Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED REHABILITATION OF ROADS WITHIN LIMURU CBD-OLD NAKURU ROAD-2.4KM IN KIAMBU COUNTY IN THE NAIROBI METROPOLITAN REGION

June 30, 2017
Certificate of Declaration and Document Authentication
This document has been prepared in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003 of the Kenya Gazette Supplement No.56 of 13th June 2003, Legal Notice No. 101.
This report is prepared for and on behalf of:

The Proponent
The Senior Principal Superintending Engineer (Transport), Ministry of Transport, Infrastructure, Housing and Urban Development, State Department of Housing and Urban Development,
P.O. Box 30130-00100,
Nairobi - Kenya.

Title
Name
Signature
Date

Lead Expert

Eng. Stephen Mwaura is a registered Lead Expert on Environmental Impact Assessment/Audit (EIA/EA) by the National Environment Management Authority–NEMA (Reg. No.7284), confirms that the contents of this report are a true representation of the Environmental & Social Impact Assessment of the proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in Nairobi Metropolitan Region. This report is issued without prejudice.

Lead Expert – Eng. Stephen Mwaura
Signature:

________________________

Date:

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Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

ACRONYMS

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>DOHSS</td>
<td>Directorate of Occupational Health &amp; Safety Services</td>
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<td>DONMED</td>
<td>Directorate of Nairobi Metropolitan Development</td>
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<td>EA</td>
<td>Environmental Audit</td>
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<td>ESIA</td>
<td>Environmental &amp; Social Impact Assessment</td>
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<td>EHS</td>
<td>Environment, Occupational Health and Safety</td>
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<td>EMCA</td>
<td>Environmental Management &amp; Coordination Act, 1999</td>
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<td>ESMMP</td>
<td>Environmental and Social Management &amp; Monitoring Plan</td>
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<td>EMS</td>
<td>Environmental Management System</td>
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<td>ISO</td>
<td>International Standards Organizations</td>
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<td>MoTIH&amp;UD</td>
<td>Ministry of Transport, Infrastructure, Housing &amp; Urban Development</td>
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<td>NaMSIP</td>
<td>Nairobi Metropolitan Services Improvement Project</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
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<td>NMT</td>
<td>Non-Motorized Transport</td>
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<td>OHS</td>
<td>Occupational Health &amp; Safety</td>
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<td>OSHA</td>
<td>Occupational Safety &amp; Health Act</td>
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<td>PPC</td>
<td>Public Participation &amp; Consultation</td>
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<td>PSP</td>
<td>Private Sector Participation</td>
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EXECUTIVE SUMMARY

1. Introduction

This Environmental & Social Impact Assessment (ESIA) report was prepared as per the provisions of the Environmental Management and Coordination Act No. 8 of 2015, and the Environmental Impact Assessment Regulations 2003. It is also in line with the World Bank Safeguards Policies, OP4.01 (Environmental Assessment). These safeguard policies are a set of instruments to ensure that the Bank supported lending operations minimize any adverse impacts on local people, their livelihoods, culture and the environment and are a mandatory mechanism for evaluating Bank financed projects during design, implementation and completion, mainly through environmental and social impact assessments. This Project Report gives the findings of the Environmental and Social Impact Assessment Study undertaken as an integral part of the design and construction process. The project report highlights salient social, economic and environmental issues associated with the design, construction and operational aspects of the proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in Nairobi Metropolitan Region. This report is issued without prejudice.

2. Scope of the Project Report

This Environmental & Social Impact Assessment (ESIA) project report was prepared as per the provisions of the Environmental Management and Coordination Act No. 8, 2015 and more specifically to Environmental Impact Assessment Regulations 2003. It is also in line with the World Bank Safeguard Policies and specifically OP4.01 (Environmental Assessment). These Safeguard policies are a set of instruments to ensure that the Bank supported lending operations minimize any adverse impacts on local people, their livelihoods, culture and the environment and are a mandatory mechanism for evaluating Bank financed projects during design, implementation and completion, mainly through environmental and social impact assessments. The study process leading to this project report was further designed to address client expectations as stipulated in the Terms of Reference.

3. Objectives of the Project Report Study

The main objective of the Study was to identify environmental and social impacts associated with the proposed access road project and to recommend an appropriate environmental management strategy for the project. Thus, a core outcome of the Study is an Environmental and Social Management and Monitoring Plan (ESMMP) for the project.
4. Study Approach and Methodology

The systematic investigative and reporting methodology specified for conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted in this Study. Baseline data on project design was generated through discussion with the client and review of project documentation. Opinions formed were revalidated through field work entailing site investigations and interviews with potentially affected people and secondary stakeholders.

To identify, predict, analyze and evaluate potential impacts that may emanate from the project, diverse study methods and tools including use of checklists, matrices, expert opinions and observations were employed. An Environmental and Social Management and Monitoring Plan comprising of an impact mitigation plan and modalities for monitoring and evaluation were then developed to guide environmental management during all phases of project development. Once approved by the Ministry of Transport, Infrastructure, Housing and Urban Development and NEMA, the Project Report will be disclosed as required.

5. Policy, Legal and Regulatory Framework

This Project Report has been developed to ensure that the proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km is in conformity with national policy aspirations towards securing sustainable development. Specifically, this report has been developed to ensure compliance with requirements of the Environmental Management and Coordination Act (EMCA) 2015-Kenya’s supreme environmental law and the National Constitution. Section 58 of EMCA requires that all proposed development in Kenya to be subjected to an environmental and social impact assessment and to be conducted in line with the Second Schedule (of EMCA) and the Legal Notice 101 (Regulations for Environmental Assessment and Audit) of June 2003. The entire study process has been designed to conform to the regulatory framework stipulated by the National Environment Management Authority (NEMA)-the body that will review this report and make decisions on grant of an environmental license to the development.

6. Project Description

The total length of the works is approximately 2.45 km located in the Limuru area of Kiambu County. The road connects Limuru town to the Nairobi Nakuru Highway through Uplands. It will involve the construction of a road 7.0m carriageway to bituminous standards to include drainage and paved 2.0m walkways on the built up areas around the town.
7. Project Justification
The broad aim of the project is to enhance mobility, accessibility and transport to and from Limuru Town.

8. Scope and content of project
The works shall include but not limited to:

(a) Site clearance and earthworks as necessary
(b) Excavation to remove unsuitable materials
(c) Filling with approved materials as specified and directed.
(d) Hand packing with approved stone as specified and directed
(e) Base repairs as specified and directed
(f) Repairs to existing drainage structures as specified and directed
(g) Improvement/construction to the drainage facilities as directed
(h) Sectional improvement/construction of sections of roads as directed
(i) Repairs and/or improvement/construction to footpaths and shoulders as directed
(j) Laying of Asphaltic concrete layer(s) to a consolidated thickness directed
(k) Laying and/or replacement of kerbs and channel as specified and directed
(l) Grading and/or improvement/construction of unpaved roads as directed
(m) Construction of road junctions abutting to these roads
(n) Provision of public transport facilities
(o) Operations ancillary to the main works
(p) Maintenance of the works during the construction and maintenance periods specified
(q) Traffic Management through the works and from the works
(r) Relocation and/or protection of other services including but not limited to water pipes, sewer pipes, street-lighting, power and telephone
(s) Provision of service ducts
(t) Installation of Streetlights

The scope of works covering 2450m goes up the underpass below A104 and hence we will not reach the Nairobi - Nakuru (A104) Road. However it's important to realize that there's an elaborate existing junction at A104 providing both the acceleration and deceleration lanes as well as traffic islands to separate movement of vehicles turning right to and from A104. In view of the above, the improvement measures to improve on safety of road users would include but not limited to:

1. Installing the necessary and appropriate traffic signs,
2. Road marking with reflective paints

Any other works as instructed by the Engineer and/or as specified in this document
9. **Scope of environmental and social assessment**

This Environmental & Social Impact Assessment (ESIA) Report considers the following aspects and others that may prove of significance during the study.

1. Assess the project’s impacts on ecology. This will in essence cover:
   - i. Impacts due to loss of vegetation cover, if any
   - ii. Surface run-off water, containment and flood control.

2. Assess social implications of the development within the locality, region and nationally to include:
   - i. Economic implications of the development.
   - iii. Employment.
   - iv. Impact on livelihoods.
   - v. Public health implications.
   - vi. Demand and development of infrastructure and social amenities.

3. Assess the impacts of development on landscape and land use such as:
   - i. Determine the impact on change on civic shape, scenery, aesthetic modifications.
   - ii. Examine the compatibility of the development with the surrounding land uses and how it complements them.
   - iii. Examine the impacts of dumping of spoil from the road works.

4. Assess the impacts of the development on power demands, water demands, and access road congestion as well as possible impacts on surface run-off and ground water qualities and quantities, if any.

5. Impacts of safety during construction - this is mainly because of increased traffic during construction requiring better traffic management plan during construction for the safety of workers, safety of motorists and other road users during construction.

6. Develop an Environmental and Social Management and Monitoring Plan (ESMMP) that would mitigate the possible impacts on the environment.

10. **Consultation and Public Participation Process**

Public participation and consultative forums were held at the site that included business community in and along the Limuru CBD-old Nakuru Road-2.4Km operators mainly as the primary stakeholders and the county government as key secondary stakeholder. The aim of the consultative meetings was to obtain data related to the past and present operations of the project road that are significant to the future environmental status of the area, the management of the project both...
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during and after implementation. The stakeholders responded positively to the
development as long as mitigation measures especially dust abatement, waste
management and noise management were incorporated in the implementation
phase of the project. The record of the consultations is presented in this report in
the form of questionnaires, attendance sheets and minutes of meetings held that
had been administered to the stakeholders seeking their views on the project and
especially as regards environmental management during project implementation.

11. Findings from the Study

(i) Potential positive impacts anticipated:
The core observation of this study is that the proposed rehabilitation of Limuru
CBD-Old Nakuru Road-2.4Km project is aimed at enhancing mobility, accessibility
and transport to and from Limuru town and the broad transport sector along
Nairobi Nakuru Road. As such, the project in itself is already an activity in
mitigation of an existing concern and this is the prime justification of the proposed
investment. Other positive implications of the project will accrue from its potential
to create short-term business and employment opportunities to both professional
staff and workers during the design phase while, at construction phase, traders will
benefit from opportunities to supply construction material while locals will be
employed in works. Upon commissioning, the project will enhance mobility,
accessibility and transport to and from Limuru Town.
It will also shorten the time if a motorist wants to divert to Limuru from Nairobi
Nakuru without having to go the current long route around the township. Other
positive impacts include storm-water drainage improvement as the project
encompasses drainage works as well as improvement of footpath as non-
motorized transport facilities, mainly for pedestrians.

(ii) Potential adverse impacts:
Construction activities will introduce nuisances such as dust, noise, vibrations and
fumes which however can be effectively managed through shortening the
construction period. Social vices associated with influx of job seekers can disturb
the social order and even lay the ground for escalation of HIV/AIDS cases whose
impacts are likely to be prolonged in prevalence. The notable potential negative
environmental impacts that were identified include among others:

i. Air pollution due to noise, vibration and dust;
ii. Traffic inconvenience during construction;
iii. Material sourcing and supply for the construction and maintenance
    works; and
iv. Any effects from uncontrolled storm-water run-off

These have to be mitigated sufficiently for the project to progress. Mitigation measures include dust abatement, traffic management and material sourcing from licensed quarries and borrow pits. The mitigation measures to manage these impacts are as identified in the Environmental and Social Management and Monitoring Plan (ESMMP) in the report.

(iii) Residual and cumulative impacts:

These include operations and maintenance impacts – solid waste management, maintenance of lighting and drainage – and these will be managed by the county government after project completion and commissioning and during operations.

12. The ESMMP

An ESMMP has been developed whose pursuit can greatly improve the overall net effect of the project. This report observes that the bulk of adverse impacts will manifest at the construction stage in which case, the core effort in mitigation will be concentrated in the contract for construction. This report therefore requires that the ESMMP be integrated into the design report with appropriate allocation of funds in the Bills of Quantities. The contract for construction should bear clauses binding the contractor to implement impact mitigation as part of the civil works. The NaMSIP’s PCT will mount own internal monitoring to ascertain environmental and social sensitivity at all stages of project development. During project development, a grievance redress mechanism will also be in place to handle all complaints and there will be creation of awareness and sensitization on HIV-AIDS. The ESMMP budget is estimated at about Kshs. 3,090,000. Moreover, this project’s potential benefits and positive impacts far outweigh the negative impacts.

13. Total Cost of the Project

Total cost of the project is approximated to be Kshs. 121,516,874/16.

14. Recommendations and Conclusions of this Project Report

Our conclusion is that the project is important for economic development of Limuru Township in Kiambu County and has balanced environmental considerations and benefits. The ESIA team has given adequate measures to mitigate the negative impacts and a management plan proposed which the proponent should adhere to. In the view of this study, the project as currently proposed is environmentally sound. An ESMMP has been outlined to guide resolution of potential adverse impacts while enhancing the positive ones. Further, all negative impacts need to
be mitigated and it is recommended that this project is granted NEMA licensing and other clearances to pave way for implementation.
CHAPTER ONE: INTRODUCTION

1.1. Introduction and Project Objectives
This project involves rehabilitation of roads within Limuru CBD-Old Nakuru Road from being an earth road to bitumen standards to ease movement in the area of the road.

1.2. Study approach and methodology
The systematic investigative and reporting methodology specified for conduct of Project Report Studies (Legal Notice 101 of EMCA) was adopted in this Study. Baseline data on project design was generated through discussion with the client and review of project documentation. Opinions formed were revalidated through field work entailing site investigations and interviews with potentially affected people and secondary stakeholders.
To identify, predict, analyze and evaluate potential impacts that may emanate from the project, diverse study methods and tools including use of checklists, matrices, expert opinions and observations were employed. An Environmental and Social Management and Monitoring Plan comprising of an impact mitigation plan and modalities for monitoring and evaluation were then developed to guide environmental management during all phases of project development.
Once approved by the Ministry of Transport, Infrastructure, Housing and Urban Development, NEMA and the World Bank, the Project Report will be disclosed as required.
Consequently, this report provides the following;

- The location of the project including the physical environment that may be affected by the project’s activities.
- The activities that shall be undertaken during the project design, construction, operation and of the project
- The materials to be used, products and by-products including waste to be generated by the project and the methods of disposal.
- The potential environmental and social impacts of the project and mitigation measures to be taken during and after the implementation of the road construction project.
- An action plan for prevention and management of possible accidents during the project cycle
- A plan to ensure the health and safety of the workers and the neighboring communities
- The project cost – Kshs. 121,516,874/16.
Any other information that the proponent may be requested to provide by NEMA. This report also seeks to ensure that all the potential environmental and social impacts are identified and that workable mitigation measures are adopted. The report also seeks to ensure compliance with the provisions of the EMCA 2015, Environmental (Impact Assessment and Audit) Regulations 2003 as well as other regulations and World Bank OP 4.12.

Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) is mandatory for a project of this nature to ensure monitoring and mitigation of negative environmental and social impacts during the different phases of the project.

1.3. Project description

The project involves the rehabilitation of an existing 5.0m carriageway to 7.0m carriageway way. The works will involve the construction of a road 7.0m carriageway to bituminous standards to include drainage and paved 2.0m walkways on the built up areas around the town. This will include Site clearance and earthworks of 1.5m on either side, 150mm thick gravel sub base of 1.5m on either side, 300mm thick Hand packing with approved stone for the base, Construction of earth drains Construction to the drainage facilities i.e. open lined drain, access and cross culverts, Sectional base repairs, Regulation and patchwork, Laying of 35mm Ac wearing course and Construction of road junctions abutting to these roads. The scope of works covering 2450m goes up the underpass below A104 and hence we will not reach the Nairobi - Nakuru (A104) Road. However it's important to realize that there's an elaborate existing junction at A104 providing both the acceleration and deceleration lanes as well as traffic islands to separate movement of vehicles turning right to and from A104. In view of the above, the improvement measures to improve on safety of road users would include but not limited to:-

1. Installing the necessary and appropriate traffic signs,
2. Road marking with reflective paints

1.4 Project Justification

The broad aim of this sub-project is to enhance mobility, accessibility and transport to and from Limuru Township. The sub-project is also aimed at providing and improving access to Nairobi Nakuru highway from Limuru town.

1.5 ESIA Methodology

The study assessed and quantified the potential impacts, both positive and negative of the proposed project. The baseline information collected was used to analyze the potential impacts of the proposed project. The ESIA study team utilized various methodologies such as field visits, literature review, consultations with the affected public and
stakeholders, among others. In order to generate adequate baseline information that served as a benchmark for analysis.

Potential impacts and generating an Environmental and Social Management Plan (ESMP); the fieldwork included several activities:

- A reconnaissance visit was made to the project area by the ESIA team which helped the team to set out key areas of observation during the study.
- This was then followed by field visits to the project area and the vicinity, taking records of observations as well as interviewing community members.
- The relevant statutes that have direct significance to the proposed project were reviewed.
- Other reports and reference materials on physical and biological data on the study area were also studied including the Detailed Design Report on the project.
- Questionnaires were administered to the community members in an attempt to get detailed individual views about the proposed project and data on the socio-economic landscape of the study area.

1.6 Scope of Works

The works shall include but not limited to:

- Site clearance and earthworks as necessary
- Excavation to remove unsuitable materials
- Filling with approved materials as specified
- Hand packing with approved stone
- Improvement/construction of drainage facilities
- Repairs and/or improvement/construction of footpaths and shoulders
- Laying of asphaltic concrete layer(s) to a consolidated thickness. The materials for construction of this project include the following;
  - Filler material
  - Aggregates for sub-base
  - Bituminous (Asphaltic) mixes of bitumen and aggregate
  - Bitumen (Asphalt)

These materials are purchased from respective dealers where filler materials and aggregates are purchased from quarries and borrow pits in the vicinity that are owned by private dealers or individuals. Bitumen is also purchased from bitumen dealers and purchased in drums.

- Laying and/or replacement of kerbs and channel
- Construction of the two road junctions abutting to this road
- Maintenance of the works during the construction and maintenance periods
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- Traffic management through the works and from the works
- Relocation and/or protection of other services including but not limited to electric poles and
- Any other works as instructed by the Engineer and/or as specified in this report

1.7 GPS Coordinates and Altitude
The general GPS coordinates of the location of the site of the sub-project are as follows;

Latitude: Degrees: S-1° 10’ 7198"
Longitude: Degrees: E36° 6’ 4”

Approximate Altitude: 1523 meters above sea level (masl)

1.8 Description of the Project’s Construction Activities
1.8.1 Pre-construction investigations
The implementation of the project’s design and construction phase will start with thorough investigation of the site biological and physical resources in order to minimize any unforeseen adverse impacts during the project cycle.

1.8.2 Demolition works
Any wastes or debris arising from any demolitions will be transported to licensed sites for disposal.

1.8.3 Sourcing and transportation of construction materials
Construction materials will be transported to the project site from their extraction, manufacture, or storage sites using transport trucks. The materials to be used in construction of the project will be sourced from the licensed quarries in the neighboring areas. Greater emphasis will be laid on procurement of construction materials from within the local area, which will make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles.

1.8.4 Storage of materials
Construction materials will be stored on site. Bulky materials such as rough stones, ballast and sand will be carefully stored on site. To avoid piling large quantities of materials on site, the contractor should order bulky materials such as sand, gravel and stones in batches.
1.8.5 Excavation and foundation works
Excavation will be carried out to prepare the site for construction of foundations, pavements and drainage systems. This will involve the use of heavy earthmoving machinery, human effort and appropriate equipment.

1.8.6 Construction of the Road
This is the main activity and will incorporate the laying of the various layers of road up to the finish in asphalt.

1.8.7 Landscaping
To improve the aesthetic value or visual quality of the site once construction ceases, the contractor will carry out landscaping.

1.9 Description of the Project’s Operational Activities

1.9.1 General repairs and maintenance
The road will be repaired and maintained by Kiambu County Government during their operational phases.

1.10 Description of the Project’s decommissioning activities

1.10.1 Demolition works
Upon decommissioning, the project components including pavements, drainage systems, parking areas and perimeter fence will be demolished. This will produce a lot of solid waste, which will be reused for other construction works or if not reusable, disposed of appropriately by a licensed waste disposal company.

1.10.2 Site restoration
Once all the wastes resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil.

1.11 Presentation of the Report
The ESIA study report as indicated above culminated with the production of this Project Report designed to ensure that the proposed development project complies with Environmental Management and Coordination Act (EMCA, 2015). The report is arranged in 10 chapters as outlined below:

Chapter 1: Introduction of the project which include project Background, Scope of the ESIA Study, Study Methodology and Presentation of the report.

Chapter 2: Gives the Policy, Legal and Regulatory Framework Policy, Legal, Institutional and Administrative Framework.

Chapter 3: Project Description.
Chapter 4: Baseline Information of the Study Area.
Chapter 5: Outcome of the Public Participation and Consultation process.
Chapter 6: Alternatives to the Project.
Chapter 7: Identification of Potential Impacts and mitigation measures of the project.
Chapter 8: Mitigation Measures of Potential Impacts of the Project.
Chapter 9: Environmental and Social Management and Monitoring Plan (ESMMP)
Chapter 10: Concludes the Project and recoups the core recommendations.

Section 10(2) of Part II of Legal Notice 101 allows for approval of proposed projects at the Project Report Stage and has been effectively used by NEMA to grant Environmental Licenses to small projects without requiring a full EIA. This is the process and stage at which the ESIA process for Rehabilitation of roads within Limuru CBD-Old Nakuru Road Project is expected to end.
CHAPTER TWO: LEGAL, INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

2.1 National, Legal and Institutional Framework

Kenya has approximately 77 statutes that guide on environmental management and conservation. Most of these statutes are sector specific, covering issues such as public health, soil conservation, protected areas conservation and management, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use among other issues.


2.2 Environmental Management and Coordination Act of 2015 (Amended)

This project report has been undertaken in accordance with the Environment (Impact Assessment and Audit) regulation 2003, which operationalize the environment management and coordination act 1999. The report is prepared in conformity with the requirements stipulated in the environmental management and coordination act no 8 of 1999 (EMCA) and the Environmental Impact Assessment and audit regulations 2003 regulation 7 (1) and the second schedule. Part II of the said act states that every person is entitled to a clean and healthy environment and has the duty to safeguard the same. In order to achieve the goal of a clean environment for all, new projects listed under the second schedule of Section 58 of EMCA No 8 of 1999 shall undergo an Environmental Impact Assessment. This includes development activities such as this new project. In addition to the legal compliance above, the following legal aspects have also have been taken into consideration or will be taken into consideration before commencement of construction:
2.3 Occupational Health and Safety, 2007
The said Act requires that before any premises are occupied or used a certificate of registration should be obtained from the chief inspector. The occupier must keep a general register with provision for health, safety and welfare of workers on site. For safety, fencing of the premise and dangerous parts must be done for this project and this has been included in the design. There should also be provision for clean and sanitary working conditions. More so, the project must ensure provision of quality and quantity wholesome drinking water.

2.4 Public Health Act Cap 242
Part IX section 115 of the Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that local authorities shall take all lawful necessary and reasonable practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to injuries or dangerous to human health. This will have to be provided for this project.

2.5 Physical Planning Act, 1999
The said Act section 29 empowers the local authorities to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section allows for prohibition or control of the use and development of an area. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local Authority. This project has integrated with the planning of Limuru township by Kiambu County.

2.6 Land Planning Act Cap 303
Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it requires that before the local authority submits any plans to the minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted, which intends to reduce conflict of interest with other socio economic activities. There will be no land acquisition for this project as there is adequate room to construct the paved road, the footpath, the drainage and the relocate services in these areas without taking additional land.

2.7 Building Code 2000
Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the Local Authority for permit to connect to the sewer line and all the wastewater
must be discharged into sewers. The code also prohibits construction of structures or building on sewer lines. There is no sewer along the road corridor.

2.8 Other Relevant Laws

2.8.1 EMCA (Waste Management) Regulations, 2006

These Regulations guide on the appropriate waste handling procedures and practices. It is anticipated that, the proposed project will generate large quantity of solid waste (mostly excavated top soil) during construction which will need to be managed through reuse, appropriate disposal. Others include solid waste from the generated from construction materials such as cement bags, bitumen, empty drums, among others. This regulation requires that:

i. The contractor should not dispose any waste on the highway, street road, recreational area and public places;

ii. Waste should be segregated and grouped according to their similarity for example plastics, toxic, organic etc;

iii. All waste should be deposited in a designated dumping are approved by the local authority;

iv. All waste handlers engaged by the proponent should be licensed by NEMA and posses all relevant waste handling documents such as waste transport license, tracking documents, license to operate a waste yard, insurance cover, vehicle inspection documents among others;

v. Contractor should implement cleaner production principles of waste management strategy namely reduce, reuse and recycle;

vi. All hazardous wastes are labeled as specified in section 24 (1-3) of the regulation.

vii. The fourth schedule lists wastes considered as hazardous and solvents, emulsifiers/emulsion, waste oil/water and hydrocarbon/water mixtures. Road and bus parks projects involve use of inputs which are likely to generate the mentioned wastes and thus will need to be handled as required by the regulations.

This law requires that all wastes generated by this project in all its phases are managed in an environmentally friendly manner.

2.8.2 EMCA (Noise and Vibrations Control) Regulations, 2009

These Regulations provides guidelines for acceptable levels of noise and vibration for different environments during the construction and operation phase. Section 5 of the regulation warns on operating beyond the permissible noise levels while section 6 gives guidelines on the control measures for managing excessive noises and copy of the first schedule indicating the permissible noise levels for different noise sources and zones. The project team should observe the noise regimes for the different zones especially when
working in areas termed as silent zones which are areas with institutions and worship places. These areas are permitted exposure to sound level limits of not exceeding 40 dB (A) during the day and 35 dB (A) at night. The regulation states that a day starts from 6.01 a.m. to 8.00 p.m. while night starts from 8.01 p.m. – 6.00 a.m. Construction sites near the silent zones are allowed maximum noise level of 60 dB (A) during the day and night levels are maintained at 35 dB (A) according to local noise control rules. The time frame for construction sites is adjusted and the day is considered to start at 6.01 a.m. and ends at 6.00 pm while night duration from 6.01 p.m. to 6.00 a.m. Part III of the regulation gives guidelines on noise and vibration management from different sources. Sections 11, 12 and 13 of the stated part give guidelines on noise and vibration management from machines, motor vehicles and night time construction respectively. Section 15 requires owners of activities likely to generate excessive noise to conduct an ESIA to be reviewed and approved by NEMA. It is anticipated that the proposed project will generate excessive noise and/or vibration due demolition of the existing road this noise will originate from the construction equipments, vehicles and the workers since the road neighbors homesteads and institutions in some sections. The project proponent has developed mitigation measures to reduce noise propagation in the project area and such as to ensure that the project works are only conducted during the day.

**2.8.3 EMCA (Air Regulations), 2014**

This Act is meant to ensure that all activities at least maintain ambient quality standards of air and any pollution to air (in particulate matter, dust or obnoxious and poisonous gases) needs to be sufficiently mitigated. The project proponent has proposed regular watering of the construction site to minimize dust during the construction period.

**2.8.4 Way Leave Act Cap 292**

Section 3 of the Act states that the Government may carry any works through, over or under any land whatsoever, provided it shall not interfere with any existing building or structure of an ongoing activity. Notice, however, should be given one month before carrying out any such works (section 4) with full description of the intended works and targeted place for inspection.

Any damages caused by the works would then be compensated to the owner as per Section 8 of the Act that states that any person whom without consent causes any building to be newly erected on a way leave, or cause hindrance along the way leave shall be guilty of an offence and any alterations will be done at his/her costs. The project will comply with this provision by ensuring that there will be minimal disruption of utilities in the area. There is no land acquisition, neither permanent nor temporary necessitating a RAP.

**2.8.5 Public Roads and Roads of Access Act (Cap 399)**

Sections 8 and 9 of the Act provides for the dedication, conservation or alignment of public travel lines including construction of access roads adjacent to lands from the nearest part of a public road. Sections 10 and 11 allows for notices to be served on the adjacent land
owners seeking permission to construct the respective roads. This road project is being built to fulfill, in addition to other benefits, the provisions of this Act.

2.8.6 Traffic Act Chapter 403
This Act consolidates the law relating to traffic on all public roads. The Act also prohibits encroachment on and damage of roads including land reserved for roads. This project entails rehabilitation of the road and is under the provisions of this Act.

2.8.7 County Governments Act, 2012
This Act delineates the roles and responsibilities of county governments with their administrations as well as the role of county citizens in public participation and consultations regarding projects at the county level. CPP is part of this road project involving the county government and other stakeholders.

2.8.8 HIV Aids Prevention and Control (Cap 246A)
This Act is to promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS. It also seeks to positively address and seek to address conditions that aggravate the spread of HIV infection. In the Rehabilitation of roads within Limuru CBD-Old Nakuru Road Project, there will be awareness creation and sensitization on the workers and other persons on the risks of infections to foster prevention and control.

2.9 National Policy Framework
Several policies have been developed over the years to guide the development and management of proposed projects to ensure both economic and social sustainability these policies are discussed below.

2.9.1 The National Poverty Eradication Plan (NPEP)
The objective of the NPEP is to reduce the incidences of poverty in both rural and urban areas by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. It also aims to narrow gender and geographical disparities and create a healthy, better-educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for Social Development (WSSD) of 1995.
The plan focuses on the four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantage people and creation of an enabling economic, political, and cultural environment which can be achieved through developing the transport and communication sector. The plan will be implemented by the Poverty Eradication Commission (PEC) formed in collaboration with Government ministries, Community Based Organization (CBO), private sector, Non-Governmental Organization (NGO), bilateral and multilateral donors.
2.9.2 The Poverty Reduction Strategy Paper (PRSP)
The PRSP has the twin objectives of poverty reduction and enhancing economic growth. The paper articulates Kenya’s commitment and approach to fighting poverty; with the basic rationale that the war against poverty cannot be won without the participation of the poor themselves. The proposed project through improving transport in the area will contribute towards economic growth, as well as relieve the daily pressure of poverty for sustainable number of people by enabling them reach the markets and suppliers on time.

2.9.3 National Environmental Action Plan (NEAP)
The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country’s economic and social development.
The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.
The application of this plan is widening as the government through NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project’s development plan which is in line with the requirements of the NEAP.

2.9.4 Environmental and Development Policy (Session Paper No.6 1999)
As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development. It is recommended that the requirements of this policy are observed, as much by:

i. Taking measures to enhance the water catchment by replanting trees, using clean energy to reduce deforestation;

ii. Undertaking environment friendly practices during project implementation;

iii. Take measures to reduce pollutants leading to eutrophication of water bodies both above- and underground water bodies; and

iv. Rehabilitate project affected areas and public infrastructure among other

2.9.5 International Policy Framework
Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment which aims at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority. The agreements of interest to Kenya can be
categorized as those for protecting natural resources, atmosphere and social wellbeing of man.

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

2.10 World Bank Environmental and Social Safeguard Policies
Like in any project financed by, or with financial participation of, the World Bank, the environmental and social safeguards as defined in the Bank's Operational Procedures (OPs) will be respected for the purposes of this project implementation. WB classifies its projects into four Environmental Assessment categories according to the likely impacts on the environment they will have. This classification is as follows (only main conditions mentioned):
Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts.
Category B: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. This particular NaMSIP subproject has been categorized as B.
Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.
Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts; this case, in any way, is not applicable to the NaMSIP project.

The table below shows the applicability of World Bank Operational Safeguards as it applies to the proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road Project in Kiambu County of Nairobi Metropolitan Region.

Table 1: Applicability of WB OPs
Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

<table>
<thead>
<tr>
<th>OP</th>
<th>Title</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.01</td>
<td>Environmental Assessment</td>
<td>Applicable. As a result of environmental and social screening, the project was identified as a Category B project due to its road rehabilitation and other activities, as described</td>
</tr>
<tr>
<td>4.04</td>
<td>Natural Habitats</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.09</td>
<td>Pest Management</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.10</td>
<td>Indigenous Peoples</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.11</td>
<td>Physical Cultural Resources</td>
<td>Not applicable. Site visits and inventories have not indicated the presence of any cultural (historical, archaeological) sites in the sample settlements. However, to manage “chance finds” an appropriate procedure is included in this ESIA. Such procedure to be followed by contractors during the construction phase.</td>
</tr>
<tr>
<td>4.12</td>
<td>Involuntary Resettlement</td>
<td>Not applicable. No business, traders or land is taken to allow for the works as there is adequate road corridor</td>
</tr>
<tr>
<td>4.36</td>
<td>Forests</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>4.37</td>
<td>Safety of Dams</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>7.50</td>
<td>Projects on International Waterways</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>7.60</td>
<td>Projects in Disputed Areas</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

2.11 World Bank Group Environmental Health and Safety Guidelines on structural safety on project infrastructures

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are
designed to be used together with the General EHS Guidelines document which provides guidance to users on common EHS issues potentially applicable to all industry sectors

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

Relevance to the Project
The EHS Guidelines for infrastructure include information relevant to planning, siting and design phases of project

1. Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors or other emissions
2. Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire.
3. Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response
4. Engineers and architects responsible for designing and constructing facilities, buildings, plants and other structures should certify the applicability and appropriateness of the structural criteria employed

The design for the project has ensured these environment risks are mitigated.
CHAPTER THREE: BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction

Baseline conditions cover all the biophysical and socio-economic conditions in the project area. Gathering of baseline data is necessary to meet the following objectives:

- To understand key biological, physical, ecological, social, cultural, economic, and political conditions in areas potentially affected by the proposed project;
- To understand the expectations and concerns of a range of stakeholders on the proposed development;
- To inform the development of mitigation measures;
- To benchmark future socio-economic changes/impacts and assess the effectiveness of mitigation measures.

3.2 Project location

Limuru is a town located about 30 miles from Nairobi and is in Kiambu County of central Kenya. The town is mostly known for the Bata shoe factory and most of the people of
Limuru are mostly farmers with several engaged in small enterprises mainly in the town. Tea and horticulture farming is very prominent in the area. Early in the British colonial period (from the 1890s) Europeans settled in the area due to its proximity to Nairobi, the railway, its fertile land and pleasant weather.

3.3 Environmental Baseline Profile

3.3.1 Relief and physiography
Altitude of the town is about 2226 meters. The drainage pattern of the Limuru is such that the entire area can drain into the Ithanji River.

3.3.2 Temperature
The mean annual temperature ranges from minimum of 13°C to a maximum of 29°C. The coolest period is from June to September and the warmest period October to March.

3.3.3 Rainfall
The project area experiences a highland equatorial type of climate with a mean annual rainfall in the region of 905 mm. The main rainfall seasons are, March to May and October to December. In between these periods the area is generally dry with occasional showers.

3.3.4 Topography
Kiambu County in general is divided into four broad topographical regions namely Upper Highland, Upper Midland, Lower Highland and Lower Midland. The Upper Highland is an extension of the Aberdare Ranges, which are steep and form important water catchments for rivers like Bathi and Gatamaiyu. The upper Midland lies below 1,500 m above sea level. The major features are widespread ridges and volcanic or footbridges. The lower Highland (of which the site is part of) is found mainly in Limuru and parts of Kikuyu and Githunguri. The area generally has a few ranges with wide spaced parallel ridges. Plateaus and high-level structural plains characterize it. Much of the Red Coral landscape is gently sloping at an elevation of between 2230 - 2304m above sea level. The lower midland zone is found in parts of Kikuyu (Karai) and Limuru (Ndeiya) Divisions. The soils are dissected erosional plains and vary from well drained, shallow, and dark red to yellowish red, stony loamy sand to imperfectly drained, very deep, dark brown and strongly calcareous soils with sodic clay topsoil.

The project road traverses a generally flat terrain with gentle slopes.
3.3.5 Hydrogeology
The Limuru Trachytes geological unit is the main recharge rock for the Kikuyu Springs Aquifer and the Nairobi Aquifer Suite, due to their outcrop in the watershed and the effects of faults and fractures through which groundwater movement occurs. The watershed itself is a raised fault block (horst): the western side of the property is thus elevated on the block, while the eastern boundary runs along the downthrown valley from a second parallel fault zone.

3.4 The Socio-Economic Profile
3.4.1 The County Perspective
The county has a total of 2,517 trading centres with 6,634 registered retail traders and 750 registered wholesale traders. There are also a number of urban centres with the largest being Thika Town which is one of the largest industrial towns in the country. Other urban centres include Kiambu and Karuri in Kiambaa constituency, Kikuyu in Kabete constituency, Limuru in Limuru Constituency, Gatundu in Gatundu South Constituency and Ruiru in Juja Constituency.

3.4.2 Population
According to the 2009 Kenya Population and Housing Census, Kiambu County population for 2012 was projected to be 1,766,058 with 873,200 males and 892,857 females. Further, the population is expected to reach 2,032,464 people by the end of 2017. This is influenced by the county’s high population growth rate, which is at 2.81 per cent and the influx of people working in the city who prefer to stay in Kiambu and its environs where there is less congestion and well developed infrastructure.

3.4.3 Education status of the people
The county has a total population of 87,594 children falling within the age group of 3 to 5 (pre-school). This consists of 44,177 males and 43,417 females. The total number of early child education (ECD) teachers is 1,843 and the teacher to pupil ratio is 1:40. There are 1,225 primary schools in Kiambu County out of which 576 are public and 349 are private. The total number of primary school teachers is 21,090 and the teacher to pupil ratio is 1:38. The total enrolment rate stands at 295,409 pupils comprising of 115,375 males and 113,910 females. The gross enrolment rate stands at 109.6 percent, while the net enrolment rate is 99.7 percent. This could be attributed to the introduction of Free Primary Education programme. Infrastructure in schools has also improved through devolved funds e.g. Constituency Development Fund (CDF) and Local Authority Transfer Fund (LATF). However, the county still needs to invest in the provision of additional education facilities because of the increasing number of school going population.
There are 303 secondary schools consisting of 227 public and 76 private schools. The total enrolment rate is 89,065 out of which 44,777 are males and 44,288 are females. The gross enrolment rate is 69.3 percent and the net enrolment rate is 61.8 percent. The number of teachers in the county stands at 3,479 and the teacher/pupil ratio is 1:25. As indicated in the fact sheet, the completion rate is 92.5 percent and therefore there is need for great investment in the education sector to ensure the rate reaches 100 percent.

The percentage of people within the county who can read stands at 95.6 percent while 3.8 percent of the total population cannot read. Also, 95.2 percent of the total population can write while 4.2 percent cannot write. About 95.4 percent of the total population within the county can read and write while 4.6 percent cannot read and write. Those who can read and write stand at 95.4 per cent. The high literacy rates are as a result of continued investment in the education sector and there is need for more investment to ensure the literacy levels gets to 100 percent. (Kiambu, CIDP 2013 – 2017).

### 3.4.4 Housing
According to the 2009 Kenya Population and Housing Census, 48.3% of all homes in the County are stone –walled, 4.9% are brick/block, while 4.8% are mud/wood walled. 74.6% of the houses have cemented floors while 87.5% have corrugated iron sheets. A small proportion (0.1%) of the houses has other forms of roofing materials.

The proximity of the County to the city of Nairobi has seen the conversion of large parcels of agricultural land into residential and/or mixed use developments as many of those working in Nairobi opt to reside in the County.

### 3.4.5 Energy access to Kiambu County
Firewood is the main fuel used in cooking by 47.3% of the households in Kiambu County, while paraffin is the major fuel used in lighting. This poses a great challenge to the realization of 10% forest cover within the County. 98% of all trading centers within the County are connected to the national grid. However, connection to individual homes is low and there is need for up-scaling of the rural electrification programme.

### 3.4.6 Community organizations/non-state actors

#### 3.4.6.1 Co-operative Societies
The co-operative movement in the county is well established with societies covering several sectors. The county has 254 active co-operatives societies and 22 dormant ones. The total membership is 258,198 and the annual turnover is approximately KShs. 5,069,560,000. Types of co-operatives found in the county include dairy co-operatives, coffee co-operatives, transport SACCOs and housing SACCOs among others. The marketing co-operatives are engaged in production, processing and marketing of
members’ produce. The savings and credit co-operative societies give loans to members at affordable interest rates.

3.4.6.2 Non – Governmental Organizations
The county has about 38 Non Governmental Organizations that operate in the entire county. However there is greater concentration in Kiambu and Thika towns within Kiambara and Juja constituencies. Majority of them, concentrate in the fight against HIV and AIDS, children welfare and women empowerment.

3.4.6.2 Self Help, Women and Youth Groups
The county boasts of having one of the biggest numbers of registered Community Based Organizations (CBO’s). Though actual data is not available, they are estimated to be more than 10,000. The groups are engaged in a wide variety of activities which include: Micro-finance, HIV and AIDS, Drugs and substance abuse campaign, Environmental conservation, Training and advocacy and other income generating activities. The county has over 3,746 active women groups and 1,664 youth groups. Through these groups, women and youths are able to access loans through the Women Enterprise Fund and Youth Enterprise Fund that assist them to engage in income generating activities. Over 467 youth groups have already benefited from the Fund, while a total of 1,193 women groups have benefited from the Women Enterprise Fund. The youths engage in activities such as Jua kali sector, Micro-Finance (Revolving Loan Fund), HIV and AIDS and drug abuse campaign and Home Based Care, Environmental conservation e.g. tree planting, training and advocacy, entertainment, drama and theatre and income generating activities.

3.4.7 Gender
The sex ratio of male to female is approximately 1:1.02.

3.4.8 Poverty
The poverty level in the county is estimated at 21.75 percent. The most affected areas by poverty are in the eastern part of the county for instance Thika East, which is semi-arid and with low 40 rainfall. Pockets of poverty are also found in informal settlements of Thika Municipality, Ruiru and Juja Towns. Inadequate access to credit facilities for the community reduces economic empowerment hence increasing economic dependence. This increases the poverty cycles among families. Besides, security must also be improved so that investment can take place in the county in order to absorb the ever rising unemployment levels and boost economic growth and development of the county in general.
3.4.9 HIV and AIDS
The county’s HIV prevalence rate is 4.6 percent against the national rate of 5.6 percent. There are various programmes within the county being implemented by NACC and NASCOP geared towards reducing the prevalence of HIV and AIDS.

3.5 Sensitive Receptors
The road to be constructed passes through Limuru Town with several commercial buildings on either side of the road corridor. It moves further to an area without buildings as it approaches the Nairobi-Nakuru Highway. The key environmental receptors include commercial buildings/enterprises, motorists, pedestrians and small-scale businesses located along the proposed project.
CHAPTER FOUR: PUBLIC PARTICIPATION AND CONSULTATION

4.1 Introduction
Legal Notice 101 of EMCA 1999 (The Environmental Regulations, 2003) requires that all environmental assessment process in Kenya to incorporate Public Consultation. The aim is to ensure that all stakeholder interests are identified and incorporated in project development, implementation and operation. Of necessity, stakeholder consultations should take place alongside project design and implementation to ensure that the project puts in place measures to cater for stakeholder concerns in all project phases.

4.2 Approach to Public Participation and Consultations
In case of the proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road Project, public participation and consultations followed these steps:

1) Identification of Stakeholders
Like in all civil works projects, the core stakeholders comprise people to be directly served by the road and then comprise residents along the road corridor, motorists, businessmen and service providers who rely on the road. Along the road corridor are business men and women. This is the group that is likely to benefit or be affected by the proposed development hence the primary stakeholders.
This study also identified a second category of stakeholders comprised of county officers and institutions in charge of diverse sectors), which are likely to be impacted by the road improvement project. This category was also consulted as key informants on sectoral policy and to advise this ESIA study on mitigation measures to be put in place so as to minimize adverse impacts in respective sectors. Each category of stakeholders called for a different approach to consultation.

4.3 Modalities for stakeholder consultation
The following techniques and instruments were used for public participation and consultation;

➢ Photography and direct observation
Photography was particularly useful as it captured the real situation on the ground that was relevant to the study. Direct observation involved site viewing of the proposed project location to see the extent of development on it and the condition of the existing road as shown on the plates below.
Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

Old Nakuru Road to be upgraded

Participants listening to ESIA team

Old Nakuru Road

Part of the road to be upgraded
Public participation

➢ Site checklists
Checklists were used to assess the suitability of the site where the proposed project is to be located and the negative impacts it might have on the environment.

➢ Public meetings (barazas)
This involved scheduled meetings with the public who are directly affected by or will benefit directly from the proposed project. The aim was to get their views concerning the proposed project; how it will affect them and the environment. Such a meeting was held along Old Nakuru Road on 14th November 2016.

➢ Scheduled interviews
This involved face-to-face interaction between the consultants/experts and the stakeholders of the project like Kiambu County government. An interview guide was used to solicit information from various government offices and relevant players on the area of study.

4.4 CPP Methodology
Interviews were carried out in the project area by the use of questionnaires, to find out all the views from the neighbors’ and other stakeholders on the proposed project. The main objective was to find out if the stakeholders support the project and have no objection to it. The questionnaire was to initially give introduction and make the residents aware of the
proposed project. Afterwards, the ESIA team enquired on the acceptance of the project and whether the project would cause any negative impacts on the following:

a) Local residents and their businesses; b) Ecology of the area; c) Human environment; d) Recreational and leisure facilities; e) Public health and safety; f) Effect on water resources and quality; g) Effect on the soils; h) Effect on road transport and; i) Waste disposal.

The said parameters were directly mentioned to foresee which had intense negative impacts. The meeting of the key stakeholders (NaMSIP, County Government) assessed the need for the project and its attendant benefits. During such meetings, it was emphasized that high environmental, occupational health and safety standards would be adhered to during project implementation.

4.5 Stakeholder Analysis
A sample of the questionnaires from those that attended the meeting including the attendance sheet and minutes is part of this report. Those that attended the meeting included;

- Owners/operators of various shops in Limuru Town
- Residents of Limuru Town along the road to be rehabilitated
- Pedestrians
- Political leaders and/or their representatives
- Officers from Kiambu County Government
- Drivers/motorists of vehicles along the road

The ESIA consultations included disclosure of the design and project status that was done by the appointed Resident Engineer (RE). The issues that were raised by each group of stakeholders included;

**Outcomes of stakeholder consultation**

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Owners / operators of shops along the road wanted to know how dust issues during construction would be handled</td>
<td>ESIA team assured them that there would be dust management during implementation and this was affirmed</td>
</tr>
<tr>
<td>2.</td>
<td>Political leaders / their</td>
<td>Eng Mwaura told them that the</td>
</tr>
</tbody>
</table>
Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

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<tr>
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<tbody>
<tr>
<td>1.</td>
<td>representatives wanted to know long the project would take once it starts and if it can be extended to include further length.</td>
</tr>
<tr>
<td>3.</td>
<td>Drives and motorist wanted to know the exert period the project would take</td>
</tr>
<tr>
<td>4.</td>
<td>Pedestrians wanted to know whether the contractor would engage the local residents for jobs</td>
</tr>
<tr>
<td>5.</td>
<td>The shop owners wanted to know if their businesses would be affected</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

5.1 Introduction

This chapter outlines the potential negative and positive impacts that will be associated with the project. The impacts will be related to activities to be carried out during construction of the project and the operation stage of the project. The operational phase impacts of the project will be associated with the activities carried out within the premises. In addition, closure and decommissioning phase impacts of the project are also highlighted. The impacts of the project during each of its life cycle stages (construction, operation and decommissioning) can be categorized into: impacts on the biophysical environment; health and safety impacts and socio-economic impacts.

5.2 Negative environmental impacts of construction activities
5.2.1 Extraction and use of construction materials
Construction materials such as rough stone, ballast and bitumen required for construction of the roads project will be obtained from quarries and bitumen dealers. Since substantial quantities of these materials will be required for construction of the roads, the availability and sustainability of such resources at the extraction sites will be negatively affected, as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

5.2.2 Dust emissions
During construction, the project will generate substantial quantities of dust at the construction site and its surrounding. The sources of dust emissions will include excavation and leveling works, and to a small extent, transport vehicles delivering building materials. Emission of large quantities of dust may lead to significant impacts on construction workers and the local residents, which will be accentuated during dry weather conditions.

5.2.3 Exhaust emissions
The trucks used to transport various building materials from their sources to the project site will contribute to increases in emissions of CO₂, NO₂ and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts. Because large quantities of building materials are required, some of which are sourced outside the access road area, such
emissions can be enormous and may affect a wider geographical area. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent running of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

5.2.4 Noise and vibration
The construction works, delivery of construction materials by heavy trucks and the use of machinery/equipment including bulldozers, generators, tippers and concrete mixers will contribute high levels of noise and vibration within the construction site and the surrounding area. Elevated noise levels within the site can affect project workers and the residents, passers-by and other persons within the vicinity of the project site.

5.2.5 Risks of accidents and injuries to workers
Because of the intensive engineering and construction activities including excavations, concrete work, sub-base stone laying among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from the hand tools and construction equipment and risk of vehicular accidents.

5.2.6 HIV/AIDS
The project may raise and expose workers and other persons to sexual immorality leading to infections of sexually transmitted diseases including HIV-AIDS.

5.2.7 Labor Camps
These may need to be set up and it is important that labour laws or activities that abuse workers and children are avoided.

5.2.8 Increased soil erosion
Excavation works associated with this project may lead to increased soil erosion at the project site and release of sediments into the drainage systems. Uncontrolled soil erosion can have adverse effects on any local water bodies.

5.2.9 Solid waste generation
Large quantities of solid waste will be generated as a result of clearances, excavations and the final construction of the selected roads. Such waste will consist of surplus materials, surplus soil and excavated materials among others. Such solid waste materials can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human and animal health. This may be accentuated by the fact that some of the waste materials contain hazardous substances such as paints, cement, adhesives and bitumen, while some of the waste materials including plastic containers are not biodegradable and can have long-term and cumulative effects on the environment.
5.2.10 Energy consumption
The project will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The project may also use electricity supplied by Kenya Power & Lighting Company (KPLC) Ltd. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

5.2.11 Water use
The construction activities will require large quantities of water that will be supplied from the town council. Water will mainly be used for concrete mixing, dust suppression and sanitary and washing purposes. Excessive water use may negatively impact on the water source and its sustainability.

5.2.12 Social disturbance
The construction works may cause disturbance to the local population with interactions of non-local workers with residential communities. The movement of trucks and other equipment in the project area during the works implementation will cause noise and dust if the works will be in dry weather. This noise and dust may also affect the businesses in the vicinity of the construction works.

5.3 Positive environmental impacts of construction activities
5.3.1 Creation of temporary employment opportunities
Several employment opportunities will be created for construction workers during the construction phase of the project. This will be a significant impact since unemployment is currently generally high in Kenya and in most urban and surrounding areas.

5.3.2 Provision of market for supply of construction materials
The project will require supply of large quantities of construction materials most of which will be sourced locally in the larger Limuru area and the surrounding areas. This provides ready market for construction material suppliers such as quarrying companies, hardware shops and individuals with such materials.

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

5.4.1 Increased storm water flow
The pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the roads. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems in addition to increased erosion or water logging in the neighboring areas if not adequately mitigated.

5.4.2 Worksite health and safety
The health and safety of surrounding community may be affected from dust, a matter that was raised during the CPP.

5.4.3 Operation of quarries and borrow pits
The contractor will mainly source this from private quarries but all in all this degrades the environment.

5.4.4 Traffic management
Flow of traffic along or near the proposed road will be affected and diversions may need to be done to manage traffic

5.4.5 Road safety
This may be impeded because of increased traffic post-road upgrade. The county will need to maintain the road signage to ensure pedestrian and driver safety.

5.5 Positive environmental impacts of operational activities

5.5.1 Revenue to national and local governments
Through payment of relevant taxes, rates and fees to the government and the local authority, the roads project will contribute towards the national and local revenue earnings from those using the improved facilities.

5.5.2 Positive social impacts of operational activities
The operational activities after this project is commissioned will have several positive long-term social impacts that include the following;

(a) Improved access to and from Limuru town and Nairobi-Nakuru highway
(b) Improved pathways (NMT) for cycling and walking for pedestrians
(c) Easier accessibility for all to different parts of Limuru in the locality
(d) Improved drainage will reduce the flood damage and improve accessibility especially for pedestrian traffic and residents
(e) Improved accessibility will spur physical development in the area leading to increased jobs for the urban poor
(f) Improved lighting will increase trading hours for the businesses
(g) Cleaner and orderly environment
(h) Improved safety and security for all

In a nutshell, all roads being improved or rehabilitated will be installed with street lights. This will lead to improved security in the area as well as increased time for doing business and hence increased income to inhabitants of the area.

5.6 Negative environmental impacts of decommissioning activities

5.6.1 Solid waste
Demolition of the roads and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, kerbs, bitumen, stones and ballast. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia, which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

5.6.2 Dust
Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighboring residents.

5.6.3 Noise and vibration
The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas.

5.7 Positive environmental impacts of decommissioning activities

5.7.1 Rehabilitation
Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to its original status. This will include replacement of topsoil that will lead to improved visual quality of the area.

5.7.2 Employment Opportunities
Several employment opportunities will be created for demolition staff. There therefore will be citizen and community engagement that requires a communication and community engagement plan.
CHAPTER SIX: ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of site, technology and waste management options.

6.1 Relocation Option
Relocation option to a different site is not an option available for the project implementation as the Old Nakuru road already exists and only need to be rehabilitated so as to enhance mobility, accessibility and transport to and from Limuru Town.

6.2 Zero or No Project Alternative
The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Limuru and the community as a whole. The area will continue to have earth roads and this will not help maximize usage and utilization of this area and its facilities. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of Kenyans and the local people would remain unchanged.
- The bus station and market would remain largely under-utilized as it is currently.
- No employment opportunities will be created for thousands of Kenyans who will work in the project area.
- Increased urban poverty and crime in Kenya.
- Discouragement for investors and loaners
- Development of infrastructural facilities (roads and associated infrastructure) will not be undertaken.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the local people and the Government of Kenya.

6.3 Analysis of Alternative Construction Materials and Technology
The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The road-works will be made using locally sourced materials that meet the Kenya Bureau of Standards requirements.

The alternative technologies available include the conventional concrete roads, prefabricated concrete panels, or even temporary structures. These may not be desirable from a cost and durability perspective. The technology to be adopted will be the most economical and one sensitive to the environment.
6.4 Solid waste management alternatives
A lot of solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness program in the management and the staff. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation program to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, the proponent will need to establish agreement with Kiambu County Government to ensure regular waste removal and disposal in an environmentally-friendly manner. In this regard, a NEMA registered solid waste handler would have to be engaged. This is the most practical and feasible option for solid waste management considering the delineated options.
CHAPTER SEVEN: IMPACTS MITIGATION AND MONITORING

7.1 Introduction
This chapter highlights the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental, health and safety impacts associated with the project during its construction, operation and decommissioning phases. Allocation of responsibilities, time frame and estimated costs for implementation of these measures are presented in the Environmental and Social Management and Monitoring Plan (ESMMP).

7.2 Mitigation of construction phase impacts
7.2.1 Efficient sourcing and use of raw materials
The contractor will source construction materials such as sand, ballast and hard core from registered quarry and sand mining firms, whose projects have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated. To reduce the negative impacts on availability and sustainability of the materials, the contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the contractor shall consider reuse of construction materials and use of recycled materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

7.2.2 Excavations
The existing earth roads will have to be excavated to make for new roads and associated facilities and the removed materials will be taken to licensed sites or reused.

7.2.3 Minimization of run-off and soil erosion
The project design has incorporated construction drainage to avoid instances of standing water and manage run-off. The contractor will put in place some measures aimed at minimizing soil erosion and associated sediment release from the project site during construction. These measures will include silt traps, barriers, vegetation planting, terracing and leveling the project site to reduce run-off velocity and increase infiltration of rainwater into the soil. In addition, construction vehicles will be restricted to designated areas to
avoid soil compaction within the project site, while any compacted areas will be ripped to reduce run-off. This is especially relevant to the area close to the bus station, which is located in a low lying area likely to have standing water during the rainy season.

7.2.4 Minimization of construction waste
It is recommended that demolition and construction waste is properly collected, stored, recycled or reused to ensure that materials that would otherwise be disposed off as waste are diverted for productive uses. In this regard, the proponent is committed to ensuring that construction materials left over at the end of construction will be used in other projects rather than being disposed off. The proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. Additional recommendations for minimization of solid waste during construction of the project include:

- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to weather elements
- Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- Use of construction materials containing recycled content when possible and in accordance with accepted standards.

7.2.5 Reduction of dust generation and emission
Dust emission during construction will be minimized through strict enforcement of on-site speed controls as well as limiting unnecessary traffic within the project site. Traffic routes on site have to be sprinkled with water regularly to reduce amount of dust generated by the construction trucks.

7.2.6 Minimization of exhaust emissions
This will be achieved through proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. In addition truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off vehicle engines at these points.
7.2.7 Minimization of noise and vibration
Noise and vibration will be minimized in the project site and surrounding areas with strict adherence to NEMA designated working hours; and through sensitization of construction truck drivers to switch off vehicle engines while offloading materials. In addition, they will be instructed to avoid running of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools. In addition, construction machinery shall be kept in good condition to reduce noise generation. It is recommended that all generators and heavy duty equipment be insulated or placed in enclosures to minimize ambient noise levels.

7.2.8 Reduction of risks of accidents and injuries to workers
The contractor will have to be committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Health and Safety Act, OSHA 2007. In this regard, the contractor is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers as outlined in the EMMP.

7.2.9 Reduction of energy consumption
The proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the proponent shall monitor energy use during construction and set targets for reduction of energy use.

7.2.10 Minimization of water use
The contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water usage to minimize pressure on the local water resource. Water will be sourced externally, including using the nearby rivers and streams after obtaining licenses from WARMA.

7.3 Gender mainstreaming
There will adequate mechanisms in place to protect local vulnerable population especially women and minors from risks associated with influx of workers (harassment, underage sex). This system will ensure having security on site provided by the contractor as well as sensitization and enforcement by the contractor. There will also be a code of conduct established for Contractor employees and contract workers acknowledging a zero tolerance policy towards child labor and child sexual exploitation.
7.4 HIV/AIDS awareness and prevention
To prevent spread and HIV-AIDS infection owing to the project, there shall be a behavior change communication and awareness and sensitization on sexually transmitted diseases to construction workers. The contractor will maximize hiring local workforce for the project to minimize influx of migrant workers during construction.

7.5 Mitigation of operation phase impacts
7.5.1 Management of storm-water runoff
The County Government will ensure that the drainage is regularly maintained for storm-water runoff management.

7.5.2 Increased traffic
The County government will ensure that the road maintenance include management of the road safety signage to support pedestrian and driver safety, keep road crossings safe and maintain advisable speed limits.

7.6 Mitigation of decommissioning phase impacts
7.5.2 Efficient solid waste management
Solid waste resulting from demolition or dismantling works will be managed as described above.

7.5.3 Reduction of dust concentration
High levels of dust concentration resulting from demolition or dismantling works will be minimized as described earlier.

7.5.4 Minimization of noise and vibration
Significant impacts on the acoustic environment will be mitigated as described.

7.6 Grievance redress system
A grievance redress mechanism as attached in the annexure will be used to handle any complaints mainly during project implementation.
CHAPTER EIGHT: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 Significance of an EMMP

An Environmental and Social Management and Monitoring Plan (ESMMP) for developing projects is used to provide a logical framework within which identified negative environmental impacts can be avoided, mitigated and monitored. In addition, the ESMMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. The ESMMP is a vital output of an Environmental and Social Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMMP outlined below will address the identified potential negative impacts and mitigation measures of the project based on the chapters on Environmental Impacts and Mitigation of the Negative Impacts.

8.1.1 Pre-Construction & Construction Phases ESMMP

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase of the project are as outlined below:
Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

Table 3: The ESMMP for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Increased exploitation of raw materials</td>
<td>▪ Maximize sourcing of construction materials – sand and aggregates from registered quarry and sand mining firms whose activities are approved by NEMA and have acceptable environmental and social performance standards.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td></td>
<td>▪ Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td></td>
<td>▪ Ensure that damage or loss of materials at the construction site are kept minimal through proper storage</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td>2) Run off and soil erosion</td>
<td>▪ Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil, e.g. silt traps and other barriers.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>15,000</td>
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<td></td>
<td>▪ Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site. The trucks should not be driven off the existing roads and trucks to avoid damaging the surrounding land.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td></td>
<td>▪ Ensure that any compacted areas are filled in to reduce run-off or accumulation of water during rains.</td>
<td>Contractor</td>
<td>6 months</td>
<td>-</td>
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<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
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<td>3) Solid waste generation</td>
<td>- Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of.</td>
<td>Contractor</td>
<td>One-off</td>
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<td>- Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
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<tr>
<td></td>
<td>- Utilize opportunities for donating recyclable/reusable or residual materials to local community groups, institutions and individual local residents or home owners.</td>
<td>Contractor</td>
<td>One-off</td>
<td></td>
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<td></td>
<td>- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td></td>
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<td></td>
<td>- Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements</td>
<td>Contractor</td>
<td>One-off</td>
<td>10,000</td>
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<td></td>
<td>- Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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### Objective/Plan

<table>
<thead>
<tr>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
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<tbody>
<tr>
<td>▪ Use construction materials that have minimal or no packaging to avoid the generation of excessive packaging waste</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
</tr>
<tr>
<td>▪ Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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</tr>
<tr>
<td>▪ All wastes will be segregated, collected and stored in appropriate containers, and removed from site at least once per week. The wastes shall be segregated into those for recycling, hazardous waste, and wastes for disposal with general household waste. Only register carriers will be used to remove wastes from the site, and the removed wastes shall be taken to the nearest appropriate facility that is registered to receive that type of waste</td>
<td>Contractor &amp; Nairobi City Council</td>
<td>Throughout construction period</td>
<td>10,000/month</td>
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<tr>
<td>▪ Sprinkle water on graded access routes as necessary to reduce dust generation by construction vehicles</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>10,000/month</td>
</tr>
<tr>
<td>▪ Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas. Switch off or keep vehicle engines at these points. Ensure vehicles are maintained in accordance with manufacturers’ requirements.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
<td>-</td>
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<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
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<td>5) <strong>Air pollution</strong></td>
<td>▪ Ensure proper planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done per vehicle or the number of vehicles on the road.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td>▪ Sensitize construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used. Ensure vehicles are maintained in accordance with manufacturers’ requirements.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td></td>
<td>Contractor</td>
<td>Throughout construction period</td>
</tr>
<tr>
<td>6) <strong>Noise Pollution</strong></td>
<td>▪ Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td></td>
<td>▪ Ensure that construction machinery are kept in good condition to reduce noise generation. This machinery should be maintained in accordance with manufacturers’ requirements.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td></td>
<td>▪ Ensure that all generators and heavy duty equipment are insulated or placed in enclosures to minimize ambient noise levels and maintained in accordance with manufacturers’ requirements.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td>7) <strong>Depletion of energy resources</strong></td>
<td>▪ Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<td></td>
<td>▪ Monitor energy use during construction and set targets for reduction of energy use.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
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<tr>
<td>8) Exploitation of water resources</td>
<td>▪ Promote recycling and reuse of water as much as possible. ▪ Organize collection of rainwater on site. Water will be tankered to site to reduce pressure on local resources.</td>
<td>Contractor</td>
<td>Throughout construction period</td>
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<tr>
<td>9) Accidents</td>
<td>▪ Ensure that provisions for reporting incidents, accidents and dangerous occurrences during construction using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO) are in place as required by OSHA 2007. ▪ Ensure that the premises are insured as per statutory requirements (third party and workman’s compensation) ▪ Develop, document and display prominently an appropriate SHE policy for construction works ▪ Provisions must be put in place for the formation of a Health and Safety Committee, in which the employer and the workers are represented</td>
<td>Contractor</td>
<td>Continuous</td>
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<td></td>
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<td>Proponent</td>
<td>Annually</td>
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<td></td>
<td></td>
<td>Contractor</td>
<td>One-off</td>
</tr>
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<td></td>
<td></td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>10) Hygiene</td>
<td>▪ Suitable, efficient, clean, well-lit and adequate gender specific sanitary conveniences should be provided for construction workers</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>11) Medical Examinations</td>
<td>▪ Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment.</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td>12) Machinery Safety</td>
<td>▪ Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>13) Injuries caused by machineries and equipments.</td>
<td>▪ Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>▪ All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury</td>
<td>Contractor</td>
<td>One-off</td>
</tr>
<tr>
<td></td>
<td>▪ Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>▪ Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>▪ Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that materials (cement bags, aggregates, bitumen drums) are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>▪ Conduct sensitization campaign for the public on risks related to construction sites. A safe system will be established encompassing use of warning signs, barricading the working areas and sensitizing the workers on occupational health and safety.</td>
<td>Contractor</td>
<td>Twice (before construction begins) and a repeated after 1 month.</td>
</tr>
<tr>
<td>14) Poor storage of materials</td>
<td>▪ Ensure that items are not stored STACKED against weak walls and partitions</td>
<td>Contractor</td>
<td>Continuous</td>
</tr>
</tbody>
</table>
## Objective/Plan

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>▪ All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained</td>
<td>Contractor</td>
<td>Continuous</td>
<td>–</td>
</tr>
<tr>
<td>15) Emergencies.</td>
<td>▪ Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency. Such procedures must be tested at regular intervals</td>
<td>Contractor</td>
<td>Every 3 months</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that adequate provisions are in place to immediately stop any operations where there is an imminent and serious danger to health and safety and to evacuate workers</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Provide measures to deal with emergencies and accidents including adequate first aid arrangements</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Sensitize the public on potential emergency situations</td>
<td>Contractor</td>
<td>Twice (before construction begins) and a repeated after 1 month.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Fire-fighting equipment such as fire extinguishers should be provided at strategic locations such as stores and construction areas.</td>
<td>Contractor</td>
<td>One-off</td>
<td>50,000</td>
</tr>
<tr>
<td>Objective/Plan</td>
<td>Recommended Mitigation Measures</td>
<td>Responsible Party</td>
<td>Monitoring Mechanism</td>
<td>Approximate Cost (Kshs)</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>16) Food and toxins.</td>
<td>▪ Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained</td>
<td>Contractor</td>
<td>Every 3 months</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>▪ Signs such as “NO SMOKING” must be prominently displayed within the premises, especially in parts where inflammable materials are stored</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Well stocked first aid box which is easily available and accessible should be provided within the premises</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that all chemicals used in construction are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, suppliers classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Keep a record of all hazardous chemicals used at the premises, cross-referenced to the appropriate chemical safety data sheets</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ There should be no eating or drinking in areas where chemicals are stored or used. Eating and drinking will only be in defined areas.</td>
<td>Contractor</td>
<td>Continuous</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>▪ Ensure that workers at the excavation sites and other dusty sites are adequately protected from inhalation of substantial quantities of dust through provision of suitable protective gear (e.g. nose masks)</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
</tbody>
</table>
### Objectives/Plan

<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Approximate Cost (Kshs)</th>
</tr>
</thead>
</table>
| **17) Provisions of PPE to Workers.** | - Provide workers in areas with elevated noise and vibration levels, with suitable ear protection equipment such as ear muffs.  
- Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc should be made available and construction personnel must be trained to use the equipment.  
- Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.  
- Provide and maintain adequate and suitable accommodation for clothing not worn during working hours for construction employees.  
- Provide and maintain, for the use of all workers whose work is done standing, suitable facilities for sitting sufficient to enable them to take advantage of any opportunities for resting which may occur in the course of their employment.  
- Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained in within the site. | Contractor | One-off | -                      |
|               | - All work places must be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance. | Contractor | Continuous | -                      |
|               | - Accumulations of dirt and refuse should be cleaned daily from the floors, benches, staircases and passages. | Contractor | Daily | -                      |
| **19) Insecurity** | - Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the Construction site. | Contractor | Continuous | -                      |
**Conduct sensitization campaign for the public on risks related to construction sites.**

**Contractor**

**Twice (before construction begins) and a repeated after 1 month.**

**HIV-AIDS Management**

**Awareness creation and sensitization to workers and other persons engaged in the project to reduce or eliminate chances of infections of HIV-AIDS and other sexually transmitted diseases**

**Contractor**

**Continuous**

Kshs. 2,500,000

**Management of complaints and/or grievances**

**Employ a grievance redress mechanism incorporating a negotiation and/or mediation team or party**

**Grievance Chairman/Committee (Stewarded by Resident Engineer)**

**Continuous**

-

**TOTAL ESMMP BUDGET**

Kshs. 3,092,000

**NB:**
For items with no budget assigned, the budget is coming from the construction budget and has been allowed for in the Bill of Quantities.

The key responsibilities regarding compliance to the above ESMMP rest on the Contractor. However, it is important that the project proponent ensures adequate monitoring and evaluation for the Contractor for no non-conformances.

**8.1.2 Operational Phase ESMMP**

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase the project are outlined below.
<table>
<thead>
<tr>
<th>Objective/Plan</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Monitoring Mechanism</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Storm Water Run-off Management ★ Provide proper storm water drainage from the paved roads during road construction. ★ Provide regular inspection and maintenance of the drains.</td>
<td>Contractor</td>
<td>One-off</td>
<td>Part of project costs</td>
<td>-</td>
</tr>
<tr>
<td>2) Health and Safety Risks. ★ Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project as stipulated in OSHA 2007</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3) Solid waste management ★ Implement measures to ensure adequate solid waste management in the park including putting wastes receptacles and disposal</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4) Access Road management ★ Implement a sustainable access road management plan after hand-over with clear structure of management</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5) HIV-AIDS Management ★ Awareness creation and sensitization to workers and other persons post-project to reduce or eliminate chances of infections of HIV-AIDS and other sexually transmitted diseases</td>
<td>County</td>
<td>Continuous</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
8.13 Decommissioning Phase

In addition to the mitigation measures provided above, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. The necessary objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the project are outlined in below.

Table 5: ESMMP for the Decommissioning Phase

<table>
<thead>
<tr>
<th>Environmental Impact</th>
<th>Recommended Mitigation Measures</th>
<th>Responsible Party</th>
<th>Time Frame</th>
<th>Cost (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold Waste Generation.</td>
<td>• All removed materials that will not be used for other purposes must be removed and recycled/reused as far as possible</td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>• Where recycling/reuse of the removed materials and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site or arrangements made with Kiambu County Government</td>
<td>Contractor</td>
<td>One-off</td>
<td>5,000</td>
</tr>
<tr>
<td>Degeneration of vegetation at the construction site</td>
<td><strong>Donate reusable demolition waste to charitable organizations, individuals and institutions</strong></td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------</td>
<td>--------</td>
<td>---</td>
</tr>
<tr>
<td><strong>Implement an appropriate re-vegetation program to restore the site to better status</strong></td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Consider use of indigenous plant species in re-vegetation</strong></td>
<td>Contractor</td>
<td>One-off</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent residential area and the development.</strong></td>
<td>Contractor</td>
<td>Once-off</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
8.2 Duties of the Proponent
It will be the duty of the proponent to ensure that all legal requirements as pertaining to the development are met as specified by the law, including World Bank Safeguards and specifically OP4.01 (Environmental Assessment).

- The proponent shall hand over the site to the Contractor for implementation of the project
- The proponent will fund the project
- The Proponent will acquire the NEMA license
- The proponent will the project and will also ensure its satisfactory implementation

- The proponent shall ensure that there is a functional stakeholder engagement plan and grievance redress mechanism.

8.3 Duties of the Contractor

- Prepare and maintain an approved time and progress work-chart, showing clearly the period allowed for each section of the work.
- The contractor is to comply with all regulations and by-laws of the local authority including serving of notices and paying of the fees.
- During the night, public holidays and any other time when no work is being carried out on-site, the contractor shall accommodate only security personnel and never should a labor camp be allowed onsite.
- The contractor shall make good at his own expense any damage he may cause to the public and private roads, drainages and pavements in the course of carrying out the road work.
- The proponent shall define the area of the site, which may be occupied by the contractor for use as storage, on the site
- The contractor shall include all recommendations from ESIA into the contract.
- The contractor shall provide at his own risk, and cost all water required for use in connection with the works including the work of subcontractors, and shall provide temporary storage tanks, if required
- The contractor shall make his own arrangements for sanitary conveniences for his workmen. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.
- The contractor shall be responsible for all the actions of the subcontractor in the first instance.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighboring properties and to the public
generally, and shall use proper precaution to ensure the safety of wheeled traffic and pedestrian.

- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or guests of the client and the neighbors must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 80dBA.
- No work should be undertaken outside of the normal working hours (e.g. 7am to 6pm).
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the Proponent. He shall also remove from the site all rubbish and dirt as it is produced to maintain the tidiness of the premises and its immediate environs.
- No blasting shall be permitted without the prior approval of the proponent and the local authorities.
- Borrow pits will only be allowed to be opened up on receipt of permission from the proponent
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards and/or current British codes of practice where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- The contractor shall maintain good working relationship with the community and implement the stakeholder engagement plan and the grievance redress mechanism
CHAPTER NINE: CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

The proposed project was linked with both positive and negative impacts. The positive impacts are highly rated and will benefit all stakeholders and the Kiambu County Government residents at large. These impacts include;

- **Creation of temporary employment opportunities**
  Several employment opportunities will be created for construction workers during the construction phase, operation and decommission phase of this project.

- **Provision of market for supply of construction materials**
  The project will require supply of large quantities of construction materials most of which will be sourced locally in the larger Limuru area and the surrounding areas. This provides ready market for construction material suppliers such as quarrying companies, hardware shops and individuals with such materials.

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

- **Revenue to national and local governments**
  Through payment of relevant taxes, rates and fees to the government and the local authority, the roads project will contribute towards the national and local revenue earnings from those using the improved facilities.

- **Rehabilitation**
  Upon decommissioning the project, rehabilitation of the project site will be carried out to restore the site to its original status.
  Other positive impacts that will be associated with this project include;
  - Improved access to the railway station
  - Improved pathways (NMT) for cycling and walking for pedestrians
  - Easier accessibility for all to different parts of Limuru in the locality
  - Improved drainage will reduce the flood damage and improve accessibility especially for pedestrian traffic and residents
Improved accessibility will spur physical development in the area leading to increased jobs for the urban poor

Improved lighting will increase trading hours for the businesses

Cleaner and orderly environment

Improved safety and security for all

On the other hand the proposed development was associated with negative impacts which can be mitigated, and have potentially short term low significant effects. These impacts include;

**Increased exploitation of raw materials**- Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered, Maximize sourcing of construction materials from suppliers who use environmentally friendly processes in their operations and Ensure that damage or loss of materials at the construction site are kept minimal through proper storage

**Excavations**- Ensure existing earth roads are excavated and the waste materials taken to licensed sites or re used

**Run off and soil erosion**- Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil, e.g. silt traps, barriers, tree planting, Ensure that construction vehicles are restricted to existing graded roads as much as possible to avoid soil compaction within the project site. Ensure that any compacted areas are ripped to reduce run-off.

**Solid waste generation**- Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed of. Reuse packaging materials such as cartons, cement bags and plastic containers to reduce waste at the site

Storm water- Ensure that proper drainage is provided and regularly maintained for storm-water runoff management.

**Dust concentration**- Sprinkle water on graded access routes each day to reduce dust generation by construction vehicles

**Noise and vibration**- Sensitize construction drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as residential areas and schools

**Grievances redness**- Employ a grievance redress mechanism incorporating a negotiation and/or mediation team or party

**Gender mainstreaming**- There will be a system to prevent sexual and gender based violence and adequate mechanisms in place to protect local vulnerable population
especially women and minors from risks associated with influx of workers (harassment, underage sex). There will also be a code of conduct established for Contractor employees and contract workers acknowledging a zero tolerance policy towards child labor and child sexual exploitation.

**HIV-AIDS Management** - Awareness creation and sensitization to workers and other persons engaged in the project to reduce or eliminate chances of infections of HIV-AIDS and other sexually transmitted diseases

**Emergencies preparedness and response access** - Ensure that adequate provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers

### 9.2 Recommendations

The project proponents have proposed to adhere to prudent implementation of the environmental management and monitoring plan. The contractor should be committed to obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. The proponent has proposed adequate safety and health mitigation measures as part of the relevant statutory requirements.

It is the duty of NEMA to consider licensing the project subject to annual environmental audits once it has been commissioned. This will be in compliance with the Environmental Management and Coordination Act, EMCA of 2015 and the Environmental Impact Assessment and Audit Regulations, Legal Notice No. 101 of 2003.
REFERENCES


Kenya gazette supplement Acts *Building Code 2000* by government printer, Nairobi

Kenya gazette supplement Acts *Land Planning Act (Cap. 303)* government printer, Nairobi

Kenya gazette supplement Acts *Local Authority Act (Cap. 265)* government printer, Nairobi

Kenya gazette supplement Acts *Physical Planning Act, 1999* government printer, Nairobi

Kenya gazette supplement Acts *Public Health Act (Cap. 242)* government printer,


The Environmental Management & Coordination Act 1999 (EMCA 1999).
Environmental and Social Impact Assessment Report for the Proposed Rehabilitation of roads within Limuru CBD-Old Nakuru Road-2.4Km in Kiambu County in the Nairobi Metropolitan Region

Annexure

- Sample Chance Find Procedures
- Plate of Selected Photographs
- Public Participation & Consultation Documents
  - Attendance Sheets
  - Questionnaires
  - Minutes of Meetings
- Grievance Redress Mechanisms
- Location Map
Annex A. Sample Chance Find Procedures

Chance find procedures are an integral part of the project EMMP and civil works contracts. The following is proposed in this regard:

If the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Ministry of State for National Heritage and Culture take over;
- Notify the supervisor, Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Ministry of State for National Heritage and Culture immediately (within 24 hours or less);

Responsible local authorities and the Ministry of State for National Heritage and Culture would then be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the National Museums of Kenya. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, namely the aesthetic, historic, scientific or research, social and economic values.

Decisions on how to handle the find shall be taken by the responsible authorities and the Ministry of State for National Heritage and Culture. This could include changes in the layout (such as when finding irremovable remains of cultural or archeological importance) conservation, preservation, restoration and salvage.

Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities.

Construction work may resume only after permission is given from the responsible local authorities or the Ministry of State for National Heritage and Culture concerning safeguard of the heritage.
Annex B. Plate of Selected Photographs

<table>
<thead>
<tr>
<th>Public participation</th>
<th>Old Nakuru Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles of the old Nakuru road</td>
<td>Cattle grazing along the old Nakuru Road</td>
</tr>
</tbody>
</table>
Annex C: Public Participation & Consultation Documents

Attendance sheets and questionnaires will be attached to the final hard copy

MINUTES OF THE PUBLIC PARTICIPATION MEETING HELD AT Old NAKURU ROAD ON 14TH NOVEMBER 2016

ATTENDANCE LIST
As in the attendance sheet.
Eng. Stephen Mwaura called the meeting to order at 2:50pm and it was opened with a word of prayer from one of the residents.

Agenda
1. Introductions
2. Matters arising
3. Questions
4. AOB

Minute 1.
Eng Mwaura introduced to all about the project, NaMSIP (Nairobi Metropolitan Services Improvement Project).
  o Namsip deals with five counties which includes; Machakos, Kajiado, Murang’a, Kiambu and Nairobi City County.
  o Namsip is funded by the World Bank to deal with infrastructure improvement i.e. markets upgrading, sewerage, water facilities and roads.
  o Namsip identified this road to provide easier accessibility to and from Limuru.
  o Namsip conducts public participation forums for every project it handles to establish how the project affects the residents positively and negatively.

Minute 2.
Residents living along the project area and Limuru town in general read the questionnaire and filled in the details as required and Eng. Mwaura took them through(translated the questions to Swahili).

Minute 3.
The ESIA consultations included disclosure of the design and project status that was done by the appointed Resident Engineer (RE). The surrounding community raised
some issues concerning the project. The issues that were raised by each group of stakeholders included:
  o **Owners / operators of shops along the road**
  **Issue**: What about dust during project construction?
  **Response**: There would be dust management during implementation and this was affirmed.
  o **Political leaders / their representatives**
  **Issue**: How long the project would take once it starts and if it can be extended to include further length and scope.
  **Response**: The project would start as soon as it complies with the requirements on environmental and social issues and after the contractor is awarded the work. The project budget would limit it extending further to include further scope.
  o **Drivers / Motorists**
  **Issue**: What is the project period?
  **Response**: 6 months
  o **Pedestrians**
  **Issue**: Whether the contractor would engage local staff for casual work
  **Response**: Yes
  o **Shop owners**
  **Issue**: Whether their business would be affected by the rehabilitation
  **Response**: A full survey is to be carried out to indicate the beacons of the road corridor before work commences. The road corridor is wide enough and it is unlikely any businesses will be affected.

**Minute 4, AOB**
Having no other business the meeting was ended by Eng. Mwaura with the residents giving back the filled up forms.
Annex D: Grievance Redress Mechanisms

Grievance Resolution Mechanism

1. Steps in dealing with grievances
   1.1. Complaint received in writing from affected person
   1.2. Recording of grievance in standard form
   1.3. Reconnaissance site visit with the complainant.
   1.4. Submission of detailed complaint to Resident Engineer for resolution by negotiation.
   1.5. Submission of detailed complaint to the Grievance Committee for resolution by mediation.
   1.6. Submission of complaint to NaMSIP for resolution.

2. Composition of grievance committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Organization</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Eng. Allan Nyagah</td>
<td>Resident Engineer</td>
<td>Nairobi City County</td>
<td>Committee Secretary</td>
</tr>
<tr>
<td>2</td>
<td>Assistant Resident Engineer</td>
<td></td>
<td>Committee Assistant Secretary</td>
</tr>
<tr>
<td>3 Martin Sauka</td>
<td>Site Administrator</td>
<td>Contractor - Njuka</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Community Member</td>
<td>Local communities</td>
<td>Community Representative</td>
</tr>
<tr>
<td>7</td>
<td>Business Member</td>
<td>Business members</td>
<td>Business Representative</td>
</tr>
</tbody>
</table>
GRIEVANCE RESOLUTION PROCEDURE

1. Recording of grievance in standard forms
2. Receipt of
3. Reconnaissance site visit
4. Can the grievance be resolved by the Resident Engineer’s office?
   - Yes – 3 days
   - No
5. Can the grievance be resolved by Grievance Committee?
   - Yes – 5 days
   - No
6. Submission of grievance to NaMSIP for resolution.
7. Grievance resolved
8. STORAGE OF ALL GRIEVANCE RELATED DOCUMENTS

Yes
Annex E: Location Map