PROPOSED KUSP PROJECTS IN KAJIADO AND NGONG MUNICIPALITIES OF KAJIADO COUNTY

MINUTES

Date: **10th and 11th July 2019**

Time: **Diverse**

Venue: Kajiado central, Ongata Rongai , Kiserian primary school And Ngong project road

Participants (see list attached)

Agenda

1. Disclosure of proposed project
2. Project description
3. Project requirements
4. Impact prediction
5. Mitigation
6. Question-Answer experience
7. Conclusion
8. A. O. B

PARTCIPANTS (List Attached)

1. Proponent
2. The consultant
3. The PAPs
4. Area administration

AGENDA

MIN 001: PRAYER: The meeting began with a word of prayer.

MIN 002: INTRODUCTION (a): The area Ward administrator coordinated the introduction of the PAPs by name and relationship with the proposed project road

MIN 002: INTRODUCTION (b): The Ward administrator introduced the main agenda of the meeting as to listen to consultant engaged by the county people to ensure sustainable implementation of the proposed road upgrading works.

MIN 002: INTRODUCTION (c): Area Ward administrator handed over the meeting to the Consultant for self-introduction and explanation of main agenda

MIN 003: DISCLOSURE and project description (the Consultant): The Government of Kajiado County has secured funding from the World Bank and has proposed to use part of the money to upgrade the following roads within Kajiado County from earth to bitumen standards:

(1). Road 2: Kenol/Kobil-Wama dispensary-Mechanic parking lane

(2).Total Junction-Catholic Church-KCB Junction Road (Kajiado Municipality)

(3). Kobil-Ololua -Cathedral-Junction B50 Road

(4). Junction B50-Kiserian Primary School-Magadi Rd Junction Road

The proposed upgrading includes both sides-roadside storm water drainage channels, Both-side pedestrian walkways (NMTFs) and parking lots in sections with space

The main objective of the works is to prepare the municipalities for urbanization while the specific objectives include (i) enhancement of the quality of life of the user-community in terms of time taken to reach utilities, management of dust and mud, road-side storm water management and connectivity and accessibility. The project will not "eat" into any persons' private land but the neighboring community will be affected in other ways. The end product of the meeting is to produce an Environmental and Social Impact Assessment report which will enable the project and proponent to comply with the existing legal framework especially the Environmental Management and Coordination Act, Cap 387.

The project activities include but may not be limited to: excavation, transportation of materials, disposal of debris and spoil, curing of materials

MIN 004: PROJECT REQUIREMENTS: (i).The project will require support of the community because the need to enhance accessibility and connectivity within the municipalities is critical for all. In addition, this will ensure value of land increases to the benefit of land owners who may want to dispose of their land assets in future.

(ii) The surveyors will need to access the land to determine the corridor, establish beacons and determine key sub-sites which require different designs such as for culverts, bridges, bumps etc

(iii) The community should allow the surveyors (although they may be new to the area) and support them where need arises.

(iv).The participants should rise their opinions without fear of any form of repercussions because there will be none.

MIN 005: PROJECT AREA (PROPOSED ROUTES) (i). The route does not traverse a national park, game reserve or any form of conservancy

(ii).The proposed route do not affect any land which is held by any person under private land tenure law

(iii).The proposed route does not play host to any land which plays host to any endemic plant or animal species

(iv).The route will follow an already existing, well mapped road and there will be no land acquisition

(v) Any PAPs who are PAPs because of them encroaching the road site will be granted adequate time to move their structures out of work route

MIN 006: IMPACT PREDICTION: The proposed project is expected to produce the following impacts among many others (table 1):

Positive Impacts	Negative Impacts
1. Enhanced connectivity 2. Enhanced accessibility 3. Creation of jobs and income generation 4. Skill transfer 5. Increase in land values 6. Reduction of road-generated dust pollution\ 7. Well managed storm waters	1. Insecurity in the area during construction because of infiltration of the area by persons who may be assumed to work for the project and yet are criminals 2. Insecurity increases after upgrading due to increased mobility of persons who may steal and move from the area fast on cars, motorcycles or on matatus 3. Workers sanitation? 4. Sexual exploitation and harassment of women and girls by "monied" male workers 5. Drainage of road side storm water may be directed to farms, homes or private compounds 6. Increase in cases of HIV-AIDS in the villages

	7. Increased accidents especially for children 8. Increased vehicular speed may lead to accidents speed

MIN007: PROPOSED MITIGATION: The following measures can be activated to ensure the predicted negative impacts are reduced, avoided and or minimized:

1. The project workers must not use the open defecation as a strategy for their sanitation. The contractor must provide mobile toilets for both male and female workers
2. There should be established a dispute resolution consisting of the contractor (or his representative), the workers representatives, the PAPs representative (community representative) and Sub location administration. The area assistant chief and the ward administrator should be part of this committee
3. The design should take into account areas of mass-road use especially cross points to churches, or schools. There should be speed bumps and clear signs indicating maximum speed installed in those places (such as the Ngong town road)
4. The recommended speed limit for estates should be enforced along the improved road

5. The community will start teaching and training the children on road safety as early as now.
6. Road signs: they should be installed in all critical places of the road. They should be reflective because in Kiserian and Ngong darkness comes early and sometimes because of fog it can be too very dark.
7. The designers should ensure the road side drainage systems and the culverts do not direct water to private property. The road side storm waters should be poured into natural drainage systems which area available near all routes proposed for improvement
8. The PAPs (community) will increase efforts to train the young ones against HIV-AIDS
9. The contractor should allow workers regular and well- coordinated leave /off days for them to go home and be with their spouses and not "misbehave" with village girls and women

MIN 009: QUESTION ANSWER: Table (2) provides a list of all questions which were asked during this PAP Public Participation Meeting in relation to the proposed upgrading of the road.

Qn.	Question	Translation	Response	Responder
1	We have heard and understood you But our question here in Kajiado central is one: Why don't you extend the project to cover other roads within the urban area?		The county government is working phase by phase to upgrade the municipality headquarters. This is determined by need and availability of funds. Secondly we must use what we have and start somewhere. Allow the planners to start with the proposed roads and wait for continuous progress from road to road. We must start somewhere	The Proponent/ The ESIA expert
2	The road in Ngong town passes through areas of mass use: Churches, schools and a slum area. We foresee accidents with improved road surface	-	The surveyors have identified such areas. And your input in this assessment is critical in affecting the design so that the project does not become source of grieve to families. Adequate bumps, signs and speed control will be anchored in the design	The Proponent/ESIA expert
3.	What I have seen in many places when works are happening is importation of workers. We want to ask: Will our young men be recruited as a priority before you guys bring people from other parts of Kenya?	-	-Everywhere we recommend that the locals are considered as a matter of priority in the jobs available. But the criterion is always (i) availability (ii) willingness (iii) ability Those who do not get direct jobs can take advantage of project and supply foods and meals to the workers. They need to get medical certificates before that.	The ESIA expert

4.	In Kiserian, several people have encroached on the proposed road land . We are aware of that and we have organized ourselves and signed a document to show that we are willing to give way		That is very good what you have done. We encourage you to keep that spirit up	The Proponent/ESIA expert
5.	The Kiserian road passes next to two schools. We are afraid of interactions between workers and pupils and students.	-	The interaction can be a source of drug use or traffic. It can also lead to unwanted pregnancies and HIV aids transmission . The contractor will develop a policy of NON-INTERACTION between workers and students and pupils regardless of relationship at home. Any worker caught in such interaction, however minimal it may be must be subjected to disciplinary action or even immediate dismissal	The ESIA expert
7.	Excavation leaves a lot of debris on land like here in Kiserian or even in the towns.. What plans do you have about collection of debris?	-	All exaction debris will be utilized for backfilling where necessary. The rest will be ferried to designated sites for such disposal	The proponent